



GLOBAL ENVIRONMENT FACILITY  
INVESTING IN OUR PLANET

**Naoko Ishii**  
CEO and Chairperson

April 25, 2018

Dear Council Member:

UNEP as the Implementing Agency for the project entitled: ***Regional (Antigua And Barbuda, Barbados, Dominica, Grenada, St. Kitts And Nevis, St. Lucia, St. Vincent and Grenadines): Preventing COSTS of Invasive Alien Species (IAS) in Barbados and the OECS Countries***, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with UNEP procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by Council in June 2016 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by UNEP satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at [www.TheGEF.org](http://www.TheGEF.org). If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

for Naoko Ishii  
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document  
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee



# GEF-6 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF TRUST FUND

For more information about GEF, visit [TheGEF.org](http://TheGEF.org)

## PART I: PROJECT INFORMATION

Project Title: Preventing COSTS of Invasive Alien Species (IAS) in Barbados and the OECS Countries			
Country(ies):	Antigua and Barbuda, Barbados, St. Kitts and Nevis, and Regional (Commonwealth of Dominica, Grenada, St. Lucia, St. Vincent and the Grenadines)	GEF Project ID: <sup>1</sup>	9408
GEF Agency(ies):	UN Environment	GEF Agency Project ID:	01404
Other Executing Partner(s):	Antigua and Barbuda Ministry of Health and the Environment; Barbados Ministry of Agriculture, Food Fisheries and Water Resource Management; St. Kitts and Nevis Ministry of Sustainable Development; and CABI	Submission Date:	April 17, 2018
GEF Focal Area (s):	BD	Project Duration (Months)	36
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP <input type="checkbox"/>	
Name of Parent Program	[if applicable]	Agency Fee (\$)	356,055

## A. FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES<sup>2</sup>

Focal Area Objectives/Programs	Focal Area Outcomes	Trust Fund	(in \$)	
			GEF Project Financing	Co-financing
BD-2 Program 4	Outcome 4.1 Improved management frameworks to prevent, control, and manage invasive alien species (IAS)	GETTF	3,747,945	6,656,477
<b>Total project costs</b>			3,747,945	6,656,477

## B. PROJECT DESCRIPTION SUMMARY

<b>Project Objective:</b> Prevention, early detection, control and management frameworks for invasive alien species (IAS) that emphasize a risk management approach by focusing on the highest risk invasion pathways of Barbados and OECS countries.						
Project Components / Programs	Financing Type <sup>3</sup>	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Confirmed Co-financing
Component 1: IAS Policy, Institutions and Capacity (Antigua and Barbuda; Barbados; St. Kitts and Nevis)	STA	1.1 Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems	1.1 (3) Critical Situational Analyses completed  1.2 (3) National Invasive Species Strategies and Action Plans (NISSAPs) developed to address risks and promote cross sectoral collaboration in 3 countries  1.3 (3) Legal frameworks for IAS developed or upgraded in 3 countries (regulatory guidance, protocols, codes of conduct)  1.4 (3) Awareness and capacity building programs developed & implemented (internalizing IAS threats, impacts, and new controls and regulations)  1.5 (3) National cost recovery financial mechanisms designed and implemented	GEFTF	1,505,457	2,747,707

<sup>1</sup> Project ID number remains the same as the assigned PIF number.

<sup>2</sup> When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#) and [CBIT programming directions](#).

<sup>3</sup> Financing type can be either investment or technical assistance.

Component 2: Control and Management of IAS Impacts	STA	2.1 Eradication and/or improved control of IAS impacting global biodiversity significance, thereby reducing threats to key species	<p><b>2.1 A) Antigua &amp; Barbuda Pilot</b> 2.1a1 <i>Eradication</i> of IAS on Green Island, Smith Island and Maiden Island. Establishment of new and improved biosecurity mechanisms on Redonda and other critical offshore islands. 2.1a2 Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands</p> <p><b>2.1 B) Barbados Pilot</b> 2.1b1 Biosecure site(s) for threatened native reptiles established. 2.1b2 Monitoring program on effectiveness of control of invasive alien plant species in support of the Integrated Gully System Management Plan. 2.1b3 Rat and mongoose control at selected hawksbill turtle (<i>Eretmochelys imbricata</i>) nesting beaches. 2.1b4 Lionfish assessment and management project in place at high biodiversity value reef sites</p> <p><b>2.1 C) St. Kitts and Nevis Pilot</b> 2.1c1 Management plan developed for the sustained control and management of the monkey (<i>Chlorocebus aethiops</i>) populations in protected areas.</p>	GEFTF	1,032,929	2,270,770
Component 3: Regional Biosecurity	STA	<p>3.1 Increased collaboration among Caribbean states to tackle IAS</p> <p>3.2 Enhanced regional IAS management through early warning system, response measures and capacity building</p>	<p><u>3.1-Regional cooperation</u> 3.1.1 Regional strategy for prevention and surveillance at ports of entry (i.e. customs) developed and Regional IAS Working Group established 3.1.2 Database established for interceptions at ports 3.1.3 A Strategic Plan for the Regional Financing System for shared IAS developed.</p> <p><u>3.2-Enhanced regional management of IAS</u> 3.2.1 Regional technical capacity developed to conduct risk assessment and measure economic impact of IAS 3.2.2 CIAS.NET strengthened as a learning network for IAS 3.2.3 Regional App or ID IAS risk cards for prioritized species that can affect important biodiversity, agriculture, and human health developed for ports of entry.</p>	GEFTF	768,530	1,071,000
Subtotal					3,306,916	6,089,477
Monitoring and Evaluation					265,000	315,000
Project Management Cost (PMC) <sup>4</sup>					176,029	252,000
<b>Total project costs</b>					<b>3,747,945</b>	<b>6,656,477</b>

### C. CONFIRMED SOURCES OF [CO-FINANCING](#) FOR THE PROJECT BY NAME AND BY TYPE

Please include evidence for [co-financing](#) for the project with this form.

<sup>4</sup> For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount US (\$)
Antigua and Barbuda	Plant Protection Department of Agriculture	In Kind	500,000
	Department of Environment	In Kind	500,000
	Antigua and Barbuda Defence Force	In Kind	90,000
	Environmental Awareness Group	In Kind	75,000
	National Parks Authority	In Kind	20,000
		<b>Sub total</b>	<b>1,185,000</b>
Barbados	Ministry of the Environment	In Kind	1,202,112
		Cash	30,000
	Ministry of Agriculture	In Kind	126,300
	Ministry of Health	In Kind	360,000
	Coastal Zone Management Unit	In Kind	9,000
		<b>Sub total</b>	<b>1,727,412</b>
Dominica	Ministry of Agriculture	In Kind	Hurricane devastation made it impossible to receive the letter at this stage. During inception meeting efforts will be done to obtain the letter.
Grenada	Ministry of Agriculture	In Kind	<b>105,000</b>
St. Kitts and Nevis	Ministry of Agriculture	In Kind	<b>727,602</b>
St. Lucia	Ministry of Agriculture	In Kind	300,000
	Ministry of Sustainable Development	In Kind	262,362
		<b>Sub Total</b>	<b>562,362</b>
St. Vincent and the Grenadines	Ministry of Agriculture	In Kind	<b>301,101</b>
NGO	CAB International	In Kind	<b>300,000</b>
NGO	Flora and Fauna International	Cash	240,000
		In Kind	260,000
		<b>Sub Total</b>	<b>500,000</b>
International organization	United Nations Environment Programme	In Kind	<b>100,000</b>
Bi-Lateral	USDA APHIS	Cash	213,000
		In Kind	380,000
		<b>Sub Total</b>	<b>593,000</b>
NGO	CCN	In Kind	<b>300,000</b>
Non-Governmental organization	FAO	In Kind	<b>255,000</b>
<b>TOTAL</b>			<b>6,656,477</b>

**D. TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES), FOCAL AREA AND THE PROGRAMMING OF FUNDS**

GEF Agency	Trust Fund	Country Name/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee <sup>a)</sup> (b) <sup>2</sup>	Total (c)=a+b
UNEP	GEFTF	Antigua and Barbuda	Biodiversity	BD	885,845	84,155	970,000
UNEP	GEFTF	Barbados	Biodiversity	BD	1,114,155	105,845	1,220,000
UNEP	GEFTF	St. Kitts and Nevis	Biodiversity	BD	620,091	58,909	679,000
UNEP	GEFTF	Regional/Global	Biodiversity	Set aside	1,127,854	107,146	1,235,000
<b>Total Grant Resources</b>					<b>3,747,945</b>	<b>356,055</b>	<b>4,104,000</b>

a) Refer to the Fee Policy for GEF Partner Agencies

## E. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS<sup>5</sup>

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	Antigua and Barbuda: 44,000 ha Barbados: 43,100 ha St. Kitts and Nevis: 26,100 ha <b>Total: 113,200 ha</b>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries: 7</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries: 7</i>

## F. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? NO

(If non-grant instruments are used, provide an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/CBIT Trust Fund) in Annex D.

## PART II: PROJECT JUSTIFICATION

### A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF<sup>6</sup>

Note: No Changes were made to the wording of the Components or Outcomes, with the exception of Outcome 2.1 (explained below). All other changes were made at the Output or Activity level, including a reduction in the number of Outputs in response to comment 16 in the STAP Review.

PIF Elements & Text	CEO ER Elements	Explanation of Changes
<b>Component 1: IAS Policy, Institutions and Capacity (Antigua and Barbuda; Barbados; St. Kitts and Nevis)</b>	<b>Component 1: IAS Policy, Institutions and Capacity (Antigua and Barbuda; Barbados; St. Kitts and Nevis)</b>	No changes
<b>Outcome:</b> Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems	<b>Outcome 1.1:</b> Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems	No changes
<ul style="list-style-type: none"> <li>3 Critical Situational Analyses [Risks for various pathways assessed and recommended measures implemented to minimize economic Impacts of IAS across productive sectors and human well being and minimizing loss of native biodiversity and environmental services]</li> </ul>	Output 1.1 (3) Critical Situational Analyses completed	<ul style="list-style-type: none"> <li>Output wording simplified.</li> <li>Focus of CSAs changed to make them broader from “identification of the most important pathways of introduction” to also include assessing legislation, policies and compliance with MEAs, stakeholder roles and capacities, and past efforts. These changes were made based on issues raised during national and regional consultations, which included country missions and a regional consultation workshop during the PPG phase, as well as a regional workshop on IAS coordinated by the CBD Secretariat in September 2017 in Jamaica. One area of</li> </ul>

<sup>5</sup> Update the applicable indicators provided at PIF stage. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period.

<sup>6</sup> For questions A.1 –A.7 in Part II, if there are no changes since PIF, no need to respond, please enter “NA” after the respective question.

PIF Elements & Text	CEO ER Elements	Explanation of Changes
		widespread concern and agreement was that all previous attempts to develop model legislation have failed, but also that with the emerging context of free movement of goods in the OECS (that should have started in 2017), it is much more possible that national IAS legislation will be approved. For this reason, it was agreed the timing is good for this regional project to support new IAS legislation. The CSA will speak to this likelihood and recommend the key persons and agencies to be engaged with to ensure that the any legislation drafted is enacted and implemented post-project.
<ul style="list-style-type: none"> <li>• 3 National Invasive Species Strategies</li> <li>• Cross sectoral arrangements agreed and institutionalized in 3 countries</li> </ul>	Output 1.2 (3) National Invasive Species Strategies and Action Plans (NISSAPs) developed to address risks and promote cross sectoral collaboration in 3 countries	<ul style="list-style-type: none"> <li>• Two PIF outputs combined into new output, which includes creation of a NISSAP for each country and the establishment of cross-sectoral working groups in each country.</li> <li>• However, the focus of the NISSAPs in the PIF has been changed to make them broader than “National Invasive Species Strategies established, which prioritize habitats and species to be protected” to also address risks and to promote cross-sectoral collaboration. This change is needed in order to focus resources, efforts and the content of the NISSAPs to addressing the greatest threats to IAS in these SIDs, especially in the context of ensuring sustainability post project.</li> </ul>
<ul style="list-style-type: none"> <li>• Development and or upgrading of legal frameworks relating to IAS in 3 countries</li> <li>• Regulatory guidance and protocols established and implemented for high risk pathways and species (regional, tailored for national)</li> <li>• Procedures, codes of conduct, incentives system developed. Methodologies for prevention and learning formalized</li> </ul>	Output 1.3 (3) Legal frameworks for IAS developed or upgraded in 3 countries (regulatory guidance, protocols, codes of conduct).	<ul style="list-style-type: none"> <li>• Three PIF outputs combined into new output for clarity and simplicity.</li> <li>• The level of detail on development / upgrading of legal / regulatory frameworks has been reduced. The level of detail on development / upgrading of legal / regulatory frameworks will be guided by the CSA. If buy-in and a firm commitment from the attorneys’ general department in the three counties can obtained, the project will proceed</li> </ul>
<ul style="list-style-type: none"> <li>• Public and private sectors awareness and capacity building programs developed and rolled out- internalizing IAS threats, impacts, and new controls and regulations</li> </ul>	Output 1.4 (3) Awareness and capacity building programs developed & implemented (internalizing IAS threats, impacts, and new controls and regulations)	<ul style="list-style-type: none"> <li>• Wording of Output changed slightly to improve clarity</li> <li>• Some activities listed in PIF have been combined with others to streamline the work flow</li> </ul>
<ul style="list-style-type: none"> <li>• National cost recovery financial mechanisms designed and implemented</li> </ul>	Output 1.5 (3) Support to the design and implementation of National cost recovery financial mechanisms	<ul style="list-style-type: none"> <li>• Wording of Output changed slightly to improve clarity</li> </ul>
<b>Component 2: Control and Management of IAS Impacts</b>	<b>Component 2: Control and Management of IAS Impacts</b>	No changes
<b>Outcome:</b> Eradication and/or improved control management of IAS impacting global biodiversity for at least 2-3 sites of global biodiversity significance, reducing threats to key species	<b>Outcome 2.1:</b> Eradication and/or improved control of IAS impacting globally significant biodiversity, thereby reducing threats to key species	<ul style="list-style-type: none"> <li>• The word management was removed as it is redundant in this context</li> <li>• Eradication of rats will take place in 3-4 offshore islands in Antigua only. Other pilot sites will pilot improved control strategies. Therefore, the specification of 2-3 sites was</li> </ul>



PIF Elements & Text	CEO ER Elements	Explanation of Changes
		removed
<u>21a – Antigua and Barbuda</u>	Output 2.1a – Antigua and Barbuda Pilot	No change
<u>Antigua:</u> Eradication of IAS on Redonda Island	2.1.a1 Eradication of IAS on Redonda Island, Green Island, Smith Island and Maiden Island. Establishment of new and improved biosecurity mechanisms on Redonda and other critical offshore islands	The output has been revised to show that eradication of selected species will take place on 4 islands
<u>Antigua:</u> Establishment of new and improve biosecurity mechanisms on Redonda and other critical offshore islands	2.1.a2 Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands	The output has been revised to improve clarity. The biosecurity plan will be implemented in 16 islands including, the 4 islands that will be cleared of rats, to ensure that no islands are reinvaded.
<u>21b - Barbados</u>	Output 2.1b – Barbados Pilot	No change
<u>Barbados:</u> Establishment of a biosecure site(s) for threatened native reptiles	2.1b1 Biosecure site(s) for threatened native reptiles established	<ul style="list-style-type: none"> <li>• Wording slightly revised to reflect an output rather than an activity</li> <li>• Activities have not changed</li> </ul>
<u>Barbados:</u> Development and implementation of a long term monitoring program on effectiveness of control of invasive alien plant species in support of the Integrated Gully System Management Plan.	2.1b2 Monitoring program on effectiveness of control of invasive alien plant species in place and supporting implementation of the Integrated Gully System Management Plan	<ul style="list-style-type: none"> <li>• Wording slightly revised to reflect an output rather than an activity</li> <li>• Activities have not changed</li> </ul>
<u>Barbados:</u> Rat and mongoose control at selected hawksbill turtle ( <i>Eretmochelys imbricata</i> ) nesting beaches.	2.1b3 Rat and mongoose control program in place at selected hawksbill turtle ( <i>Eretmochelys imbricata</i> ) nesting beaches	<ul style="list-style-type: none"> <li>• Wording slightly revised to reflect an output rather than an activity</li> <li>• Activities have not changed</li> </ul>
<u>Barbados:</u> Lionfish assessment and management project at high biodiversity value reef sites	2.1b4 Lionfish assessment and management project in place at high biodiversity value reef sites	<ul style="list-style-type: none"> <li>• Wording slightly revised to reflect an output rather than an activity</li> <li>• Activities have not changed</li> </ul>
	Output 2.1c - St. Kitts and Nevis Pilot	New Output. This output was included based on two issues: 1) STAP requested more work on the ground, which has been achieved by the inclusion of St Kitts and Nevis in Component 2; and 2) the country itself (St. Kitts and Nevis) requested this change, which was discussed at the regional PPG meetings, in view of the fact that preliminary data emerged during the PPG that identifies the Vervet monkey as a species with a significant negative impact on plant groups such as bromeliads and native orchids. There also seems to be a correlation of Vervet monkey and higher incidence of black rats in three national parks. The GEF focal point and other stakeholders made a strong plea for a management plan to be developed under this project.
	2.1c1 Management plan developed for the sustained control and management of the monkey ( <i>Chlorocebus aethiops</i> ) populations in protected areas.	
<b>Component 3: Regional Biosecurity</b>	<b>Component 3: Regional Biosecurity</b>	No changes
<b>Outcome:</b> Increased collaboration among Caribbean states to tackle IAS	<b>Outcome 3.1:</b> Increased collaboration among Caribbean states to tackle IAS	No changes

PIF Elements & Text	CEO ER Elements	Explanation of Changes
<u>A. Strategy and Coordination:</u>	Output 3.1- Regional cooperation	Output wording revised to better explain project approach
Review of ports of entry to identify gaps in surveillance activities and develop an action plan for upgrading infrastructure; human capacity and adopting international best practices. Regional strategy for prevention and surveillance at ports of entry (i.e. customs). Biosecurity Needs Assessment	3.1.1 Regional strategy for prevention and surveillance at ports of entry (i.e. customs) developed and Regional IAS Working Group established	<ul style="list-style-type: none"> <li>Two PIF outputs combined into a new refocused output, where some activities will now be done as part of the CSA under component one. The regional and national activities are now more harmonized than was the case in the PIF</li> <li>Output wording simplified</li> </ul>
Further uptake of existing Regional IAS Strategy, and Regional IAS Working Groups.		
Established and enhanced sub regional coordinating mechanism to enhance early detection and rapid response with emphasis at high priority pathway entry points.	3.1.2 Database established for interceptions at ports	The wording of this Output has been changed. The database will be the tool to support the enhancing of regional coordinating mechanism. The benefit of this tool, which is more likely to be used, is that it is less sensitive to impacting the trade of the country that shares the information.
Develop options for the Regional Financing System for shared IAS.	3.1.3 A Strategic Plan for the Regional Financing System for shared IAS developed	Output reworded to represent a concrete output rather than an activity
<u>B. Capacity Building and Awareness</u>	Outcome 3.2 Enhanced regional IAS management through early warning system, response measures and capacity building	Outcome wording revised to better explain project approach
	Output 3.2-Enhanced regional management of IAS	Output wording revised to better explain project approach
National capacity building program delivered in the sub region to conduct risk assessment and measure economic impact of IAS. Regional training modules (Train the Trainers) for port/s staff in identifying, capture and possible destruction of IAS when intercepted at the port.	3.2.1 Regional technical capacity developed to conduct risk assessment and measure economic impact of IAS	Wording of activity simplified
Learning Network, CIASNET further integrates and strengthens Barbados & OECS country learning through regional e-learning modules	3.2.2 CIAS.NET strengthened as a learning network for IAS	Three activities from PIF combined into single activity, which has been reworded for clarity
Awareness module developed and delivered for personnel engaged in surveillance to the open sources of data for identifying IAS.		
Sub-Regional data exchange for monitoring systematized in a long-term sustainable platform. Database of regional expertise established in a sustainable platform and database of IAS in the region		
Regional App or ID IAS risk cards for prioritized species that can affect important biodiversity, agriculture, and human health developed for ports of	3.2.3 Regional App or ID IAS risk cards for prioritized species that can affect important biodiversity, agriculture, and human health	Two activities from PIF combined into single activity



PIF Elements & Text	CEO ER Elements	Explanation of Changes
entry	developed for ports of entry.	
Regional IAS ID Guide which to include information on impacts and management		
Co-finance USD 6,627,412	Co-finance USD 6,551,477	There is a difference in co-finance of USD 75,935. This is due to the fact that Caribbean countries have been affected by hurricanes recently and it has been difficult to get the letters. However, it is expected that by inception all letters will be received and the total co-finance for the project could be even bigger than the amount indicated at PIF stage.

## A.1. Project Description

### A.1.1 The global environmental and/or adaptation problems, root causes and barriers that need to be addressed

#### *Threats*

The unique biodiversity of the Caribbean is under threat from IAS which is being introduced at an increase rate through trade, transport, travel and tourism. These risks are being exacerbated whether deliberate or accidental as a consequence of increased international economic and cultural links in such diverse areas as agriculture, aquaculture, transport and trade (commodities, pet and aquaria trade, as well as accidental introductions in containers and on wood packaging); tourism including ecotourism, yacht and cruise ship traffic, and fully grown ornamental plants for landscaping of hotels and resorts; and industrial developments including the movement of used industrial plant; equipment and aggregate material.

IAS introduced in Barbados and the OECS are likely to spread to other countries as well and the wider Caribbean within a relatively short space of time especially now as a result of more severe hurricanes and other extreme climate events exacerbated by climate change. The introduction, establishment and spread of IAS pose a severe threat to biodiversity in particular native and endemic biodiversity in the OECS countries. In addition, IAS continues to pose a threat to several important economic sectors in these islands resulting in severe disruptions of livelihoods of persons engaged in: agriculture (both crops and livestock); fisheries; forestry; and tourism. IAS also results in negative social and health impacts. Although precise figures on the financial costs of IAS regionally are not available, the Commonwealth of Dominica estimates for instance that management of the Giant African Snail is costing upwards of \$500,000/year, and that of citrus aphids is costing the economy \$1million a year. Black Sigatoka has cost \$1.2 million thus far. The Chytrid fungus has wiped out over 80% of the Mountain Chicken, the native frog species of Dominica. In many cases, the impact of IAS has not been quantified (e.g., the Cuban tree frog) and is based primarily on casual observations.

The following factors and root causes predispose the countries and the region to IAS:

There are several intrinsic factors that predispose this region to IAS. Many of these cannot be changed but systems and policies can be factored in to ensure that their effects are minimized. Global connectivity especially the marine environment makes the region vulnerable. This connectivity is increasing with the expansion of the Panama Canal and the inauguration of the international airport in St. Vincent and development plans for marinas in other OECS countries. The region has a naturally high vulnerability to IAS due to geophysical and ecological complexities. Small islands with high border to land ratio, steep hilly terrain that is often inaccessible makes it a haven for invaders. There is lack of awareness and data to influence IAS relevant policy especially among national resource allocators like the ministries of finance. Lack of coordination at the national level is both a cause and an effect of weak policy frameworks to address IAS. There is limited capacity and effective tools to prevent, control and manage IAS especially in a reactive context. There is insufficient collaboration among Caribbean states to tackle IAS. However, there are attempts to change this that this project can build on.

#### *Root causes*

Global connectivity especially the marine environment makes the region vulnerable: The area of ocean encompassing the islands of the Caribbean, excluding Bermuda, is nearly 5 million km<sup>2</sup>. The total area of land is

approximately 240,000 km², a ratio of sea: land of about 20:1(5). This large ratio of water to land and the presence of many landing sites on the extensive coastline make it very demanding to conduct effective inspection and surveillance activities to prevent the introduction of IAS from entering and spreading within the Caribbean.

High vulnerability to IAS due to geophysical and ecological complexities: Marine environments present particularly challenging conditions for the control of bio-invasions. The absence of clear borders in the marine environment severely limits management options. Detection of IAS, particularly at low densities, is difficult. Species spread in a three-dimensional fluid system, where monitoring is a difficult and costly task. Moreover, many eradication and control options (e.g. clearance, shooting, pesticides, herbicides, biological control etc.) that are used in terrestrial biota are harder to apply in the aquatic systems.

Other aspects of these geophysical and ecological complexities include the relatively low buffer capacity of small islands to severe environmental fluctuations and events. Species often become concentrated in small and fragmented areas. At these marginal breeding sites, they are subject to various natural and anthropogenic pressures that endanger their survival. Species that have evolved on islands have done so free from competition with large numbers of other species and therefore lack adequate defences and are susceptible to invasions by alien species. Some endangered species have below critical mass breeding populations. Their interchange is further restricted by habitat fragmentation.

This high rate of endemism on such a vulnerable, small and fragile habitat is of serious concern. As is the case of off shore islands in Barbados and the OECS. This sub region is also a nesting site for sea turtles, migratory terns and white sea urchins and is both a marine reserve and a bird sanctuary. It is extremely vulnerable to IAS, arriving via natural pathways and/or human activity, such as avian influenza and rats, respectively.

Barrier Analysis

The project aims to remove the following key barriers that affect the effective prevention, control and management of IAS

Numerous pathways for introducing IAS (to be addressed by components one and three):

There are numerous pathways for IAS introduction into and within the participating countries, and although this reality is widely understood and acknowledged, to date inadequate bio-security measures have been adopted. These pathways are linked to the “four Ts” -- Trade, Travel, Transportation and Tourism. A seminal study that examined the pathways for the introduction of pests that can affect plants in the wider Caribbean (Meissner, Lemay, Bertone, & Ferguson, January 9, 2009) identified nine pathways in which IAS are introduced into an island and then within and among islands. These pathways with their associated levels of risk are summarized in Table 4 below:

**Table 4: Pathways and Risk Rating for IAS**

<b>Very High Risk</b> Human Movement Wood Packaging Material Forestry Related Pathways Propagative Material Hitch-hikers	<b>Medium Risk</b> Airline Passenger Baggage Natural Spread Mail	<b>No Rating</b> Maritime trade
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Among the significant tourism, air sea and land transport pathways for the introduction of IAS are the aquaria and pet trade, ballast water (which is now governed by an international treaty), and the movement of used vehicles and tyres. The Caribbean Tourism Organisation (2016) reported that the wider Caribbean received 28.7 million visitors in 2015. This high level of visitor arrivals is an important pathway for the introduction of new IAS into the Caribbean, as demonstrated with the experience with the Pink Hibiscus Mealy Bug in the 1990s and the recent spread of the Red Palm Mite. Once an IAS enters an island in the Caribbean region, it is typically only a matter of time before it spreads to the other islands. It is a natural tendency for persons to take their favourite fruits and vegetables with them when they travel. These may not in themselves be invasive but may carry along with them spores or seeds of other invasive species that are inadvertently introduced. As can be seen in the following table, the number of visitors to Barbados

and OECS countries is extremely high, in many cases outnumbering the number of residents on the islands, and severely straining the capacity of the limited staff to do proper surveillance.

Table 5: Cruise ship arrivals for 2015 and 2014 for participating countries

Country	Period	2015	2014	% Change
<b>Antigua and Barbuda</b>	Jan-Mar	320,401	270,262	18.6
<b>Barbados</b>	Jan-Mar	217,139	231,144	-1.3
<b>Dominica</b>	Jan-Mar	177,479	189,400	-6.3
<b>Grenada</b>	Jan-May	133,072	125,461	6.1
<b>St. Lucia</b>	Jan-June	399,746	364,278	9.8
<b>St. Vincent and the Grenadines</b>	Jan-April	52,219	54,853	-4.8

Table 6: Tourist arrivals for 2015 and 2014 for participating countries

Country	Period	Tourist Arrivals	% Change		
			overall	Winter #	Summer #
<b>Antigua and Barbuda</b>	Jan-Mar	36,300	3.3	4.3	-1.6
<b>Barbados</b>	Jan-Feb	171,299	15.3	15.3	-
<b>Dominica</b>	Jan-May	33,332	-1.3	-4.8	14.1
<b>Grenada</b>	Jan-Mar	38,000	4.7	4.2	-
<b>St. Lucia</b>	Jan-June	185,424	5.3	5.2	5.8
<b>St. Vincent and the Grenadines</b>	Jan-April	25,927	-0.1	-0.1	-

Source: (Caribbean Tourism Association, 2016)

Insufficient scientific data and information on economic impacts of IAS (to be addressed by components two and three):

Insufficient scientific data is directly related to the limited resources and capacity directed to the inspection, surveillance, identification and research of IAS at the national level in the Caribbean. At the international level there are many organisations dealing with IAS, which host databases and websites for information management, undertake public awareness, and facilitate regional and international collaboration to address IAS issues. However, little scientific data and information are submitted to these sources by OECS countries as a result of the limited work being done at the country level. Many regional and international organisations such as The Inter-American Institute for Cooperation on Agriculture (IICA), The Food and Agriculture Organization (FAO), CABI trading as CAB International, and the Caribbean Plant Health Directors Forum among others have attempted to document and disseminate information on IAS over the years. The reality is there is still insufficient scientific information on the impact that IAS are having in the Caribbean in general, and Barbados and the OECS in particular. More importantly, information of the impact of IAS on biodiversity is lacking, and as a consequence information to guide management options for the control of IAS is highly limited (with the exception of IAS that have a significant economic impact, such as the Pink Hibiscus Mealy Bug, and even then funding only becomes available after the IAS is well established).

The lack of updated and accurate information on IAS and their impacts on national economies and livelihoods is an impediment to convincing national governments to allocate sufficient resources and funds to IAS management. As in most countries, in the Caribbean the government ministries and departments that are responsible for managing IAS, such as the Ministries of Agriculture, Fisheries and the Environment, depend on budgetary allocations from the Finance ministries, but in the absence of concrete data on IAS impacts, they are typically unable to convince financial authorities to provide the financial resources necessary to manage IAS, or even to implement basic prevention programs.

Narrow agricultural focus of existing efforts to address IAS impacts (to be addressed by component one):

Work on IAS within the Caribbean has been largely focused on pest and diseases of major crops and livestock, rather than IAS impacts on biodiversity and ecosystem services. This agricultural bias is a self-defeating approach to tackling the devastating impacts of IAS, given that most IAS that impact agriculture also have an impact in the environment (or may survive in the natural environment and thereby pose an on-going threat to agriculture), and strategies for mitigating the impact on agriculture must include preventing their entry in the first place.

Limited technical capacity and effective tools to prevent control and manage IAS (to be addressed by components one, two and three):

The most cost effective strategy for dealing with IAS is prevention. However, to prevent the introduction of an IAS, a country must be very proactive, with high levels of surveillance at ports of entry. Unfortunately, in almost all islands of the Caribbean, the human resources dedicated to surveillance activities for IAS are limited to a few plant quarantine officers, public health and veterinary officers. Furthermore, very few of these staff have been trained in identifying and dealing with the wide range of IAS (microbial, viruses, insects, plants and animals) that may be introduced into the region, and governments in general do not provide for the continuous updating of skills of those involved in surveillance activities. In many instances persons are not well trained, and specialist positions like virologist, mycologist, and bacteriologist are lacking in departments of agriculture or environment management units.

The shortage of technically trained personnel is linked to the current difficult economic conditions in the region, which greatly limit staff hiring; in some countries, when IAS surveillance staff retire or are promoted they are not replaced in their previous positions. Thus, for example, none of the islands participating in the proposed project has a Chief Invasive Species Officer or any dedicated public officer to oversee IAS management programs. Similarly, none of the islands has a dedicated committee or coordinating mechanism to deal with IAS, other than some coordinating bodies on plant and animal quarantine.

Another widespread problem is inadequate inspection and quarantine infrastructure. Although plant quarantine departments in all Caribbean countries were relatively better resourced in previous years, the declining importance of agriculture to the economies of the islands means that governments have reduced their capacities and resources inspection and quarantine and now face many challenges in executing their national and international obligations effectively. A regional workshop hosted by FAO and IICA in 2012 for the review of phytosanitary surveillance in the context of the IPPC Standard (ISPM6) identified a number of key constraints, including: Limited resources (human, financial, other); Lack of resources to access scientific information to establish surveys; Very high costs to implement IAS management (incl. skilled personnel, capacity building, digitizing data, tools, equipment, diagnostic services, etc.); Limited access to skilled personnel / subject matter specialists; Lack or deficiency of capacities / skills in most countries, including lack of diagnostic capabilities / services / support; Very high training needs (survey methodology, symptom recognition, data capture and management, management skills for technical heads); Transparency issues (countries might not be forthcoming with pest status due to potential bans on exports by importing countries) (FAO and IICA, 24-26 January 2012).

Finally, none of the participating countries has an effective database to record or share information on interceptions at air and seaports to assist in surveillance activities. The physical infrastructure in most countries is unable to meet the needs for the application of sanitary and phytosanitary (SPS) measures and quarantine functions to protect against the introduction of new pest and diseases for the agriculture sector. For example, none of the participating countries have a functional incinerator that can destroy any unauthorized risky imports that may contain IAS in passenger luggage at air or seaports.

Weak legal and policy frameworks for effective IAS management (to be addressed by component one):

The countries participating in the proposed project possess plant and animal health and quarantine legislation, which often encompass the management of invasive species and other biotic threats. Other legislation related to apiculture, coastal and marine environments, forest, protected areas and wildlife does in some cases relate to invasive species in the territories of the respective countries and may regulate activities which may result in the introduction or export, internal spread and management of invasive species. For example, the Control of Live Fish Act in St. Lucia is effectively species-specific invasive species legislation, which indicates that impacts of the introduction of non-indigenous species were historically recognized. However, when the legal frameworks of these countries are examined against the Environmental Law Institute (ELI) model of state law for invasive species detection, control, and management (ELI, 2004), it is easy to conclude that the legal frameworks in these islands are deficient. In these countries, legal frameworks for IAS are not consolidated and instead relevant regulations are

spread among many different legal documents, such as plant quarantine acts, environmental protection legislation, regulations for prevention and control of zoonosis, food safety legislation, and human health regulations and standards. It should be noted that Saint Lucia drafted model IAS legislation under the GEF-funded project Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASIC); unfortunately, the legislation was not given priority by the national authorities and remains in draft form. Fortunately, the regional priority and momentum for establishing a regime for the free movement of goods is expected to greatly increase the likelihood that legislation governing IAS will be passed by the respective parliaments in the OECS.

In order to deal effectively with IAS issues, legislative frameworks must be in place that consolidate and focus state efforts to manage IAS, for example by giving inspection and surveillance authorities and their staff the legal right to seize and destroy any material that could potentially introduce invasive species into an area. The poor legal and policy framework is compounded by inadequate enforcement: with a general rise in serious crimes and a focus of law enforcement officials on this, enforcement of existing legislation pertaining to the environment is generally lacking. Awareness of issues such as IAS and their impacts on the environment is also lacking among all arms of the legal fraternity such that if someone is brought to the courts for illegal trafficking in wildlife, the punishment may not be severe enough to serve as a deterrent.

The enactment and implementation of harmonised legislation across the Caribbean region, based on international standards and conventions will enable Caribbean countries to meet the requirements of international conventions such as Convention on Biological Diversity; the World Trade Organisation (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), and the Ballast Water Management (BWM) Convention of the International Maritime Organization; and also have the necessary precautions in place to limit the introduction of invasive species.

Inadequate national and regional coordination on IAS issues (to be addressed by component three):

Legal/policy frameworks must recognise the cross border implications of IAS and encourage countries to cooperate and collaborate to effectively combat IAS. Effective coordination must take place at the national, regional and international levels, and while such coordination exists for the Caribbean and globally, weaknesses at the national level limit the effectiveness of existing regional coordination mechanisms. A wide range of agencies at the national level, including the agriculture, health, trade, tourism, education, environment and the information and communication sectors, need to work together in order to address IAS issues, and yet communication and networking is largely lacking both within and between countries.

To effectively combat IAS issues requires the close collaboration of all stakeholders from both the public and private sectors to implement actions and policies to successfully combat the negative impacts of IAS on the various countries. However, such coordination mechanisms do not exist, and even with individual ministries there is often little coordination across departments. An even larger barrier is the very weak to non-existent coordination and collaboration between the public and private sectors on IAS management, with a few exceptions such as Antigua and Barbuda, where there is very good collaboration between public entities and the NGO community.

Inadequate awareness and information (to be addressed by components one, two and three):

Human beings are involved in all of the major pathways that introduce IAS into an area. The rate at which new IAS are introduced into the Caribbean speaks to the lack of general awareness of IAS and their impacts on agriculture and the wider environment, and as a result, the practice of casually transporting live animals and planting material remains too common. For example, the general public in the participating countries has very little idea of the economic impacts of IAS. Unfortunately, very few studies have been carried out of IAS impacts on livelihoods in the Caribbean, but a study conducted in six countries in East Africa on the economic impacts on smallholder mixed maize farming systems from five major IAS (*Chilo partellus*, Maize Lethal Necrosis Disease, *Parthenium hysterophorus*, *Liriomyza* spp. and *Tuta absoluta*) estimated combined annual losses of US\$0.9–1.1 billion (Pratt, Constantine, & and Murphy, 2017), and this provides some idea of the scale of the problem that IAS can pose for rural livelihoods.

Public education and general awareness targeting changes in human behaviour to reduce these risks are crucial to minimizing the impacts from IAS. It is increasingly becoming more apparent to scientists that socio-demographic factors, as well as the kind of species and the method used, are significant criteria to take into account when

designing alien species control and eradication policies. Raising awareness and educating the general public should then become a priority in order to enhance the acceptance and success of such policies. However, in order to conduct an effective public awareness programme, the right message derived from proper research is critical.

No dedicated or sustainable funding mechanism focused on prevention (to be addressed by components one and three):

Insufficient funding is an issue in all of the above barriers. Apart from any funding that might be received from international agencies, funding for IAS management comes from the consolidated budget funds of national governments. Typically, these funds are sufficient to cover minimum personnel and basic materials, but not to support capital expenditures for equipment, collect important information on IAS, conduct effective surveillance or control programmes, etc. As noted above, although relevant line ministries (Agriculture, Environment, etc.) may see the need for increased funding for IAS management, they face a significant hurdle in convincing budget authorities to provide such funds. To date, there are few alternatives, such as sustainable and innovative funding sources, among the participating countries. For example, while countries like Costa Rica charge a departure tax from which a percentage goes to support biosecurity work, such mechanisms do not exist in the participating countries, even though in Barbados even a very small fee collected from airline and cruise ship passengers could significantly improve IAS management capabilities and assist in preventing the introduction and spread of new invasive species.

## **A1.2 The baseline scenario or any associated baseline projects.**

Please see section 2.6 of the Prodoc

## **A1.3 The proposed alternative scenario, GEF focal area<sup>7</sup> strategies, with a brief description of expected outcomes and components of the project.**

The project goal is to manage the risks and costs of IAS on important ecosystems, species and genetic diversity in Barbados and the OECS region.

The objective of this project is “Prevention, early detection, control and management frameworks for invasive alien species (IAS) that emphasize a risk management approach by focusing on the highest risk invasion pathways of Barbados and OECS countries”.

### **Project components and expected results**

The project will attempt to achieve its results through 3 components. Components 1 and 2 address needs of Antigua and Barbuda, Barbados and St. Kitts and Nevis in relation to national frameworks for IAS management and control, and actual work on the ground that will lead to improved local capacity to deal with particular IAS. Component 3 is regional, and as such will be oriented towards addressing common needs of seven OECS countries (Antigua and Barbuda, Barbados, St. Kitts and Nevis, Commonwealth of Dominica, Grenada, St. Lucia, St. Vincent and the Grenadines) in relation to IAS.

**Component 1: IAS Policy, Institutions and Capacity** (1,505,457 USD from GEF financing and 2,747,707 USD from co-finance)

**Outcome 1.1** *Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems.*

This outcome will be achieved via the following outputs:

#### Output 1.1 (3) Critical Situational Analyses completed

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<sup>7</sup> For biodiversity projects, in addition to explaining the project’s consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving..



During the PPG at both the national and regional consultations a preliminary assessment was done of the national priority needs to effectively address the impact of IAS on the general economy, and specifically on biodiversity. This preliminary analysis also identified high risk pathways for IAS introductions (accidental and deliberate), i.e., fisheries, agriculture, horticulture and landscaping, shipping (including ballast and fouling organisms, and cruise ships), air transportation, construction projects, aquaculture, tourism, and aquarium and pet trade. However, during the project this information will be complemented with emphasis on species of global biodiversity significance. A critical situation analysis (CSA) will use national teams from Antigua and Barbuda, Barbados and St. Kitts and Nevis that will verify the initial assessment and conduct a more in-depth review of the national legislation and policies for IAS management. This review will also include the commitments made by these countries to the various MEAs dealing with IAS to assess to what extent they have fulfilled their respective national commitments and what is lacking to fully realize this. Then the CSAs will review the key stakeholders currently engaged in IAS management and assess their current level of coordination and collaboration through feeding in the process of partnership building. Their inherent strengths, weaknesses, opportunities and threats will be assessed in determining the best coordination mechanism that will be viable for these countries to both prevent the introduction of IAS and to manage those that are already in the country and impacting livelihoods and biodiversity. In elucidating the current situation in each of these countries with respect to IAS, the project will advocate for detailed case studies of how key IAS were managed in the past. It will demonstrate how the current lack of adequate policies and legislation has stymied efforts to prevent IAS introductions in the first place and then why early response and rapid eradication have failed. Since the skill sets required to accomplish these CSAs will require intimate knowledge and experience with varying ecosystem types, it will be very difficult to find one individual or firm with the required skill set. As such, the CSAs will be supported by three separate risk assessments, for the marine environment; for the pet and aquaria trade, and for international travel. It will also document the lessons learnt in managing and controlling these key IAS in a manner that will make a compelling case for ensuring the other outputs of component one are achieved. It will also inform the process of developing the national invasive species strategy and action plans and other outputs of component one.

Output 1.2 (3) National Invasive Species Strategies and Action Plans (NISSAPs) developed to address risks and promote cross sectoral collaboration in 3 countries

The CSAs will be used to engage the key stakeholders from all relevant sectors affected by IAS to develop in a participatory manner three NISSAPs, which will become overarching national strategic policy documents for IAS management. The NISSAPs will prioritize habitats and species to be protected in order to support decision making based on sound scientific information. The active participation of the private sector, policy makers and government institutions will also be crucial to their agreement and implementation. At the beginning of the project, based on the preliminary assessment during the PPG, cross-sectoral National Steering Committees (NSCs) for project implementation will be set up in each of the three countries (Antigua & Barbuda, Barbados, and St. Kitts and Nevis) to oversee development of a NISSAP as well as to guide the overall strategic direction of the project and to ensure coherence and integration of the project components. At the end of the project, a cross-sectoral working group, based on the NSC and including representatives of the major IAS stakeholders, will be constituted in each country to provide on-going coordination of actions relating to IAS at a national level. More details on the constitution of the cross-sectoral working group will be defined during the process of development of the NISSAP. In addition, in collaboration with the OECS Commission and the CARICOM Secretariat, the project will review existing mechanisms for cross sectoral and regional coordination of actions on early detection and rapid response of IAS at the sub regional level, information that will be used to feed the NISSAPs. It will also further explore new joint arrangements that can be supported by the project, for example the management of a regional database on interceptions by the OECS Commission that can facilitate the free movement of goods and services among OECS Member States as well as support effective and sustained cross sectoral national coordination on IAS issues among OECS member states. By the end of the project, the three countries are expected to possess a functional multi-sectoral IAS coordination mechanism as well as a NISSAP. By extension, the sharing of this experience with the other countries in the sub region will be encouraged to adopt similar approaches as part of the suite of actions towards managing IAS sustainably in the future. It is worth noting that a CBD workshop on IAS that took place in September 2017 in Jamaica, was the forum for discussions in which the Secretariat of the CBD (SCBD) was identified as a key project partner for this activity, since ideally the project will share information during the NISSAP development with the SCBD in order to ensure fulfilment of convention obligations and technical accuracy and to ensure no duplication of efforts while enhancing coordination and cooperation.

Output 1.3 (3) Legal frameworks for IAS developed or upgraded in 3 countries (regulatory guidance, protocols, codes of conduct)

It is universally accepted that prevention is the most cost effective strategy for dealing with IAS. To have effective prevention taking place, national IAS policies and legislation must give those engaged in surveillance unambiguous permission to seize and destroy suspected materials or materials with reasonable risk of harbouring IAS. Most laws dealing with IAS are out-dated and lack clarity as to what is an IAS and what actions can be taken to prevent their introduction. The project will work with the legal stakeholders to strengthen the legal framework for prevention and early detection of IAS, and will use the information generated by Outputs 1.1 and 1.2 as the basis for this work, with the CSAs providing an overview of what is needed, and the NISSAPs guiding the process of establishing priorities. Based on this the project will support the: 1) development of laws and regulations aimed at prevention, Early Detection and Rapid Response (EDRR) and control of IAS, e.g. development / agreement on a dirty list or clean list approach to importation of new species, limiting pet importations to species that would not be able to live in the wild should they escape, registering all captive breeding operations, etc.; 2) development of regulatory guidance and protocols for identified high risk pathways and species (regional, tailored for national) with prioritization of habitats and species to be protected; and 3) enhancement of capacity to prevent export of invasive species to other islands including assessment of use of ports for transshipments.

The project will also undertake activities to create greater awareness regarding IAS regulations and the assessment of impacts will provide the necessary information for the key stakeholders in the national implementing agencies to engage with their legal departments to convey the urgent need for such legislation. The active participation of policy makers and government institutions will also be crucial to their agreement and implementation.

Enacting properly drafted IAS legislation is the ideal outcome that the project will seek to accomplish. National and regional consultations suggest that the momentum is appropriate in the context of the proposed free movement of goods and services within the OECS member states. However, past experiences suggest that this is highly dependent on political will. For this reason, in addition to addressing laws, the project also will support the creation of new protocols that can function on their own with or without IAS legislation, including updated and published protocols and best practices on: i) activities in the marine environment (except ballast water) in order to minimize the risk of new marine IAS introductions; ii) activities in the pet, aquaria and horticulture trades to minimize the risk of new IAS introductions; and iii) activities in international passenger travel.

#### Output 1.4 (3) Awareness and capacity building programs developed & implemented (internalizing IAS threats, impacts, and new controls and regulations)

Under this output, the project will seek to raise awareness and build capacity among stakeholders (the public and private sectors as well as the general public). Public awareness campaigns will focus on making all stakeholders aware of the damage that can be done through the introduction of IAS. Some of the topics that will be part of the campaign are: IAS and their negative impact on biodiversity, minimizing entry of IAS through identified high risk pathways (International Travel; Pet, Aquaria and Horticulture trades), and promoting the National Invasive Species Strategy and Action Plan (NISSAP), among others.

Campaigns like the USDA's "Don't Pack a Pest" initiative could be utilised as a model for sensitizing international travellers to the risks associated with the introduction of invasive species. To change or encourage behaviour in the general public to reduce the risk of new introductions, there is a need for both enhancing awareness and building capacity to deal with any introductions that may occur in the future. The project will create awareness of the various global open access data sources and will support and/or train national staff in strategies for understanding and efficiently making use of various data sources, including a step-by-step approach to accessing and using tools such as CABI's Invasive Species Compendium, the Global IAS Data base, Fish base, and [www.caribherp.org](http://www.caribherp.org), among others, as well as regional sources such as the National Herbarium in Trinidad and the Smithsonian, which have compiled databases on plant species in the Caribbean. Project findings will also be fed back to the Compendium, providing a means to disseminate them globally.

Materials produced under this output could be used at the pilot site activities under Component 2, including activities with local stakeholders where awareness materials will promote IAS management and control with site managers, protected area staff, local governments, and local communities. The project will develop national electronic networking initiatives and strengthen the regional CIASNET.org (see Output 3.2.2), which will also be used to disseminate information generated under this output, thereby allowing other countries not directly involved in the development of these materials (i.e. those that only participate in Component 3) to benefit from them.

During the PPG, on-going demand for training on general issues related to the management and prevention of IAS was reported due the fairly dynamic movement of staff and the dearth of local expertise to conduct the training. As such, the project will adopt an approach of using experienced consultants where they are available in the region and when not available they will be sourced outside of the region. The approach will be to train trainers and deliver as part of their consultancies training material and conduct training of trainers' courses. This will build capacity to conduct further training in the future with minimum resources. E-learning modules/training courses will also be made accessible via CIASNET.org to encourage self-learning. The focus will be mainly on the development of courses on conducting IAS risk assessment and measuring impact on biodiversity and the economy of small island developing states. The capacity building programme will target multiple sectors of agricultural and public health; national resource managers of parks and protected areas; bio-security and border officials, tourism operators; educators, as well as policy makers.

#### Output 1.5 (3) Support to the design and implementation of National cost recovery financial mechanisms

National and regional consultations during the PPG phase noted that these small island states tend to be more reactive than proactive in dealing with IAS, although funds are available for staff engaged at border control. In many instances, the required funds to conduct for example a rapid survey when a new IAS has been detected or for eradication are generally not mobilized rapidly. Also information to validate possible control strategies for the necessary adaption to local conditions is not made available quickly enough. More importantly, where such funds do exist they are not protected and can be easily lost to competing interest. The seriousness of the loss of biodiversity warrants the setting up of a dedicated sustainable funding mechanism to combat IAS at the national level. Such a mechanism can also contribute to joint public private sector collaboration on IAS. The project will review successful models and provide costed models for adoption for the 3 countries. This will be based in the work under component 3, output 3.1.3 where the project will evaluate potential IAS management activities for financing as well as potential sources of revenue for the region, such that those countries who will pilot the cost recovery mechanisms (Antigua and Barbuda, Barbados and St. Kitts and Nevis) do that in alignment with what will be developed as a regional proposal for a financing system for IAS. A range of possibilities will be explored such as: an import levy on all goods entering the country, especially those which pose a significant risk such as horticultural/ornamental plants and pets; fees for export certification/clearance services, to be recovered from exporters of certain products and live animals; charges from transport, travel & tour operators, and agriculture & construction machinery owners, traders transporting livestock, agricultural products and related goods; a tourism levy similar to that imposed on visitors to Galapagos, a large percentage of which will be used for IAS management; fines for non-compliance with IAS management requirements and through general taxation; and levies on water usage (invasive woody and aquatic invasive species use copious amounts of water). The appropriateness of these for likely success in the OECS will be explored in conjunction with the work under output 3.1.3 under component 3. CABI, working together with UN Environment has developed cost-recovery mechanisms for Ghana, Uganda, Ethiopia, Zambia and Indonesia, and the project will draw on those experiences. The project also will assess IAS management costs that need to be covered by the financial mechanisms, including for example infrastructure needs (quarantine units, access to laboratory services, holding structures for IAS at ports of entries) for early management of IAS, the costs building post entry quarantine facilities where plants could be kept in a secure area until diagnostics prove that they are not infested or infected with pests, etc.

#### **Component 2: Control and management of IAS impacts** (1,032,929 USD from GEF financing and 2,270,770 USD from co-finance)

##### **Outcome 2.1** *Eradication and/or improved control of IAS impacting globally significant biodiversity, thereby reducing threats to key species.*

This component will include eradication and control of IAS that are already present on specific sites, and protection measures for sites of high conservation value. The restoration of ecosystems during and after removing an IAS is of major importance in preventing new invasions, hence appropriate measures and techniques have been identified and documented in pilot project documents developed during the PPG phase for Barbados, Antigua and Barbuda and St. Kitts and Nevis (see annexes 16.1; 16.2 and 16.3).

The project will partner with the national implementing organisations and key stakeholders. In Barbados this will include the department of the environment; the University of the West Indies; the primate research centre; the coastal zone management authority; the plant quarantine department; the veterinary department. In Antigua and Barbuda, the main partners in executing the pilot project are the department of the environment; the Environmental Awareness

Group; the Coast Guard; Flora and Fauna International; the Durrell Wildlife Trust. In St. Kitts and Nevis, the main collaborator will be the Department of Agriculture. This outcome will be achieved via the following outputs:

### **Output 2.1 A) Antigua and Barbuda Pilot**

Additional details on the proposed pilot site activities in Antigua and Barbuda are provided in Annex 16.1 of the UN Environment Project Document.

#### 2.1a1 Eradication of IAS on, Green Island, Smith Island and Maiden Island. Establishment of new and improved biosecurity mechanisms on Redonda and other critical offshore islands

The primary goal of this pilot project is to advance biodiversity conservation on four islands and islets that support many of Antigua & Barbuda's most endangered wildlife. The target islands range from Green Island— one of the more attractive and popular offshore islands for tourism and recreation— to Redonda— the country's most rugged and least accessible island. Together, these islands represent two Important Bird Areas, two Key Biodiversity Areas and at least one Alliance for Zero Extinction site (see Appendix 16.1 in the UN Environment Prodoc for additional details). They support some of the most important seabird colonies in the Caribbean and encompass most of the ranges of at least nine nationally endemic terrestrial reptile species (five of them Critically Endangered, including the iconic Antiguan racer snake and Redonda ground lizard), the globally threatened West Indian whistling duck, nationally endemic invertebrates, rare and regionally endemic plants, and the foraging and nesting grounds of three globally threatened sea turtle species.

As noted in Annex 16.1, considerable progress has already been made on many of these islands to eliminate invasive alien rats, mongooses, goats and certain plants, but preventing incursions is a chronic challenge, especially in light of the rising numbers of visitors and boat traffic. The pilot will eradicate black rats, which are frequently identified with catastrophic declines of birds on islands<sup>8</sup>, from Green Island, Smith Island and Maiden Island (West) by baiting the islands in 5m square grids. Trapping will also take place for mongooses, which is blamed for the extirpation of the Antiguan racer on other islands in the country. This will benefit important biodiversity, including: Antiguan racer (Critically Endangered, but has increased from 50 to over 1,100 since 1995 thanks to the removal of rats and mongooses); Antiguan ground lizard (*Pholidoscelis griswoldi*) (Near Threatened); Antiguan spotted tree lizard (*Anolis leachii*); Antiguan pygmy gecko (*Sphaerodactylus elegantulus*); Caribbean brown pelican *Pelecanus occidentalis* (Regionally Endangered, but increasing in the project area); Least Tern (*Sternula antillarum*) (Regionally Vulnerable); West Indian whistling duck (Globally Vulnerable—Antigua & Barbuda contains the world's second largest population, with dozens of pairs on the offshore islands); White-crowned pigeon (Globally Near-threatened—Now common on offshore islands). The islands also have important nesting beaches for sea turtles, especially the hawksbill turtle (Critically Endangered). They support a number of regionally and globally threatened vegetation types, including Leeward Islands Dry Forests (WWF Ecoregion NT0220: Critical/ Endangered), Leeward Islands Xeric Shrub (NT1310: Vulnerable), Lesser Antilles Mangroves (NT1416: Critical/ Endangered).

Previously, rats were eradicated from 16 islands in Antigua and Barbuda. Re-invasion has occurred in 4 islands. The project will therefore build capacity to develop and implement a biosecurity plan for 16 offshore islands. In addition, the project will leave in place a more effective and robust biosecurity (protection of biological resources from foreign or invasive species) protocols and capacity to prevent future (re) invasions by species that threaten native biodiversity on Redonda and the other aforementioned islands.

Though only 1.5km across, Redonda supports rare and important biodiversity e.g. five endemic reptile species, four of which are Critically Endangered (Redonda ground lizard (*Ameiva atrata*), Redonda anole (*Anolis nubilus*), Redonda skink (*Copeoglossum redondae*) and Redonda pygmy gecko (*Sphaerodactylus sp. nov.*) and is a global Important Bird Area<sup>9</sup>. Surveys have confirmed severe on-going declines in the diversity and abundance of fauna and flora. The main drivers of biodiversity loss and desertification are feral goats (*Capra hircus*) and black rats (*Rattus rattus*) left by miners. Redonda is the highest priority island in the country for eradicating IAS due to its threatened wildlife and excellent prospects of lasting success. This project will eradicate the rats, translocate the goats to Antigua (where the Department of Agriculture wishes to study and preserve this rare breed), and expedite the recovery of native species and habitats. This project has firm backing from the Governments of Antigua & Barbuda and Montserrat and civil society, who share a common vision for Redonda as an internationally recognised centre for conservation and research.

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<sup>8</sup> Global Invasive Species Database

<sup>9</sup> <http://www.birdlife.org/datazone/sitefactsheet.php?id=19939>

GEF6 CEO Endorsement /Approval Template-August2016

By eliminating these invasive alien mammals - the single greatest threat to Redonda's biodiversity and ecological processes - this pilot project will have a swift, highly positive and permanent impact. The likelihood of this island being reinvaded is minimal because it is uninhabited and remote; and this project will leave in place an effective, affordable biosecurity regime. A management plan will be developed for Redonda Island and steps will be taken to declare the island as protected area. This will involve public outreach and consultations drafting the legal instruments to declare the island a protected area. Formally protecting the island will further serve to pre-empt any future anthropogenic threats. Having eliminated the greatest threats to biodiversity, the costs of managing this site as a Protected Area after the project ends are expected to be low and sustainable. A protected area management plan will set out the required actions and costs, and make strategic use of existing resources where appropriate (e.g. the Coastguard to assist with surveillance as part of its routine circuits around Redonda).

Note must be made of the Redonda Restoration Programme (RRP), which has been undertaken by Fauna & Flora International (FFI) in conjunction with the Environmental Awareness Group (EAG) and the Department of Environment (DoE). The implementation phase began in October 2016, and the project has been successful in the eradication of rats (estimated population 6,000) and the removal of feral goats (estimated population 65). As explained in the Appendix 16.1, as of 2017 there were no rats on Redonda. However, to declare the island rat free it must be demonstrated that no signs of rats were seen for a period of two years. This two-year rat eradication check to confirm Redonda as rat free will take place in 2018 under this proposed GEF project.

Based on the experiences and lessons learned from project activities on the pilot islands, the project will seek to strengthen national and regional approaches and capacities for IAS management. The project will cooperate with the national authorities to develop IAS guidelines and protocols for coastal developments, which frequently introduce IAS via equipment and landscaping plants, both on the main land and the offshore islands to prevent IAS introductions to the offshore islands in the future. The project also will develop national capacities to measure the economic impacts of IAS (through components 1 and 3), which will be used to quantify the economic values of IAS-free offshore islands. This will encourage national policies for biosecurity of the offshore islands. Finally, the experiences of Antigua and Barbuda will be published, including how to eradicate IAS in offshore islands, in order to encourage other countries to do the same.

## **Output 2.1 B) Barbados Pilot(s)**

Additional details on the proposed pilot site activities in Barbados are provided in Annex 16.2 of the UN Environment Project Document.

### 2.1b1 Biosecure site(s) for threatened native reptiles established

The project will support the establishment of biosecure site(s) for threatened native reptiles at UWI (or at the South-East coast where they are currently found). Sufficient population size and gene flow will be taken up in the experimental design of the pilot. The status of Barbados' endemic reptiles is much less well understood than the Jamaican iguana (for instance), as both the Barbados leaf-toed gecko (*Phyllodactylus pulcher*) and the Barbados threadsnake (*Tetracheilostoma carlae*) are small and cryptic and/or nocturnal. Recent assessments of *Phyllodactylus* indicate their presence in coastal limestone cliff habitats, but how their distribution and abundance is affected by invasives (rats, mongoose and house geckos) is currently unknown. Establishment of a bio-secure site will offer opportunities to study these little known species, and a place to breed them for reintroduction into the wild, as necessary. Eradication of rats and mongoose from the entire island of Barbados is not proposed, but will be done in the small biosecure site. After this, the baseline population of the leaf-toed Gecko in the biosecure site will be determined, and its behaviour will be studied to determine what other practical measures (other than the removal of IAS) can be applied to enhance the breeding population. Once established, biosecurity could be maintained by regular trapping and poisoning (poisons will be placed in bait stations that should prevent non-target organisms from consuming the bait), for which small-scale funding would be sourced on an on-going basis to be sought by the University of the West Indies (UWI).

### 2.1b2 Monitoring program on effectiveness of control of invasive alien plant species in place and supporting implementation of the Integrated Gully System Management Plan

The project will support the development and implementation of a long term monitoring program on the effectiveness of control measures for invasive alien plant species in support of the country's Integrated Gully System Management Plan. The gully ecosystem consists of forested valleys in Barbados where native understory shrubs are being

displaced by invasive alien species, mainly of the Rubiaceae and Myrtaceae families (see annex 16.2). In the Gully Ecosystem Management Study carried out in 2003, the most abundant exotic and invasive plant species were Sweet Lime (*Triphasia trifolia*) found in 15.5% of all gully segments, Mother-in-Law's Tongue (*Sansevieria hyacinthoides*) found in 13.3% of all gully segments, and Macarthur Palm (*Ptychosperma macarthurii*) found in 1.3% of all gully segments. A native shrub (*Phyllanthus andersonii*) is found in moist forests such as gullies where species such as Sweet Lime and Mother-in-Law's Tongue may threaten. The Macaw Palm (*Aiphanes minima*), endemic to the Lesser Antilles, may also be under threat through competition with the Macarthur Palm, as both species exist in the scattered lower canopy below the main closed tree canopy of gullies. The River Tamarind (*Leucaena leucocephala*) is another invasive species that was found the most frequently (52.1% on average); this is a very aggressive species which has a high rate of reproduction, it produces many seeds rapidly and frequently, and is highly abundant, adaptable, and relatively viable and its effect must be assessed. These four (4) invasive alien species will be the focus of the pilot study. Activities will include the development of a manual on how best to identify the target species (including seedlings) and how to eradicate them. Sustainable financing of the monitoring program will be taken up by the Drainage Division, Ministry of Environment and Drainage, as well as the Ministry of Agriculture, through recurrent government financing and cost recovery mechanisms to be explored under component 1, such as a water levy.

The pilot also will seek to determine any impact of these invasive plants on native reptiles. It is not known how these invasive plants affect species such as the Leaf Toe Gecko and the Threadsnake, but a study of native lizards in Australia showed that they avoid invasive plants. In that case, areas of Rubber vine (*Cryptostegia grandiflora*), which is an environmental weed that frequently invades riparian habitats in northern Australia, were avoided by native reptiles; although the Rubber vine composed some 40% of the vegetation in the riparian habitat, none of the 132 lizards observed were found in the rubber vine vegetation, even though this vegetation contains features that superficially resemble native habitat used by lizards, such as leaf litter (Valentine, 2006). The four invasive plant species listed above will be controlled in pilot plots, which will be monitored for increased presence and recovery of native reptiles and native plant species. The results of this work will inform management plans by the National Implementing agency for managing invasive plants both for the benefits of native reptiles as well as important watersheds in Barbados. It will therefore enhance efforts advanced under activity 2.1b1 to stabilize and eventually increase the populations of endemic reptile species, and furthermore will contribute to the conservation of valuable ecosystem services (watershed protection) provided by the Gully System.

#### 2.1b3 Rat and mongoose control program in place at selected hawksbill turtle (*Eretmochelys imbricata*) nesting beaches.

Barbados is currently home to the second-largest nesting population of hawksbill turtles (*Eretmochelys imbricata*) in the Wider Caribbean, with up to 900 females nesting per year. This data will be updated in the first 3 months of the project implementation to establish accurate baseline information. A reduction in predation of turtle eggs will have a measurable impact towards increasing and stabilizing populations of hawksbill turtles. Mongoose predation on hawksbill eggs is confined to particular beaches (one of which, Bath, has a population of mongoose that is genetically distinct from the rest of the island) and the behaviour may be socially transmitted. Trapping to reduce predation pressure of mongooses (and rats?) at these locations can correlate to higher numbers of hatchlings emerging. The project will reach out to potential hotel and local community partners to collaboratively design the program for trapping of rats and mongooses and to seek their support in sustaining trapping efforts over the long-term; these partners will be trained in trapping and safe handling and provided with the necessary equipment. Sustainable financing of the continuous control of rats and mongoose will be explored through the hotel industry (on inhabited beaches), in partnership with the Barbados Sea Turtle Project (University of the West Indies Cave Hill Campus), the Ministry of Health and its Vector Programme, and cost recovery mechanisms to be explored under component 1, such as a levy on tourists viewing the laying of eggs or the release of hatchlings. Another possible alternative may be the implementation of a small bounty by the Government as was used in the Giant African Snail control. The population of turtles will be monitored to determine the efficacy of the actions undertaken.

#### 2.1b4 Lionfish assessment and management project in place at high biodiversity value reef sites

Focused lionfish control efforts in strategic locations through targeted interventions have been found to have sustainable impacts in increasing recruitment at key life stages of coral reef fish such as the fairy basslet (*Gramma loreto*), bridled cardinalfish (*Apogon aurolineatus*), white grunt (*Haemulon plumieri*), bicolor damselfish (*Stegastes partitus*), several wrasses (*Halichoeres bivittatus*, *H. garnoti*, and *Thalassoma bifasciatum*), and striped parrotfish (*Scarus iserti*). Lessons learned from targeted removal experiences (baited traps for instance) in The Bahamas, Bonaire, and Cayman Islands will be integrated into project design. The project also will build on the biodiversity assessment conducted by CERMES in the early phase of the lionfish invasion to conduct an economic impact



assessment of lionfish on livelihoods and biodiversity. A baseline survey will be conducted within three months of project inception to determine the extent to which the lionfish has had an impact from the preinvasion baseline data by determining the changes in the key indicator species. This information will be valuable in the attempt to develop a sustainable funding mechanism for common IAS approaches in the region and to share passive methods for reducing Lionfish numbers, such as fish pot designs developed in Jamaica and Bahamas under the last GEF project.

Sustainable financing of continued removals and monitoring of lionfish at targeted sites of high biodiversity value will be taken up by: a) the recurrent financing of the Coastal Zone Management Unit (CZMU), which is responsible for *inter alia* coral reef monitoring, regulation of marine research, public education of ICZM, coastal conservation project designs and management, and the review of any coastal projects; b) the Fisheries Division; c) partnerships with the dive community and dive shops, which have been successful in a number of countries, including The Bahamas, Bonaire, and Little Cayman Islands; d) partnerships with potential lionfish fishers and restaurants / markets; and e) cost recovery mechanisms to be explored under component 1.

## **Output 2.1 C) St. Kitts and Nevis**

Additional details on the proposed pilot site activities in St. Kitts and Nevis are provided in Annex 16.3 of the UN Environment Project Document.

### 2.1c1 Management plan developed for the sustained control and management of the monkey (*Chlorocebus aethiops*) populations in protected areas

Prior to the submission of the PIF, there was no agreement on the implementation of any pilot site activities for the management or control of any invasive species in St. Kitts and Nevis. However, the GEF Focal Point and the stakeholders during the national consultation highlighted the urgency of assisting the country with the African Green (or Vervet) monkey (*Cercopithecus aethiops*). The Vervet Monkey was introduced from West Africa approximately 300 years ago as a pet and subsequently became an invasive alien species. The impact of the monkey on biodiversity is unquantified in St. Kitts although some attribute it as the cause of the extinction of the St. Kitts endemic subspecies of the Puerto Rican Bullfinch. The Vervet monkey has the most omnivorous diet of all primates, eating all of the types of food including leaves, gum, seeds, nuts, grasses, fungi, fruit, berries, flowers, buds, shoots, invertebrates, bird eggs, birds, lizards, rodents, and other vertebrate prey. The monkey has a strong preference for fruit and flowers, which are seasonal resources, and from month to month they vary their diet tremendously to cope with fluctuations in food availability.

This dietary behaviour was confirmed in a preliminary survey conducted in 2017 by the Environmental Awareness Group (EAG) in three of the country's protected areas (the Central Forest Reserve, the Nevis Peak and Camps River Watershed Protected Area, and the Booby Island Marine Reserve). In a preliminary report to the Government of St. Kitts and Nevis, the survey concluded that "...non-native mammal signs and sightings and must infer these animals are placing an immense pressure on native species throughout St Kitts and Nevis. The monkeys in particular appear to have a far-reaching ecological impact, not only through directly feeding on huge quantities of plants and small animals, but there appears to be a positive correlation between the abundance of monkeys and black rats, which benefit from fruits and other foods dropped on the forest floor. Monkeys are responsible for high levels of damage to plants. The lack of bromeliads and orchids, as noted by the project botanists, may be largely due to the monkeys. Palm hearts, fruits and other foods were found to be very commonly dropped by monkeys on the forest floor and subsequently eaten by rats, which also appeared to occur at exceptionally high densities in the forests. Vervet monkeys were the most widespread and frequently detected invasive mammal, recorded in 57% of the timed searches, followed by rats (51%), mongooses (50%), goats (42%) dogs (22%) and pigs (3%)."

On St. Kitts, where agricultural foods are readily available in the landscape and in condensed areas such as on plantations, large numbers of the Vervet monkey can be supported in a much smaller space. Population densities are estimated at 255 individuals per square kilometre on St. Kitts, as compared to 9 individuals per square kilometre at the Segera Ranch in Kenya to (Cawthon Lang, 2006). This species occurs on both of the islands of St. Kitts and Nevis, and otherwise only in Barbados within the West Indies (a con-generic, *C. mona* occurs in Grenada). Population estimates for St. Kitts vary widely from 1,200 to 5,600-8,400. The Nevis population is estimated to be 2,000, based on 100 troops mostly located in ravines around the island's central mountain. The Chief Agricultural Officer of St. Kitts noted that this species is a major pest of all crops grown in St. Kitts and Nevis. While some conservationists see the monkey as part of the country's existing biodiversity, and stakeholders in the tourism sector see it as a natural asset to the tourist product, it is clearly now a species that presents a significant threat to the islands native flora and fauna.

The project proposes to first conduct a critical review of control strategies employed locally and regionally, and to validate capture techniques (following standard humane practices) for the green monkey under local conditions. This will be followed by an evaluation of the feasibility of cost recovery mechanisms for sustainably managing the monkey population utilizing the validated methods, in order to minimize negative impacts and to quantify the impact of the Vervet monkey on native biodiversity and economic sectors (e.g. agriculture). It will then incorporate the results of these assessments into a management plan that will reduce any negative impact on biodiversity and agriculture while preserving its value to the tourist sector. Once completed, the management plan will then be taken up by the local authorities for further implementation post-project.

**Component 3: Regional Biosecurity (7 countries)** (768,530 USD from GEF financing and 1,071,000 USD from co-finance)

**Outcome 3.1** *Increased collaboration among Caribbean states to tackle IAS.*

This outcome will be achieved via the following outputs:

Output 3.1.1 Regional strategy for prevention and surveillance at ports of entry (i.e. customs) developed and Regional IAS Working Group established:

For effective IAS management in small island developing states across the Caribbean, it is critical to have coordination and collaboration within countries, as it has been shown repeatedly that once an invasive species enters the region, it is only a matter of time before it spreads to neighbouring countries. Activities under this component will therefore seek to provide collaborative mechanisms and to build capacity to enable individual countries to collaborate at the regional level in preventing the introduction of IAS. The project structures will serve as a hub and spoke mechanism through regional IAS working groups. The national coordinating mechanisms that will be created under Component 1 will be linked to form a regional coordinating mechanism where other countries (not only those part of Component 1) will participate. Initially the regional coordination will be done at the level of the international project steering committee (IPSC) and support will be sought from the SCBD as well as regional partners such as USDA/Aphis, CARAPHA, CARIBVet, CPHD, the CARICOM Secretariat and the OECS Commission, so that this will become eventually a separate Regional IAS Working Group that will endure over the long-term. To ensure buy-in from these important partners, the project team will share outputs and updates from the project with them on regular basis, and whenever possible they will be invited to join the IPSC meetings.

Current procedures and practices at ports of entry will be reviewed, to identify gaps in surveillance activities. This information will be discussed in the regional working groups and used to review and update the existing Regional Invasive Alien Species Strategy and Action Plan, with a focus on upgrading biosecurity infrastructure. Once completed, the updated strategy and action plan will be presented to national and regional policy makers for adoption and implementation on various forums where the information is pertinent. The project will also support the dissemination of international best practices for biosecurity at ports of entry, and will provide capacity building to adopt such practices, as part of a regional strategy for prevention and surveillance. This enhanced biosecurity will allow for greater trade while reducing the risks of introduced IAS.

Output 3.1.2 Database established for interceptions at ports

A critical review of biosecurity and surveillance in ports of entry will be conducted in participating countries, which will be used to support the design of a standardized database system to satisfy the needs of the key stakeholders. Current interceptions at ports of entries in all participating countries are documented in a manual system, but this information is not shared among stakeholders within the country or with other countries. A standardized database for recording data and information will be established to allow sharing of information in real time, thereby enabling practical collaboration between countries in preventing introductions to the region as a whole. The database that will be developed will assist in recording interceptions and in giving surveillance officers information on potential risks that may be posed by passengers arriving from particular destinations. The database will also generate reports that describe risks and allow these to be shared among stakeholder within a country. CABI conducted a scoping study to determine a roadmap for building a similar tool in 2014, but the roadmap has not been implemented pending finalization of an agreement on the free movement of goods in the region. The project will revive this initiative, and the information generated by this database will provide the managers of national biosecurity systems with information pertaining to the potential IAS threats and the origin of these threats

### Output 3.1.3 A Strategic plan for the Regional Financing System for shared IAS developed

For Barbados and the OECS Region, the involvement of regional umbrella organisations such as the OECS Commission and the CARICOM Secretariat and the regional programmes they manage that have an interest in IAS will be key in determining how any potential regional IAS funding system will be structured and managed. The project will work with these institutions to examine the legal and financial constraints to setting up, hosting and managing such a fund sustainably. The project will evaluate potential IAS management activities for financing as well as potential sources of revenue; produce a financial plan with mechanisms for collection and mobilization; gain endorsement of the financing plan from relevant stakeholders, and submit the plan to national authorities for implementation. These will be linked with the activities under output 1.5 of component 1 for National cost recovery financial mechanisms, where the 3 countries part of that component will be supported to tailor those mechanisms to their local operations and capacities, and to adopt them, providing important lessons for the further development of the regional process, and vice versa. The intention under this component will not be to establish a new mechanism but rather to identify any existing structures and strengthen those where possible to achieve the sustainable funding of actions for managing common IAS in the region. The other critical action will be to make a case for the establishment of funding mechanisms and to identify potential funding mechanisms.

Efforts to develop a strategic plan for financing IAS management at the regional level will be based on lessons learned from coordinated approaches to other common environmental problems affecting multiple states, such as oil spills and other man-made disasters in the Caribbean. For example, the International Convention on Oil Pollution Preparedness, Response, and Co-operation (OPRC 1990), the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region, (Oil Spills Protocol 1983) under the Convention for the Development and Protection of the Marine Environment of the Wider Caribbean Region, (Cartagena Convention 1983), and the Caribbean Island OPRC Plan 2008, all have systems in place which include regional cooperation in dealing with oil spills. These approaches will be reviewed to examine what lessons and best practices can be applied to managing common IAS problems among multiple states in the OECS sub region.

### ***Outcome 3.2 Enhanced regional IAS management through early warning system, response measures and capacity building***

This outcome will be achieved via the following outputs:

#### Output 3.2.1 Regional technical capacity developed to conduct risk assessment and measure economic impact of IAS

The second part of component three seeks to enhance regional and national cooperation to reduce the risks associated with the introduction of IAS. It will valorise some of the results and outputs in Component 1 to benefit the wider Caribbean since some of the lessons learned on effective strategies from Component 1 (i.e. development of national IAS strategies, revised legal frameworks, awareness campaigns) will be shared throughout the region. The pillars for an improved regional capacity will rest on the following project activities: improving risk assessments, upgrading infrastructure where feasible, building human capacity, and adopting best practices for surveillance and early detection.

The project will support the development of national and regional technical capacities to conduct risk assessments and to measure the economic impacts of IAS as well as the benefits of IAS management through training for the 7 participating countries. The project also will provide training for port officials on detecting, capturing, detaining and eliminating possible IAS threats at points of entry, which will lead to greater detection of IAS and better handling and treatment of intercepted samples. In addition, a model for early EDRR will be developed and will be tested at high risk entry points that will be selected during project implementation. Capacity building also will include training on measuring the economic impact of IAS through completing at least one economic impact assessment of an invasive alien species in each country. The results of these studies will be compiled and circulated to key decision makers to sensitize them on the true economic impact IAS is having on economic sectors and livelihoods in the region.

#### Output 3.2.2 CIAS.NET strengthened as a learning network for IAS

During project implementation, the current CIAS.NET will be updated to serve as a communication and coordinating hub both for the project as well as regional IAS issues in general. All of the training courses done under the project will be posted as e-learning modules on CIAS.NET so that the site will be used as an online open source to support

national capacity building efforts to manage IAS. The site will contain materials specific to trainers to use for training others. Material will also be available to encourage new recruits engaged in IAS management to improve their skills while on the job. Reports from the database of IAS interceptions at airports and seaports will also be posted on the site. Participating countries will have country pages to highlight their national IAS lists, black lists of species to be kept out of the countries, and commodities and species that are free to be traded. The current skills database on the site will be updated to include IAS experts currently active in the participating countries as well as those whose capacity to manage IAS will be developed by the project. During project implementation the various baseline data for IAS in participating countries will be translated into distribution maps and made available on the site, which will address a significant gap in this type of information in the Caribbean.

A key input for CIAS.NET will be new information on invasive plant species in the target countries. Although numerous studies have been carried out in the region on IAS fauna, information on the impacts of IAS flora is much less available; although it is widely held that invasive plants have changed the ecology / ecosystem functions of environmentally sensitive areas in the target countries, for example by reducing suitable nesting habitats for native birds. For this reason, the project will carry out surveys of invasive plants; however, prior to undertaking any surveys, the project will first consult with the Smithsonian Institute, the University of the West Indies, the Centre for Marine Environmental Sciences, and the National Herbarium of Trinidad and Tobago (CABI has existing relationships with all of these institutions) to assess their existing data on species distribution. Following that, rapid surveys will be carried out of suspected IAS flora that have not been covered in previous surveys and are believed to have significant impacts on native biodiversity.

Awareness modules on the open sources of data for identifying IAS will be tailored to those working in sectors such as agriculture, health, wildlife and forestry, fisheries, as well as NGOs, community organizations, academia, volunteers and national security personnel engaged in surveillance. Stakeholders will be able to use the hub as a source of data on IAS in the Caribbean (with links to the mobile app described below) and as a link to other online open data sources on IAS such as the CABI Invasive Species Compendium. The site will be both a repository of information on IAS in the Caribbean as well as a valuable resource of contact information on key stakeholders in the region, and it will facilitate linkages with other regions, for example the Pacific where both UN Environment and CABI work with other stakeholders to manage IAS.

CABI and the project team will work with existing regional partners to ensure that this hub will continue to operate post-project. Lessons learned from the previous MTIASIC project and stakeholder inputs during project preparation indicate that this site should be managed by stakeholders in the region. However, should this prove to be unsustainable or if regional agencies such as the OECS Secretariat or CARAPHA are unwilling to continue to manage the site as a regional resource, the site will be migrated to a CABI-managed online resource such as the Invasive Species Compendium or a new resource to be developed as part of a Global Initiative on Invasive Species.

#### Output 3.2.3 Regional App or ID IAS risk cards for prioritized species that can affect important biodiversity, agriculture, and human health developed for ports of entry

A mobile App will be developed to create awareness on IAS that can affect important biodiversity across a wider group of people and also to aid national efforts in terms of prevention and EDRR. To do this, the project will design and produce an IAS identification guide, which will be then transferred into an App for ease of use. The mobile App will be linked to existing data resources on IAS taxa and native species (see Output 1.4) once permission from these sources is obtained. For example, [www.caribherp.org](http://www.caribherp.org) provides information on reptiles of the Caribbean that will make it easy for those doing surveillance to distinguish which animals are native or exotic. Risk cards for prioritized species that can affect important biodiversity, agriculture, and human health will also be developed for use at ports of entry in situations where it is not possible to access the mobile app while conducting surveillance activities.

#### **A1.4 incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, and co-financing**

##### Baseline Scenario (without GEF support)

In absence of GEF support, the region will continue to attempt to address problems arising from IAS in the context of limited capacities and resources and ineffective coordination. Some countries may continue with the development of their national IAS strategies and others who already have a strategy (e.g. St. Lucia) may move towards its implementation. In addition, other partners will continue to invest in the region in support of the eradication,

management and control of IAS; for example, the work being done by USDA/Aphis and FAO in supporting the eradication of IAS impacting the agriculture sector. Nonetheless these efforts are unlikely to be enough to equip the region with the needed capacities to improve their ability as a region to manage, control and eradicate IAS. GEF funds will complement these efforts and will leverage resources that will have a prompt impact on the ground contributing to the safeguarding of local biodiversity.

One significant constraint that will not be easily addressed in the absence of the GEF support is fostering of regional cooperation and collaboration beyond the agriculture sector. GEF support will offer the possibility to undertake regional activities, share lessons and experiences, and foster south - south cooperation. Regional workshops such as those organized by the CBD, FAO and USDA/Aphis will continue to provide a platform for coordination on IAS in agriculture, but these will have much more limited scope and impact. In the last decade, Barbados and the OECS have seen a decline in agriculture production and a rise in tourism, and this shift in the economies of these small island states has resulted in increasing imports of food and other goods. These changes have been coupled with the opening of new routes: there are now direct flights between Brazil and Barbados; an international airport was opened in St. Vincent in 2017; and the expanded Panama Canal is contributing to increase trade in the region. The alarming increase in the rates of agricultural pest and diseases is an indication of the increase in the potential of IAS that is harmful to biodiversity to enter this region. In summary, increased imports and increased tourist arrivals significantly increase the chances of both deliberate and unintended introductions of IAS, especially as hitchhiker pests in passenger luggage.

#### Alternative Scenario (with the GEF support)

With the support of the GEF, actions will be undertaken that will make it possible to address the barriers to stemming the tide of IAS invading the Caribbean. The GEF support will offer a timely intervention to more precisely define the problem and recommend the best policies and management tools that will contribute to the sustainable management of the problem in the future.

Key elements of the proposed project include the identification of pathways with the highest risks for IAS introductions, and the development of national policies and action plans to reduce the entry and spread of IAS, which constitute the main threat to biodiversity in the participating countries and also have a significant negative impact on the national economies of these SIDS. In addition, because of the urgent need for effective collaboration between the various stakeholders, the project will set up national IAS working committees with the participation of all sectors to enhance coordination within and between sectors. The project also will build capacity to identify IAS risks and manage them via early detection and rapid response. The proposal also calls for providing the various stakeholders with the tools to effectively achieve this in a sustained manner into the future.

The project will be incremental to existing efforts being made by the national governments, the private sector, NGOs and regional and international organizations. The project involved many of these stakeholders during the PPG phase and will continue to work directly with them during the implementation of the project. This involvement will seek to develop as part of the improved policies “codes of conducts” for stakeholder groups that operate in the high risk groups such as the pet and aquaria trade, the horticulture trade, and those in the important tourism sector, to participate voluntarily and provide peer pressure to other operators in the sector.

An important aspect of this project will be the contribution of valuable tools such as a mobile app that will identify potential IAS, which will be available free of charge not only to those engaged in surveillance but also to the general public. This will allow farmers, home owners, natural resource managers and the general public to engage in surveillance and afford the widest possible participation in the conservation of the Caribbean native biodiversity.

#### **A1.5 global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF).**

##### Global environmental benefits

As the fifth most important of 35 global biodiversity hotspots, the wider Caribbean is home to some of the world’s most unique and threatened species of plants and animals. According to Conservation International, 50.4% of plants (6,550 species), 46.1% of mammals (41 species), 27% of birds (163 species), 93.4% of reptiles (69 species), 100% of amphibians (170 species), and 34% of freshwater fishes (65 species) found are in the Caribbean Islands are endemics. The previous is actually older data and it is now known that there are at least 750 reptile species in the Caribbean Islands ([www.caribherp.com](http://www.caribherp.com), viewed July, 2017). Experts predict that this number will climb to nearly 1,000 over the next decade. It is estimated that at least 36 different genera of birds are endemic to the region, as well as two endemic families: the palmchat (*Dulus dominicus*) of the family Dulidae and the todies (family Todidae). Forty-eight

bird species endemic to the hotspot are threatened with extinction, including the Puerto Rican nightjar (*Caprimulgus noctitherus*, CR), Zapata rail (*Cyanolimnas cerverai*, EN), Zapata wren (*Ferminia cerverai*, EN), and Grenada dove (*Leptotila wellsi*, CR). Estimates by Conservation International (2008) indicate that 13 bird species have already gone extinct, with several parrots in the OECS region endangered, such as the St. Vincent parrot (*Amazona guildingii*, VU), the Saint Lucian parrot (*Amazona versicolor*, VU), and the Imperial parrot (*Amazona imperialis*, EN) of Dominica.

The Caribbean region is globally recognized as being especially rich in species of reptiles, with 150 endemic species of anoles (*Anolis* spp.), 82 endemic species of dwarf geckos (*Sphaerodactylus* spp.), and 23 endemic species of curly tail lizards (*Leiocephalus* spp.). The region also boasts the world's smallest snake, *Leptotyphlops bilineata*; the most threatened rattlesnake in the world - the endemic Aruba rattlesnake (*Crotalus unicolor*, CR) of which only 250 individuals are thought to still be alive; and the rarest snake in the world, the Saint Lucia racer (*Liophis ornatus*) of which only 20 individuals are thought to be alive. In addition to its reptile populations, the region is also globally recognized as having very high amphibian endemism with most species being endemic to single islands. The second largest frog found in the Western hemisphere, *Leptodactylus fallax*, otherwise known in Dominica as “mountain chicken”, is considered extinct in St Lucia, St Kitts & Nevis and Martinique (maybe others). There is a tiny population on Montserrat, recently augmented by reintroductions from captive stock, plus a very small and fragmented (but larger than Montserrat's) population on Dominica.

The expected global benefits of this project include improved management frameworks to prevent, control and manage IAS and thereby contribute significantly to the reduction in loss of biodiversity. Project benefits are also expected to reduce the negative impacts of IAS on national economies and local livelihoods, as it is widely acknowledged and understood that IAS have a significant impact on the goods and services provided by ecosystems and that their management can contribute significantly to ecosystem function (Charles, 2008). Overarching global environmental benefits will be the reduction of IAS that are a high risk to biodiversity from entering Antigua and Barbuda (44,000 ha); Barbados (43,100 ha); and St. Kitts and Nevis (26,100 ha). Furthermore, species extinction will be avoided throughout the OECS as a result of enhanced IAS management – through reporting on invasives, early warning systems, early detection and rapid response measures, and capacity building for management of IAS at the regional level, with expected improvements over the life of the project. Comprehensive prevention, early detection control and management frameworks that emphasize risk management approach at highest risk invasion pathways will deliver the GEF goal of reducing new invasions, while cost recovery mechanisms embedded into enabling environments will assure the sustainability of GEBs.

The project will further reduce the impact of IAS on a number of species of global significance. In Antigua and Barbados, the project will undertake activities to eliminate IAS (rat and mongoose) on selected islands that prey on the following native species: Redonda ground lizard (*Ameiva atrata*), Redonda anole (*Anolis nubilus*), Redonda skink (*Copeoglossum redondae*) and Redonda pygmy gecko (*Sphaerodactylus* sp. nov.). In Barbados, the project will strengthen the conservation of the leaf-toed gecko (*Phyllodactylus pulcher*) and the Barbados threadsnake (*Tetracheilostoma carlae*) through establishment of a biosecure site for these species. In addition, in Barbados the project will help to improve the breeding success of IAS-threatened Hawksbill sea turtles (*Eretmochelys imbricata*) by reducing populations of rats and mongooses, while project activities for the targeted removal of lionfish (*Pterois* spp.) on key coral reef sites of high global biodiversity significance will have global benefits including enhanced recruitment and critical life stages of key coral reef fishes such as the fairy basslet (*Gramma loreto*), bridled cardinalfish (*Apogon aurolineatus*), white grunt (*Haemulon plumieri*), bicolor damselfish (*Stegastes partitus*), several wrasses (*Halichoeres bivittatus*, *H. garnoti*, and *Thalassoma bifasciatum*), the striped parrotfish (*Scarus iserti*), and dusky blenny (*Malacoctenus gilli*), among others. In St. Kitts and Nevis, enhanced management of the green Vervet monkey is expected to reduce the impact of this IAS on numerous native species as well as agricultural crops; the Vervet believed to be at least in part responsible for the extinction of the St. Kitts Bullfinch. Although no detailed study on the impact of Vervet monkeys on St. Kitts biodiversity has been undertaken, a recent rapid survey (as described in Appendix 16.3) notes that the monkeys are impacting plant groups such as bromeliads, orchids, native palms and heliconias; birds by preying on their eggs and adults; lizards frogs and other invertebrates as part of their voracious diets.

## **A1.6 Innovativeness, sustainability and potential for scaling up.**

### Innovation

One innovative approach the project will take is to train trainers, develop training modules, and have these available online. This approach will allow for continuous training post-project and self-learning by new recruits that are tasked with



surveillance, pest risk analysis, early detection, rapid response, and management and control of IAS. The project will draw on the considerable experience from Antigua to develop a training of trainers on rat eradication in the Caribbean. This training will specifically target the NGO community to support long-term efforts to sustainably eradicate rats on offshore islands with valuable biodiversity in other Caribbean countries. By embedding cost recovery mechanisms in the enabling environments for IAS management and thereby supporting long-term financing of IAS management objectives is innovative for the region, as are the project activities to pilot eradication and control of IAS together with restoration of habitat that will enable re-introduction and sustainable management of habitats critical for endangered and endemic species. Finally, the creation of replicable awareness building and capacity building modules tailored for the region, as well as the creation of cutting edge smart tools such as the App for the identification of IAS, are both innovative and will support upscaling and replication of project interventions.

### Sustainability

The issue of capacity and building capacity is a recurring issue in these small island developing states, where trained staff are promoted up or move to the private sector, resulting in a constant demand for new training. For this reason, the project will not conduct one-off training events, but will rather build a cadre of trainers who will be provided with the knowledge and training materials to conduct on-going training into the future. Training materials will also be available online to permit new staff to familiarize themselves with concepts such as risk assessments and surveillance for the prevention of new IAS introductions, and personnel will be encouraged to pursue self-learning as part of the initiation process of new staff.

The development and implementation of three National Invasive Species Strategies and Action Plans (NISSAPs) and a regional strategy with IAS management strategies for selected species will also make a significant contribution to ensuring that IAS management activities are sustained. The strategies and action plans will encourage departments and units with responsibilities for IAS to plan their annual work plans in a more coordinated manner, and will also assist by better defining roles and responsibilities so that different institutions can undertake coordinated actions more harmoniously. This process will also be based on the work of the national cross-sectoral committees, which will be proposed as permanent structures for support in the new NISSAPs, which will secure their continuation beyond the project, once the NISSAPs are approved on the respective countries.

The project is designed to produce some valuable tools that will contribute to sustained actions in the Caribbean in managing IAS. Tools such as IAS Identification Guides and mobile Apps (which will also include information on best management practices), will ensure that those who engage in risk assessments, surveillance and rapid response are more successful in detecting and destroying IAS that are in the process of entering the sub-region.

Through strong co-financing and key alliances with major stakeholders (local and regional) and other relevant institutions, the project guarantees the necessary actions and resources to undertake activities through the project's life and sustain the results beyond its completion. The participation of national government agencies such as ministries of environment and agriculture will contribute to project sustainability since the management and control of IAS is part of their work plans as per the national priorities stated in each country's NBSAP. This will also be the case for the national and regional cross-sectoral working groups. The national coordinating mechanisms that will be created under Component 1 will be linked to form a regional coordinating mechanism where other countries (not only those part of Component1) will participate. During project's life, the regional coordination will be done at the level of the international project steering committee (IPSC) and support will be sought from key partners (SCBD, USDA/Aphis, CARAPHA, CARIBVet, CPHD, the CARICOM Secretariat and the OECS Commission) so that this will become eventually a separate Regional IAS Working Group that will endure over the long-term. To ensure buy-in from these important partners, the project team will share outputs and updates from the project with them on regular basis, and whenever possible they will be invited to join the IPSC meetings. As a result, project outcomes have strong potential to be sustainable over time due to the fact that the national authorities have prioritized IAS matters and are actively investing in tackling IAS.

Another expected output of the project is the establishment of a sustainable funding mechanism for managing IAS that is common to the participating countries. This will complement national efforts at ensuring funding for IAS management; increased awareness generated by the project at the national level will contribute to increasing national expenditures on IAS. Targeted actions to achieve concerted private sector participation will also contribute to financial sustainability.

Support from organisations such as UN Environment, OECS, CABI and the UWI will be of great importance in providing and building up technical expertise, information and strong networking mechanisms for the participating countries, which will also add to the efforts towards the sustainability of the results.

Financial sustainability post project will benefit from several actions that will be implemented by the project these include:

- Incorporating the private sector and air and sea ports as far as possible during the project implementation in developing strategies, policies and action plans
- Targeting the private sector in all the awareness raising activities
- Examining and recommending a workable model for a designated fund to work on common IAS problems in the region. This will be done in close collaboration with regional organizations and the OECS commission sustained implementation post project
- Trainers will be trained to continue to build capacity post-project, supported by training manuals and teaching aids
- The project will work closely with the OECS secretariat that is currently implementing a regime of free movement of goods and services; in this context the risk assessment and surveillance protocols developed will be continued to be implemented post project
- Tools to be developed under the project such as the mobile app for the identification of IAS and identification manuals will assist with surveillance and increase interceptions at air and seaports, which will offer protection to economic sectors such as agriculture and tourism while protecting globally important biodiversity
- Management eradication of key IAS on 3 offshore islands and management plans for managing important IAS will also contribute to financial sustainability since countries will be better equipped to apply the management plans and prevent future re-invasions.

### Scaling Up

The majority of SIDS in the Caribbean have similar barriers to effective IAS management, such as a lack of effective policies and low levels of awareness and capacity about IAS issues. Considering that this is a regional project, several OECS countries that are not direct beneficiaries of this project can benefit from scaling up via the OECS commission and their plans for implementing free movement of goods in the sub-region. The outcomes of this project will be disseminated to the wider Caribbean via the Caribbean Plant Health Director's Forum and CaribVet meetings, which will guarantee that its outputs could be widely used by other countries or actors as needed.

The project will lay the foundations to ensure that there will be potential for scaling up in the future. The development and updating of legal frameworks and capacity building will all contribute to scaling up of IAS management activities in the future. The development of baseline data on the distribution of IAS and their impacts, together with some cost-benefit analyses, will provide policy makers and government officials with the necessary information to develop and implement additional policies together with financing mechanisms to manage IAS more effectively. The development of identification tools will also make more information available on how to identify and best manage IAS, information largely lacking to date in OECS countries. Modelling best practices at the strategic, management and operational levels, including learning modalities, will set the foundation for IAS management in the OECS sub-region and will facilitate broader regional and inter-regional cooperation (e.g. with Pacific SIDS). This cooperation will be facilitated by UN Environment, which is the IA for another GEF funded regional IAS project in the Pacific.

**A.2. Child Project?** If this is a child project under a program, describe how the components contribute to the overall program impact. NA

**A.3. Stakeholders.** Identify key stakeholders and elaborate on how the key stakeholder's engagement is incorporated in the preparation and implementation of the project. Do they include civil society organizations (yes ☐ /no ☐)? and indigenous peoples (yes ☐ /no ☐)? <sup>10</sup>

The Key stakeholders were consulted in a national workshop that was held in February 2017 and a regional workshop that was held in June of 2017. The regional workshop reviewed the project goals and objectives and the draft work plan and budget of the project.

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<sup>10</sup> As per the GEF-6 Corporate Results Framework in the GEF Programming Directions and GEF-6 Gender Core Indicators in the Gender Equality Action Plan, provide information on these specific indicators on stakeholders (including civil society organization and indigenous peoples) and gender.

The project will interact in different ways with a wide range of stakeholders. Each of them will have a particular role in the project activities either as a beneficiary, co-financier, technical partner, etc. The following table provides a summary of the stakeholder's involvement. It is worth noting that the stakeholder mapping and analysis will continue to evolve during project implementation, and therefore the project team will closely monitor these changes and/or record new partnerships or interactions.

Country/Stakeholder	Sector/Actor	Current Role or Function
<b>Antigua and Barbuda</b>		
Ministry of Health and the Environment:	Government Agency/Environment Division;	Technical advice on matters pertaining to the environment. The Department of Environment will be the local partner and main contact for project implementation. A representative of this institution will be appointed as project focal point and will also be responsible for the monitoring and reporting of the national co-finance.
Ministry of Agriculture, Lands, Fisheries and Barbuda Affairs	Forestry Division, Development Control Authority, Fisheries Division, Land Division Agricultural Extension Division, Plant Protection Unit	Development of and implementation of policies for forestry, fisheries, and agriculture. Land management. Plant quarantine and agricultural health.
Ministry of Tourism, Economic Development, Investment & Energy.		Promotion of Antigua and Barbuda as a Tourist destination. Promoting investment for economic development.
Ministry of Legal Affairs, Public Safety, Immigration and Labour:	Attorney General's Office, National Parks Authority; Mount Obama Committee;	International treaties. Responsible for national parks. Labour and industrial relations issues.
Ministry of Finance		Revenue collection and funding of public goods. National economic policies.
National NGOs	Environmental Awareness Group; Hotel and Tourist Association, Cruise Tourism Association, Historical Archaeological Society, Coast Guard, Caribbean Helicopters, farmer associations, tour operators (e.g. Dive shops)	Environmental conservation. Environmental education and awareness. Environmental advocacy. Clean up and restoration of sensitive environmental areas. Promotion of the safe use and enjoyment of environment.
<b>Barbados</b>		
Ministry of the Environment, <b>Biodiversity Unit</b>	Public Sector. Governing institution for MEAs on biodiversity, coordination of national action to conserve national biodiversity.	Environment Policy; biodiversity and genetic resources. Focal point for CBD. Will also act as National Project Executing agency
Ministry of Agriculture, Food, Fisheries and Water Resources	Public Sector.	To transform and reposition the Agricultural Sector in Barbados through the promotion of an agri-business approach to farming, with particular attention being paid to the effective use of resources, as well as border control of plant and animal imports. Competent Authority for the National Project Execution.
Ministry of Agriculture, Food, Fisheries and Water Resources – <b>Entomology Department</b>	Public Sector. This unit involved in the identification and management of insect pest problems on all economic crops and the development of control methods for these insects.	The production of extension materials, biological control of a variety of insect pests, control of new invasive species. Integrated pest management.
Ministry of Agriculture, Food, Fisheries and Water Resources – <b>Plant Pathology</b>	Public Sector. This section offers laboratory and technical assistance with the identification and control of plant diseases.	Identification of plant diseases that may come about the invasive species and development of control strategies and identification of plant diseases and development of control strategies.
Ministry of Agriculture, Food, Fisheries and Water Resources – <b>Plant</b>	Public Sector. Provides for inspection and certification of ornamental and agricultural	Issuing of Permits, Phytosanitary Certification, and inspection of products that may harbour invasives.

Country/Stakeholder	Sector/Actor	Current Role or Function
<b>Quarantine</b>	produce as well as technical assistance on matters related to the IPPC (International Plant Protection Convention).	
Ministry of Health	Public Sector. To provide comprehensive health services.	Execution of Rat Eradication and Control Program.
Coastal Zone Management Unit	Public Sector. Coral reef monitoring, updating the inventory of coastal resources, consultations with the Town and Country Development Planning Office (TCDPO). Review of any coastal projects.	Monitoring of marine ecosystems
Fisheries Division	Public Sector.	Monitoring of fish stocks and marine species management.
National Conservation Commission	Public Sector. Management of public parks, beaches and gardens.	Management of <i>Sargassum</i> seaweed.
University of the West Indies, Cave Hill Campus	NGO. Tertiary Intuition	Research into the local species populations and the impacts of invasive species on their populations.
Bellairs Research Institute (McGill University)	NGO. Tertiary Intuition	Research into the local species populations (marine and terrestrial) and the impacts of invasive species on their populations.
Barbados Agricultural Society	NGO. Represents the interest of farmers and agricultural community groups.	Provides assistance to farmers and agricultural communities.
Caribbean Agricultural and Research Institute	NGO. Development of commodities that ensure food and nutrition security.	Focuses on the threats, challenges and opportunities for managing Invasive Species and Climate Change.
Barbados Sea Turtle Project (University of the West Indies Cave Hill Campus)	Volunteer Group. To restore local marine turtle populations to levels at which they can fulfil their ecological roles.	Assists in the conservation of the endangered marine turtle species that forage around and nest on Barbados through research, education and public outreach as well as monitoring of nesting females, juveniles and hatchlings.
Caribbean Herpetological Society	Volunteer Group. Monitoring of reptiles and amphibians within the Caribbean.	Assists in the conservation of reptiles and amphibians, monitor species distributed among pet shops and the monitoring of invasive species that impact on local reptile and amphibian species.
Barbados Divers Association (Lionfish Activities)	Volunteer Group. To alert local authorities to sites where lionfish are spotted during dives.	To reduce the population of the invasive lionfish species through spear fishing and work with local restaurants in the use of lionfish in their menus.
Barbados Marine Trust	Volunteer Group. Promote environmental and socially sustainable use of marine areas in Barbados.	To assist Government and NGOs in marine management initiatives. Educational awareness on proper management of marine resources including coral reefs.
Pet Shops	Private sector. Trade in live pets and aquaria species.	Pathway to the entry of invasive plant and animal species into the local environment.
Barbados Primate Research Centre and Wildlife Reserve	NGO. Eco-Tourism site in Barbados.	Assists with the research and control of African Green monkey which is considered agricultural pests.
<b>St. Kitts and Nevis</b>		
Department of agriculture	Public Sector	Plant quarantine and agricultural health issues. Incentives for agriculture. Agricultural extension and promotion of good agricultural practices.
St. Kitts Tourism Authority, Nevis Tourism Authority	Public Sector	Promotion of St. Kitts and Nevis as a tourist destination.
Department of Legal Affairs and Justice.	Public Sector	Drafting of legislation and updating existing legislation.
St. Kitts Bird Watch Society (St. Christopher	NGOs	Environmental education and awareness. Environmental conservation and protection of native

Country/Stakeholder	Sector/Actor	Current Role or Function
National Trust, Nevis Historical Society, St. Mary's Man and Biosphere community group, Sandy Pointers Inspiring Real Improvement Throughout-SPIRIT [Sandy Point community group], Police Department.		biodiversity.
<b>Regional Organizations</b>		
UN Environment	Inter-Governmental organisation	UN Environment will be the implementing agency of the project. As such it will be part of the project's steering committee and will network with CABI, the countries and other partners. UN Environment will also provide technical advice when possible and provide monitoring and supervision services for the project.
CABI	Inter-Governmental Organization	CABI will be the regional executing agency of this project and as such it will be part of the steering committee and coordinate all the aspects related to project execution in close coordination with the participating countries, UN Environment and the partners. CABI's work includes publishing of scientific information on agriculture and the environment and the use of scientific information to improve livelihoods.
Caribbean Agricultural Health and Food Safety Agency-CAHFSA	Regional NGO	Regional coordinating body for agricultural health and food safety
Caribbean Agricultural Research and Development Institute-CARDI	Regional Research in Agriculture	Dissemination of relevant information. Research in control and management of IAS. support to regional coordination on IAS issues
CARIBBEAN COMMUNITY SECRETARIAT – CARICOM	Regional Inter-Governmental Organisation	Promotion of the single market and the economy. Regional and international collaboration and cooperation.
Fauna & Flora International (FFI)	International NGO	Conserving threatened species globally.
Food and Agriculture Organisation (UN-FAO)	International NGO. Supports the efforts of the Member States to achieve agricultural development, food production and food safety.	Responsible for the implementation of the International Plant Protection Convention. Development of standards for movement and trade in plant and plant products. Dissemination of information.
International Maritime Organization (IMO)	International NGO.	Oversees the International Ballast water convention
Inter-American Institute for Cooperation on Agriculture	International NGO.	Supports the efforts of the Member States to achieve agricultural development and rural well-being.
Royal Society for the Protection of Birds (RSPB)	International NGO	Avian conservation internationally.
University of the West Indies (UWI)	Academic and research institution	Tertiary education and Research. Managing development projects.

Country/Stakeholder	Sector/Actor	Current Role or Function
United States Department of Agriculture / Animal and Plant Health Inspection Service (USDA/APHIS)	United States Public Sector	Safeguarding US agriculture.

\* National stakeholders for the other OECS participating countries have not been included because there are no national level activities taking place.

**A.4. Gender Equality and Women's Empowerment.** Elaborate on how gender equality and women's empowerment issues are mainstreamed into the project implementation and monitoring, taking into account the differences, needs, roles and priorities of women and men. Did the project conduct a gender analysis during project preparation (yes ☐ /no ☒)?; This analysis will be done during the inception workshop. Did the project incorporate a gender responsive project results framework, including sex-disaggregated indicators (yes X /no ☐)? what is the share of women and men direct beneficiaries (women X%, men X%)? <sup>11</sup>

Invasive species have significant negative and sometimes positive impacts, and so how they are managed has consequences. Gender affects people's experiences, concerns and capabilities in natural resource management and gender relations influence how environments are managed and used over time (Masika and Joeke, 1997). Similarly to other issues in natural resource management, taking a gender perspective on invasive species can:

- Improve understanding of the impacts
- Increase the effectiveness of invasive species prevention and management
- Contribute to social equality

In relation to the loss of biodiversity due to IAS; it was noted, that indigenous women may utilize a wide variety of plants for nutritional, medicinal, cultural and other purposes, so invasives that reduce that biodiversity would more immediately impact women. Biodiversity loss can also impact ecotourism. National parks and reserves and the biodiversity they contain are the basis for major tourism industries in a number of Caribbean countries, and reduction of that biodiversity reduces their attractiveness. Different jobs in the tourism industry may be done more by one or other gender, so all suffer when tourism is affected (Fish et al, 2010).

It is also important to consider whether there are any gender differences in perception of IAS risks and management. Gender differences in risk perception are well documented in the literature (eg Bord & O'Connor, 1997), many showing that men rate risks lower than do women. In the context of IAS, risk perception is important in prevention, not only by the risk analysts but by the general public who may introduce an invasive species. Where legislation exists and is enforced, the perception of the risk of getting caught comes into play. In invasive species management, the risk of the control methods may be perceived differently by men and women (Fish et al, 2010). This is an important point that the project will take into account when supporting the countries on activities such as the drafting of NISSAPs, guidelines, and in streamlining regional cooperation.

The project has also taken into consideration gender related issues, such as the differentiated roles that women and men have on various areas such as agriculture, tourism, biodiversity preservation, education and households. The activities of the project will be undertaken under the no-discrimination approach, making opportunities available to both, men and women; paying particular attention to support whenever possible those groups that have a key role in bringing income to families and/or who's involvement on particular activities could boost their potential for future work engagements.

The project will collect and disaggregate the gender in its reporting and ensure where possible that project implementation is gender sensitive. From casual observations it seems that activities such as risk assessment and public awareness and communication are dominated by women while surveillance is balanced but eradication activities could be male dominated.

The project will apply gender targets to project activities including seeking at least 50% participation of women among persons receiving training in IAS procedures, among field workers at the project pilot sites, and in participation in site-level co-management groups and in decision-making fora. Gender indicators have been included in the project's log-

<sup>11</sup> Same as footnote 8 above.



frame. Efforts will also be made to enhance awareness among women: gender sensitive awareness materials will be developed, and workshops will be scheduled to ensure that women can participate (and in some cases, separate workshops for women may be convened to allow them to comment and participate more freely in issues pertaining to IAS). The communications, education and public awareness (CEPA) strategy will be gender sensitive in its approach, and therefore when developing the tools, documents and messages, the different roles that women and men could play in relation to IAS will be taken into account.

**A.5 Risk.** Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation. (Table format acceptable):

Risk analysis and risk management measures are summarized in the table below:

<b>Project Risks</b>				
<b>Description</b>	<b>Type</b>	<b>Impact / Probability:</b> On a scale from 1 (low) to 5 (high)	<b>Mitigation Measures</b>	<b>Owner</b> (who has been appointed to keep an eye on this risk)
Obtaining the necessary behaviour change to prioritize prevention over management in terms of cost effectiveness	Political	P= 3 I = 2	Early warning systems, emphasizing risks associated with key pathways	Project management and GEF OFP in participating countries.
Changes in internal conditions, such as movement of staff (e.g due to promotions) or the shifting of national local implementing partners to another Ministry, may lead to the delays in some components.	Operational	P=2 I=3	Institute a knowledge management strategy that allows for documentation of all decisions and actions taken in order to permit quick resumption of activities by any new staff. In addition, the use of UN Environment's project management tool ANUBIS will serve to mitigate this risk since all project related information is stored there.	Project Management Unit (PMU)
Unsustainable Financing (non-materialization of co-finance and/or insufficient project funds due to unexpected changes in economies, availability of local professionals, transportation, etc.)	Operational	P=2 I=3	Co-financing commitments have been secured prior to the start of project implementation. Actively follow up during the project to ensure pledged commitments are realized. Undertake annual budget revisions to ensure funds are allocated for key project activities based on the current situation at that time.	PMU; National Implementing Organization (NIO)
Increased international tourism, trade and transport increases the risk of IAS entry and spread within the target countries	Environmental	P=4 I=4	Develop and implement a strategy to engage the private sector through targeted public awareness. Mitigation will occur during the entire implementation life of the project.	PMU, NIO
Climate change related habitat shifts and destruction create conditions for spread of Invasive Species	Environmental	P=3 I=3	Increased study and surveillance of invasions, data collection and development of management plans to address problems. The project itself will respond to this risk through its activities.	NIO
Limited access to data due to possible trade	Political	P=2 I=3	Regional forums for exchange of data; collaboration with international	PMU; NIO

implications			databases such as the CABI Invasive Species Compendium and the Global IAS Database.	
Limited buy in from national communities	Socio-political	P=2 I=3	The project will take advantage of its communication strategy that targets key stakeholders and will use the right media to reach them. In addition, the project will not be working in isolation; it will work closely with local partners and Governmental institutions to secure their support.	NIO
Changing government priorities through change in governments or ministers in charge	Political	P=2 I=3	Keep the GEF and other national focal point informed at all stages; keep regional bodies and fora updated on the project.	PMU; NIO;
Lack of regional Buy-in	Socio-political	P=2 I=3	The project will take advantage of its communication strategy that targets key stakeholders and will use the right media to reach them. In addition the project will not be working in isolation; it will work closely with regional partners and institutions to secure their support. Key partners will also be invited to project meetings (i.e CARICOM; OECS; SCBD). The Basseterre treaty would also add to the mitigation of this risk, since better management of IAS will have an impact on the region's trade.	PMU

**A.6. Institutional Arrangement and Coordination.** Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

With regard to coordination with other projects, this project will coordinate with the UNDP-GEF project "Climate Resilient Agriculture for Integrated Landscape Management" in Grenada on IAS-related activities, which are principally focused on the control of invasive bamboo, and control of the small Indian Mongoose (*Herpestes auropunctatus*) in order to protect native species such as the Grenada Frog (*Pristimantis euphronides*) and the Grenada Dove (*Leptotila wellsi*). This project will share experiences with the Grenada Dove Conservation programme via study tour or teleconferences, including information on the mongoose trapping in Barbados.

Please refer to section 4 of the Prodoc for additional details on institutional arrangements to the information provided in the PIF.

**A.7 Benefits.** Describe the socioeconomic benefits to be delivered by the project at the national and local levels. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

No changes from PIF

**A.8 Knowledge Management.** Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.

The project's knowledge management strategy will be based on: generating information of interest, which can be shared; and learn from experiences of other projects and countries. In this sense, the project due to its regional nature, will ensure that under component 3, spaces for discussion and networking are made available.

Since component 1 and 2 of this project are specifically for 3 countries, the results of these components and the lessons learned from these 3 countries (Antigua and Barbuda, Barbados and St. Kitts) will be shared during the steering committee meeting and in other regional forums, to ensure that other countries from and outside the region, can benefit from these practical experiences. Because UN Environment is also an implementing agency of a regional IAS project in the Pacific region, synergies between both projects will be sought. In addition, following GEFSEC advice, sharing of experiences will also be sought from the Cuba IAS project. To do this, a Cuban representative will be invited to join the inception workshop and share their experiences.

In addition, project's success is partially dependent on an effective public awareness, communication and mainstreaming strategy as a mean to disseminate key products, collect data, foster networking and share lessons learned. In this sense, the continuous communications and mainstreaming of project interventions at local, national, and international level is critical to the success of the project. Thus, a communications, education and public awareness (CEPA) strategy will be ready for endorsement by participating countries at the inception workshop.

The strategy will seek to:

- 1) Understand the baseline knowledge of key actors and other stakeholders in relation to IAS
- 2) To continuously assess data gaps and needs
- 3) Effectively communicate in a language tailored to various audiences, the threats posed by IAS, and actions needed to avoid invasion, spread and control measures.
- 4) Disseminate information about the project, its objective and the measures being taken by the OECS countries.
- 5) Share lessons learned and network with key partners.
- 6) Streamline regional communication

Key messages for the CEPA will be: potential effect of IAS on the Caribbean biodiversity, possible economic and social impacts, and opportunities for change. Target audiences identified during PPG are: government employees directly related with IAS control, politicians and decision makers, local communities, regional organizations and forums where IAS related issues could be discussed (i.e. OECS, CARICOM, CAHNSA, etc.); as well as private sector and industries who could potentially play a role in either mitigation the impact of IAS, or supporting their control. The strategy will be gender sensitive on its approach, and therefore when developing the tools, documents and messages, the different roles that women and men could play in relation to IAS will be taken into account.

The CEPA strategy will utilise wherever possible the existing platforms for these messages to be disseminated. Some of the platforms identified so far are: CABI and UN Environment's websites, BIOPAMA platform within the UWI, Caribbeanbiosafety.org, local government databases and websites, amongst others. Social media has proven to be useful not only to communicate messages and raise awareness, but also to measure people's interest and reactions to particular issues. In this sense, a more specific approach towards this will be developed during project inception phase.

The strategy will enhance the [cias.net](http://cias.net) website to facilitate regular bulletins on the status of project implementation and the outputs that are produced, as well as a mean to obtain visibility and support the sustainability of the project through presenting the problem, solutions, and actions taken so far to a wider audience which can bring along future investments on IAS for the region.

The project will also try to take advantage of other successful experiences. In this regard, a very effective Public Awareness Strategy was developed and implemented by St. Lucia during the MTIASIC project. This included the use of a regional IAS on-line group; television and radio programmes; print media; [ciasnet.org](http://ciasnet.org) as well as national online sources. These experiences will inform the CEPA strategy. The strategy for each country will be informed by the surveys and build on national actions like those that are conducted routinely by the EAG.

Finally, component 3 of the project will be key to the CEPA strategy, as some of the outputs such as the mobile app and identification guide would complement communication on and raise awareness of IAS via citizens' science.

**B.1 Consistency with National Priorities.** Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions such as NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The project is consistent with the national priorities of the participating countries. This is evidenced in their respective endorsement letters and pledge of co-finance. It is particularly relevant for national priorities related to environmental protection; safeguarding biodiversity and natural heritage as well as goals relating to food security; livelihoods and wellbeing of the populations. The project contributes to the Aichi Biodiversity target 9 and the NBSAPs as well as the SPAW-RAC key objectives.

Further details on the consistency with each countries priority can be gleaned from section 3.6 of the project document.

### C. DESCRIBE THE BUDGETED M &E PLAN:

The costed M&E Plan can be found in Appendix 7 of the project document. Monitoring and evaluation will be on an on-going basis and used to test assumptions made during the development of the PIF and the FSP. The results of the M&E will be used in adaptive management that will be employed during the project. M&E will be funded by the GEFTF to the sum of U\$265,000. The M&E activities will be participatory using both males and females from the IA and EA agencies as well as the national partners and where possible the private sector; regional and international NGOs as well as external consultants for the mid-term and end of project evaluations. This participatory approach that is gender balanced will also serve to enhance the sharing of experiences and documenting of lessons learnt.

The first opportunity of monitoring and evaluation will be the inception workshop. At the inception workshop the year one work plan and budget will be discussed and signed off by the IA and EA agencies. The stakeholders will have a clear understanding of the year one work plans and budget; an inception report will document any changes from the project document and document the key concerns that will be monitored by the PMU during their monthly meetings. The project communication strategy and baseline data will also be finalized at the inception workshop.

The project indicators will be monitored continuously by the PMU and will be formally documented in the bi-annual project implementation reports. These will also be assessed by external consultants via the mid-term and end of project evaluations. These reports will be reviewed by the national project steering committees and the International Project Steering committee that will make any necessary adaptations in the implementation of the project. These decisions and any lessons learnt will also be formally documented and shared with all key stakeholders.

Monitoring field visits will be made by CABI technical staff as well as the reviewers that will be conducting the mid and final term evaluations. All M&E reports will be available online for review by stakeholders.

M&E activity	Responsible Parties	Approx. Budget from GEF (US\$)	Budget co-finance	Time Frame
Inception Workshop	Project Management Unit (PMU) UN Environment	21,000	15,000	Within 2 months of project start-up
Inception Report (translation cost) publications and reporting)	PMU		5,000	1 month after project inception meeting
-Measurement of project -baseline data collection  *all indicators will be measured by the appointed project team that will consist of regional	<input type="checkbox"/> Regional Project Coordinator  <input type="checkbox"/> PMU/ Project team	30,000	50,000	Outcome indicators:  start, mid and end of Project Progress/perform.  Indicators: Within 1 month of the end of

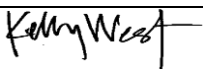
<p>project coordinator, CABI experts/support team and the national project focal points. The overall responsibility of the measurement of indicators will be with the project coordinator.</p> <p>Comp 1 indicators will in addition be measured with support from countries' representatives, Comp 2 indicators will be measured with support of the pilot coordinators, and Component 3 indicators will be measured with support from CABI, the CBD CARICOM, etc.</p>				<p>reporting period i.e. on or before 31 January and 31 July (through progress reports)</p> <p>Baseline data collection: within the 1st year.</p>
<p>Project Steering Committee (SC)</p>	<p>Regional Project Coordinator</p> <p><input type="checkbox"/> PMU</p> <p><input type="checkbox"/> UN Environment</p>	43,000	50,000	<p>At least once per year face to face and once a year virtually meetings</p>
<p>Reports of SC meetings</p>	<p>Regional Project Coordinator with inputs from partners</p>		15,000	<p>Same as above</p>
<p>Monitoring visits to field sites and areas where project is active (this will include pilot sites in 3 countries + meetings to support the development of activities under all the components)</p>	<p>Project Coordinator</p> <p>UN Environment</p>	5,000	55,000	<p>As needed and based on project progress and identified needs for support during implementation</p>
<p>Communication of M&amp;E actions</p>	<p>CABI</p>	1,000	20,000	<p>Annually at SC meetings</p>
<p>Audit reports</p>	<p>CABI</p>	60,000	25,000	<p>annually</p>
<p>Mid Term Review</p>	<p>UN Environment TM/ UN Environment Evaluation Office</p> <p>PMU</p>	45,000	30,000	<p>At mid-point of project</p>
<p>Terminal Evaluation</p>	<p>UN Environment TM/ UN Environment</p>	60,000	50,000	<p>At project end</p>

	Evaluation Office PMU			
<b>Total M&amp;E Plan Budget</b>		<b>265,000</b>	<b>315,000</b>	

### **PART III: CERTIFICATION BY GEF PARTNER AGENCY(IES)**

#### **A. GEF Agency(ies) certification**

**This request has been prepared in accordance with GEF policies<sup>12</sup> and procedures and meets the GEF criteria for CEO endorsement under GEF-6.**

<b>Agency Coordinator, Agency Name</b>	<b>Signature</b>	<b>Date (MM/dd/yyyy)</b>	<b>Project Contact Person</b>	<b>Telephone</b>	<b>Email Address</b>
Kelly West, Senior Program Manager & Global Environment Facility Coordinator Corporate Services Division		April 17, 2018	Marianela Araya	+507- 3053169	marianela.araya@unep.org

<sup>12</sup> GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, SCCF and CBIT  
GEF6 CEO Endorsement /Approval Template-August2016

**ANNEX A: PROJECT RESULTS FRAMEWORK** (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

**Please refer to appendix 4 of the project document.**



**ANNEX B: RESPONSES TO PROJECT REVIEWS** (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

**Please refer to appendixes 18 and 19 of the project document.**

**ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS<sup>13</sup>**

A. Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: <b>133,333</b>			
<b><i>Project Preparation Activities Implemented</i></b>	<b><i>GETF/LDCF/SCCF/CBIT Amount (\$)</i></b>		
	<b><i>Budgeted Amount</i></b>	<b><i>Amount Spent To date</i></b>	<b><i>Amount Committed</i></b>
Project Personnel	62,708	62,708	
Travel on official business	10,000	9,620	
Sub contract to supporting organizations	36,000	36,000	
Meetings and Conferences	24,626	18,410	6,000
Sundry	0	596	
<b>Total</b>	<b>133,334</b>	<b>127,3334</b>	6,000

<sup>13</sup> If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities. Agencies should also report closing of PPG to Trustee in its Quarterly Report.

**ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)**

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)

NA



## PROJECT DOCUMENT

### SECTION 1: PROJECT IDENTIFICATION

- 1.1 Project Title:** Preventing COSTS of Invasive Alien Species (IAS) in Barbados and the OECS Countries
- 1.2 Project number:** 9408
- 1.3 Project type:** FSP
- 1.4 Trust Fund:** GEF
- 1.5 Strategic Objectives:**  
 GEF strategic long-term objective: BD3  
 Strategic programme GEF VI: Programme
- 1.6 UN ENVIRONMENT priority:** Ecosystem Management
- 1.7 Geographical scope:** Regional
- 1.8 Mode of execution:** External
- 1.9 Project executing organisation:** CAB International
- 1.10 Duration of project:** 36 Months  
 Commencing: March 2018  
 Technical completion: March 2021
- Validity of legal instrument:** 48 months
- 1.11 Cost of project** US\$ 10,404,422  
**Cost to the GEF Trust fund** US\$ 3,747,945 % 36.0  
**Cofinance** US\$ 6,656,477 % 64.0

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount US (\$)
Antigua and Barbuda	Plant Protection Department of Agriculture	In Kind	500,000
	Department of Environment	In Kind	500,000
	Antigua and Barbuda Defence Force	In Kind	90,000
	Environmental Awareness Group	In Kind	75,000
	National Parks Authority	In Kind	20,000
		<b>Sub total</b>	<b>1,185,000</b>
Barbados	Ministry of the Environment	In Kind	1,202,112
		Cash	30,000
	Ministry of Agriculture	In Kind	126,300
	Ministry of Health	In Kind	360,000
	Coastal Zone Management Unit	In Kind	9,000
		<b>Sub total</b>	<b>1,727,412</b>

Dominica	Ministry of Agriculture	In Kind	Hurricane devastation made it impossible to receive the letter at this stage. During inception meeting efforts will be done to obtain the letter.
Grenada	Ministry of Agriculture	In Kind	<b>105,000</b>
St. Kitts and Nevis	Ministry of Agriculture	In Kind	<b>727,602</b>
St. Lucia	Ministry of Agriculture	In Kind	300,000
	Ministry of Sustainable Development	In Kind	262,362
		<b>Sub Total</b>	<b>562,362</b>
St. Vincent and the Grenadines	Ministry of Agriculture	In Kind	<b>301,101</b>
NGO	CAB International	In Kind	<b>300,000</b>
NGO	Flora and Fauna International	Cash	240,000
		In Kind	260,000
		<b>Sub Total</b>	<b>500,000</b>
International organization	United Nations Environment Programme	In Kind	<b>100,000</b>
Bi-Lateral	USDA APHIS	Cash	213,000
		In Kind	380,000
		<b>Sub Total</b>	<b>593,000</b>
NGO	CCN	In Kind	<b>300,000</b>
Non-Governmental organisation	FAO	In Kind	<b>255,000</b>
<b>TOTAL</b>			<b>6,656,477</b>

### Summary

The current project will contribute to prevention, early detection, control and management of invasive alien species in the Caribbean region. The project will be implemented on a 3 year period with seven countries participating. Antigua and Barbuda, Barbados and St Kitts will participate on all the 3 project components and 7 countries (Antigua and Barbuda, Barbados and St Kitts, St Vincent and The Grenadines, Grenada, Dominica and St Lucia) will be part of component 3, which is of a regional nature and commign from set aside funds. The proeject will be implenmented by UN ENVIRONMENT and executed by CABI with support from the participating countries. The project's 3 components are:

- 1) IAS Policy, Institutions and Capacity (Antigua and Barbuda; Barbados; St. Kitts and Nevis)
- 2) Control and Management of IAS Impacts
- 3) Regional Biosecurity

**Fig: 1 Eastern Caribbean the location of this regional project.**

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## ACRONYMS AND ABBREVIATIONS

BD	Biodiversity
BWM	Ballast Water Management Convention
BEST	Biodiversity and Ecosystem Services
CABI	Centre for Agriculture and Biosciences International
CABI CCA	Centre for Agriculture and Biosciences International – Caribbean and Central America
CAHFSA	Caribbean Agricultural Health and Food Safety Agency
CARDI	Caribbean Agricultural Research and Development Institute
CARIBVet	Caribbean Animal Health Network
CARICOM	Caribbean Community
CARPHA	Caribbean Public Health Agency
CBD	Convention on Biological Diversity
CCI	Caribbean Challenge Initiative
CEPA	Communications, Education and Public Awareness
CEPF	Critical Ecosystems Partnership Fund
COTED	Council for Trade and Economic Development
CPHDF	Caribbean Plant Health Directors Forum
CSA	Critical Situation Analysis
DoE	Department of Environment
EA	Executing Agency
EAG	Environmental Awareness group
ECEU	Eastern Caribbean Economic Union
EIMAS	Environmental Information Management and Advisory System
ELI	Environmental Law Institute
EDRR	Early Detection and Rapid Response
EU	European Union
FAO	Food and Agriculture Organisation
FFI	Fauna and Flora International
GCCA	Global Climate Change Alliance
GEB	Global Environment Benefits
GEF	Global Environment Facility
GloBallast	Global Ballast Water Management Programme
GOV	Government
IA	Implementing Agency
IAS	Invasive Alien Species
IICA	Inter-American Institute for Cooperation on Agriculture
IUCN	International Union for Conservation of Nature
IMO	International Maritime Organization
IPSC	International Project Steering Committee
KBA	Key Biodiversity Areas
MEA	Multilateral Environment Agreement
M&E	Monitoring and Evaluation
MTE	Mid-Term Evaluation
MTIASIC	Mitigating the Threats of Invasive Alien Species in the Insular Caribbean
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organization
NIO	National Implementing Organization
NISSAP	National Invasive Species Strategies and Action Plan
NSC	National Steering Committee
OECS	Organisation of Eastern Caribbean States
OPRC	Oil Pollution Preparedness, Response and Cooperation
PAA	Project Administrative Assistant
PMU	Project Management Unit
PPG	Project Preparation Grant
PSC	Project Steering Committee
PM	Planting Material

POPs	Persistent Organic Pollutants
PSC	Project Steering Committee
RRP	Redonda Restoration Programme
RSC	Regional Steering Committee
RSPB	Royal Society for the protection of Birds
SCBD	Secretariat of the Convention on Biological Diversity
SGD	St. Georges Declaration
SIDS	Small Island Developing States
SPS	Sanitary and Phyto Sanitary
TE	Terminal Evaluation
UN Environment	United Nations Environment Programme
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
USDA/APHIS	United States Department of Agriculture/Animal and Plant Health Inspection Service
UWI	University of the West Indies
WTO	World Trade Organization

## SECTION 2: BACKGROUND AND SITUATION ANALYSIS (BASELINE COURSE OF ACTION)

### 2.1 Background and context

- 1 Islands are recognized as having exceptionally high numbers of endemic species, with 15% of bird, reptile and plant species on only 3% of the world's land area. The conservation significance of islands is highlighted by global analyses showing that 67% of the centres of marine endemism and 70% of coral reef hotspots are centred on islands. This unique flora and fauna is threatened by Invasive Alien Species (IAS).
- 2 IAS are those plants, animals and microbes which are introduced to new regions, mainly through human activities, where they establish and spread, impacting negatively on biodiversity, agriculture, water resources, and human health (Pimental, 2001). Invasive species are distinct from "pests" in specifically having additional negative impacts on ecosystem services, including amongst others, such services as a stable hydrology for water supply and containment of floods; soil productivity, pollination functions, or containment of crop diseases for food crop production (Turpie, 2004; van Wilgen et al., 2008).
- 3 Since the year 1600 39% of animal extinctions arose mainly from the introduction of alien species, 36% from habitat destruction, and 23% from hunting or deliberate extermination. It is well documented that most of these extinctions occurred on islands, mainly as a result of IAS, with 80-90% of all reptile extinctions; 80-93% of all bird extinctions; and 50-81% of all mammal extinctions. Islands have suffered 64% of IUCN-listed extinctions and have 45% of IUCN-listed critically endangered species. In the past 500 years, IAS have contributed to the extinction of nearly half of global bird extinctions: 67% of globally threatened birds inhabiting oceanic islands are affected by IAS compared to 30% of globally threatened birds on continents. For example, over half of the endemic birds of the Hawaiian Islands are now extinct, due to habitat loss, introduced predators and diseases.
- 4 Small Island Developing States (SIDS) of the OECS lack national policy, awareness and capacity to effectively deal with IAS. The lack of regional cooperation is also a major impediment, especially with regard to the management of pathways. Failure of one SIDS to effectively manage IAS means that all other islands are at increased risk. A review of available data from the six OECS countries reveals a wide range of invasive species are already affecting the economy, human and animal health and biodiversity of global significance. Barbados and the following islands that belong to the Organisation of Eastern Caribbean States (OECS): Antigua and Barbuda; Dominica; Grenada; Saint Kitts; Saint Lucia and Saint Vincent are all parties to the Convention on Biological Diversity. As such these small island states recognize that there is an urgent need to address the impact of Invasive Alien Species (IAS). Article 8(h) of the Convention on Biological Diversity (CBD) states that, "Each contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species".
- 5 Since the early 1990's on becoming parties to the CBD these small island states have undertaken various initiatives to satisfy their commitment under the CBD in general and article 8(h) in particular. However, the vulnerabilities to IAS due to their relatively large border to land mass; difficult topography; large numbers of tourist arrivals; relatively high volume of trade; insufficient technical capacity and poor coordination among stakeholders made it imperative that these Small Island Developing States (SIDS) come together to tackle the issue of IAS in a manner that will build capacity, create greater awareness while eradicating, controlling and managing IAS that are affecting native biodiversity currently and lead to sustainable actions for preventing further negative impacts from IAS.
- 6 There is a dearth of quantitative information on impact of IAS on biodiversity and the economies of these countries. Table 1 highlights some important IAS that is currently impacting this small island states. However sufficient evidence exist that this problem is an old one and has contributed to the severe negative impacts on native biodiversity as shown in number of native and endemic species that are critically endangered (see Appendix 17) most by invasive species.

**Table 1:** Highlights of IAS that were introduced in Barbados and the OECS

Country	Samples of recent invasives (partial and indicative only)
Antigua and Barbuda	Giant African Snail ( <i>Lissachatina fulica</i> ), Pacific Lionfish ( <i>Pterois volitans</i> ), Lemon grass ( <i>Cymbopogon</i> spp.), Cuban tree frog ( <i>Osteopilus septentrionalis</i> ), Dwarf Mongoose ( <i>Herpestes</i>

	<i>javanicus</i> ), Lethal Yellowing ( <i>Myndus crudus</i> ), Black Rat ( <i>Rattus rattus</i> ), Brown Rat ( <i>Rattus norvegicus</i> )
Barbados	While there have been no definitive local studies on alien invasive species in Barbados, there is anecdotal evidence that some non-native plant species may be displacing local species in certain key habitats. For example, the cultivated Macarthur Palm ( <i>Ptychosperma macarthurii</i> ) seems to be displacing the indigenous Macaw Palm ( <i>Aiphanes minima</i> ) as the dominant understorey species. In certain forested gullies, the characteristic shrub layer has been replaced by solid stands of Sweet Lime ( <i>Triphasia trifolia</i> ) or Mother-in-law's tongue ( <i>Savevieria hyacinthoides</i> ), both of which are garden escapes. There is no quantitative information on the distribution and abundance of insects and invasive species on a species by species basis in Barbados except for significant crop pests such as the diamond-back moth or significant livestock parasites like the tropical bont tick.
Commonwealth of Dominica	Giant African Snail ( <i>Lissachatina fulica</i> ), Pacific lionfish ( <i>Pterois volitans</i> ), Brown citrus aphid ( <i>Toxoptera citricida</i> ), Citrus tristeza virus (CTV), Asian citrus psyllid ( <i>Diaphorina citri</i> ), Huanglongbing disease ( <i>Candidatus liberibacter asiaticus</i> ), Black Sigatoka disease ( <i>Mycosphaerella fijiensis</i> ), Red palm mite ( <i>Raoiellai indica</i> ), Seagrass ( <i>Halophila stipulacea</i> ), and Lemon grass ( <i>Cymbopogon</i> spp.), scaly insect ( <i>Icerya schechellarum</i> ), and The Chytrid fungus (on the Mountain Chicken, the native frog species of Dominica)
Grenada	Moko disease ( <i>Ralstonia solanacearum</i> ), Coconut mite ( <i>Aceria guerreronis</i> ), Pink hibiscus mealybug ( <i>Maconellicoccus hirsutus</i> ), Mango seed weevil ( <i>Sternochetus mangiferae</i> ), West Indian fruitfly ( <i>Anastrepha obliqua</i> ), Black Sigatoka disease ( <i>Mycosphaerella fijiensis</i> ), Red palm mite ( <i>Raoiellai indica</i> ), White Cedar thrips ( <i>Holopothrips inquilinus</i> ), Leaf Cutting Ant (Carriacou), Seagrass ( <i>Halophila stipulacea</i> ), Pacific lionfish ( <i>Pterois volitans</i> ) Agricultural invasive species list: <a href="http://www.ciasnet.org/wp-content/uploads/2012/11/Grenada.doc">http://www.ciasnet.org/wp-content/uploads/2012/11/Grenada.doc</a>
St. Kitts and Nevis	Silver leaf whitefly ( <i>Bemesia argentifolii</i> ), Cactus moth ( <i>Cactoblastis cactorum</i> ), Green vervet monkey ( <i>Chlorocebus sabaeus</i> ), Indian Mongoose ( <i>Herpestes javanicus</i> ), Pink Hibiscus mealybug ( <i>Maconellicoccus hirsutus</i> ), Tropical bont tick ( <i>Amblyomma variegatum</i> ), Pacific lionfish ( <i>Pterois volitans</i> ). The Green vervet monkeys ( <i>Chlorocebus sabaeus</i> ) which were originally brought to St. Kitts & Nevis from Africa by the French in the 17th century are rumored to outnumber the human population of St. Kitts and Nevis and are a priority for management.
St. Lucia	Notable species present that are impacting or with the potential to severely impact biodiversity include: Orange winged parrot ( <i>Amazona amazonica</i> ) Cuban brown anole ( <i>Anolis sagrei</i> ) Cane toad ( <i>Bufo marinus</i> ); Rock pigeon ( <i>Columba livia</i> ) Feral cats ( <i>Felis catus</i> ) Feral dogs ( <i>Canis lupus familiaris</i> ) Alien iguana ( <i>Iguana iguana</i> ) Brown rat ( <i>Rattus norvegicus</i> ); Black rat ( <i>Rattus rattus</i> ); Feral pigs ( <i>Sus scrofa</i> ) and small Asian mongoose ( <i>Herpestes javanicus</i> ). For 160 invasive species in St. Lucia and their status: Please see 160 invasive species in St. Lucia and their status: <a href="http://www.ciasnet.org/wp-content/uploads/2010/08/IAS-present-in-SLU-May-2012-revision.pdf">http://www.ciasnet.org/wp-content/uploads/2010/08/IAS-present-in-SLU-May-2012-revision.pdf</a>
St Vincent and the Grenadines	Formosa termite ( <i>Coptotermes formosanus</i> ), Mango seed weevil ( <i>Sternochetus mangiferae</i> ), Pink hibiscus mealybug ( <i>Maconellicoccus hirsutus</i> ), West Indian fruit fly ( <i>Anastrepha obliqua</i> ), Citrus black fly ( <i>Alearocanthus woglomi</i> ), Asian Citrus Psyllid ( <i>Diaphorina citri</i> ), Cycad Scale ( <i>Aulacaspis yasumatsui</i> ), Sloan slug ( <i>Veronicella sloanei</i> ), Black rat ( <i>Rattus rattus</i> ), Norway rat ( <i>Rattus norvegicus</i> ), Mouse ( <i>Mus musculus</i> ), Indian mongoose ( <i>Herpestes javanicus</i> ), Nine banded armadillo ( <i>Dasybus novemcinctus</i> ), Cane toad ( <i>Bufo marinus/Rhinella marina</i> ), Johnstones whistling frog ( <i>Eleutherodactylus johnstonei</i> ), Rock dove ( <i>Columba livia</i> ), Indo-Pacific lionfish ( <i>Pterois volitans</i> and <i>Pterois miles</i> ), Ground lizard ( <i>Ameiva ameiva</i> ), House Gecko ( <i>Hemidactylus mabouia</i> ), Trumpet bush ( <i>Cecropia peltata</i> ), Water hyacinth ( <i>Eichhornia crassipes</i> ), Kudzu vine ( <i>Pueraria montana</i> ), African tulip tree ( <i>Spathodea campanulata</i> ), Singapore daisy ( <i>Sphagneticola trilobata</i> ), Lantana ( <i>Lantana camara</i> ), Leucaena ( <i>Leucaena leucocephala</i> ), Lemon grass ( <i>Cymbopogon</i> sp.), Elephant grass ( <i>Pennisetum purpureum</i> ), Seagrass ( <i>Halophila stipulacea</i> ), Moko disease ( <i>Ralstonia solanacearum</i> ), Huanglongbing disease ( <i>Candidatus liberibacter asiaticus</i> )

- 7 In the proposed project countries, the management of IAS is not yet effectively addressed in terms of policy/legislation, professional capacity and active management and as such the impacts that IAS currently present and threats of future IAS introductions/incursions remains very high and is increasing as a result of land degradation and globalization. However, for the Caribbean, the Critical Ecosystems Partnership Fund (CEPF) rated the various threats to the Caribbean Biodiversity Hotspot from one to four. With one corresponding to an insignificant threat/impact and four being highly significant impact or threat. Ten threats to Caribbean biodiversity were assessed with IAS ranking 3.7 as the most significant.

**Table 2:** Prioritized Threats in the Caribbean Islands Hotspot

THREATS	Average prioritization score (on a scale from 1–4)
Invasive Species	3.7
Residential, Commercial Development	3.5
Severe Weather, Climate Change	3.3
Human Disturbance	2.8
Agricultural Expansion, Intensification	2.7
Over-exploitation	2.7
Mining, Energy Production	2.6
Pollution	2.4
Transportation	2.3
Geological Events	1.2

Source: (Critical Ecosystem Partnership Fund, 2010)

- 8 Some highlights of the impacts of IAS on biodiversity include: In Barbados the rat and mongoose are having a deleterious impact on the population of hawksbill turtle (*Eretomchelys imbiricata*) on nesting beaches. Rats and goats have decimated both flora and fauna on Redonda Island, an off shore island of Antigua and Barbuda with unique biodiversity despite the absence of humans on this island for more than five decades. In Dominica there are many IAS that are severely impacting the agriculture sector. The Giant African Snail (*Lissachatina fulica*) has demonstrably impacted crop production in Antigua and Barbuda; Barbados and Dominica. However, the extent to which it is negatively impacting native snails is yet to be quantified. IAS as crop pest such as a wilt complex is having a severe economic impact on the Nutmeg production one of the main exports of Grenada. The national bird the Grenada Dove is being predated by the mongoose, rats and feral cats causing a reduction in its population. The Green Vervet Monkey (*Chlorocebus sabaeus*) brought in from Africa in the 17 century is now reported to be of a higher number than the human population in St. Kitts is seen as an attraction to the tourism product, a major pest to crop farmers and major nuisance to many householders while some environmentalists considering them to be part of St. Kitts biodiversity. This is clearly now an invasive/conflict species that needs to be managed. St Lucia attempted to control the Invasive Green Iguana in a previous GEF funded project and kept its offshore island free of IAS which offered its native racer (*Erythrolamprus ornatus*) some chance of expanding its population and chances for long term survival. Several other species are known to be impacting its native biodiversity. These include: Orange winged parrot (*Amazona amazonica*) Cuban brown anole (*Anolis sagrei*) Cane toad (*Bufo marinus*); Rock pigeon (*Columba livia*) Feral cats (*Felis catus*) Feral dogs (*Canis lupus familiaris*) Alien iguana (*Iguana iguana*) Brown rat (*Rattus norvegicus*); Black rat (*Rattus rattus*); Feral pigs (*Sus scrofa*) small Asian mongoose (*Herpestes javanicus*).
- 9 A detailed analysis of the IAS present in these countries will be compiled and made available to the countries as part of their capacity building for conducting pest risk analysis. This information will also be used to populate a Mobile App to help those engaged in surveillance to detect potential IAS that may enter via ports of entry.

## 2.2 Global significance

- 10 The project will support the conservation of biodiversity in the Caribbean region, which will at the same time contribute to the global efforts to safeguard biodiversity. IAS is one of the major cause of biodiversity lost on Islands. The project will contribute to the reduction of threats to globally significant biodiversity by improving management, prevention and control of IAS; avoid extinction as a result of IAS management.

- 11 The Global significance of the Caribbean Biodiversity Hotspot is aptly described by the Critical Ecosystem Partnership Fund's Caribbean Ecosystem Profile section on Species Diversity, Endemicity and Global Threat Status notes that the Caribbean Islands Hotspot supports a wealth of biodiversity within its diverse terrestrial ecosystems, with a high proportion of endemicity making the region biologically unique. It includes about 11,000 plant species, of which 72 percent are endemics. For vertebrates, high proportions of endemic species characterize the herpetofauna (100 percent of 189 amphibian species and 95 percent of 520 reptile species), likely due to their low dispersal rates, in contrast to the more mobile birds (26 percent of 564 species) and mammals (74 percent of 69 species, most of which are bats). Species endemic to the hotspot represent 2.6 percent of the world's 300,000 plant species, and 3.5 percent of the world's 27,298 vertebrate species. By percentage, amphibians and mammals are the most threatened of the taxonomic groups assessed, at 77 percent and 39 percent respectively.

**Table 3:** Terrestrial Species Diversity, Endemicity and Global Threat in the Caribbean Islands Hotspot

<b>Taxonomic Group</b>	<b>Species</b>	<b>Hotspot endemics</b>	<b>% Endemism</b>	<b>Globally Threatened</b>	<b>% Threatened</b>
Mammals	69	51	74	27	39
Birds	564	148	26	51	9
Reptiles	520	494	95	37	7
Amphibians	189	189	100	145	77
Freshwater Fish	167	65	39	5	3
Plants	11,000	7,868	72	438	4
<b>Total</b>	<b>12,509</b>	<b>8,817</b>	<b>70</b>	<b>703</b>	<b>6</b>

- 12 The high level of biological diversity in the Caribbean is due to several factors. Geologically, the hotspot has a complex history, with the Greater Antilles forming in the Pacific Oceans more than 200 million years ago, when it was attached to what is today the Yucatan Peninsula. During its eastward migration between the Americas, the Caribbean collided with other land forms along South America, creating unique landscapes and bedrock. The Lesser Antilles are the active remnants of an ancient volcanic chain, and are geologically much younger than the larger islands to the west and north. This geologic complexity provides the basis for species that find their origin along both the Pacific and Atlantic coasts of Central America. Further, several islands have particularly rugged and mountainous landscapes separated by large stretches of sea, which has resulted in the isolation of populations and eventually to speciation.
- 13 The Caribbean Islands Hotspot forms the heart of Atlantic marine diversity. Roughly 8% to 35% of species within the major marine taxa found globally are endemic to the hotspot. The shallow marine environment contains 25 coral genera (62 species scleractinian coral), 117 sponges, 633 molluscs, over 1,400 fishes, 76 sharks, 45 shrimp, 30 cetaceans and 23 seabirds. The Caribbean contains approximately 10,000 square kilometres of reef, 22,000 square kilometres of mangrove, and as much as 33,000 square kilometres of seagrass beds.
- 14 Within the hotspot, however, little variation in marine species diversity exists because of the high degree of connectivity. The strong and predictable Caribbean Current meanders through the basin year round transporting larvae between the islands. As a result, marine habitats share many of the same marine species in contrast to the region's terrestrial biodiversity with its high rates of endemism. Large ranging and highly migratory species such as turtles, whales, sea birds and pelagic fishes inhabit different portions of the Caribbean basin during different stages of life. Despite this high degree of mixing, there are significant differences in geology, climate, productivity, and island size, all of which influence the relative abundance, extent, intactness, and vulnerability of marine biodiversity in the Caribbean. (Critical Ecosystem Partnership Fund, 2010)
- 15 The last regional IAS project: Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASIC), focused more on the IAS it was seeking to control or manage via pilot projects and only highlighted in a limited way the native and endemic species that should have benefitted. Therefore, this time it is intended that where possible the native biodiversity will be highlighted to ensure that buy in from the general public is achieved to control/manage the IAS present while setting up structures to prevent new introductions of IAS,

which will be a major focus of this project. Further details on the nature of the native biodiversity in Barbados and the OECS countries are presented in Annex 1.

## 2.3 Threats, root causes and barrier analysis

### *Threats*

- 16 The unique biodiversity of the Caribbean is under threat from IAS which is being introduced at an increase rate through trade, transport, travel and tourism. These risks are being exacerbated whether deliberate or accidental as a consequence of increased international economic and cultural links in such diverse areas as agriculture, aquaculture, transport and trade (commodities, pet and aquaria trade, as well as accidental introductions in containers and on wood packaging); tourism including ecotourism, yacht and cruise ship traffic, and fully grown ornamental plants for landscaping of hotels and resorts; and industrial developments including the movement of used industrial plant; equipment and aggregate material.
- 17 IAS introduced in Barbados and the OECS are likely to spread to other countries as well and the wider Caribbean within a relatively short space of time especially now as a result of more severe hurricanes and other extreme climate events exacerbated by climate change. This is likely to continue and the regional authorities are aware of this. The introduction, establishment and spread of IAS pose a severe threat to biodiversity in particular native and endemic biodiversity in the OECS countries. In addition, IAS continues to pose a threat to several important economic sectors in these islands resulting in severe disruptions of livelihoods of persons engaged in: agriculture (both crops and livestock); fisheries; forestry; and tourism. IAS also results in negative social and health impacts. Although precise figures on the financial costs of IAS regionally are not available, the Commonwealth of Dominica estimates for instance that management of the Giant African Snail is costing upwards of \$500,000/year, and that of citrus aphids is costing the economy \$1 million a year. Black Sigatoka has cost \$1.2 million thus far. The Chytrid fungus has wiped out over 80% of the Mountain Chicken, the native frog species of Dominica. In many cases, the impact of IAS has not been quantified (e.g., the Cuban tree frog) and is based primarily on casual observations.
- 18 The following factors and root causes predispose the countries and the region to IAS:

There are several intrinsic factors that predispose this region to IAS. Many of these cannot be changed but systems and policies can be factored in to ensure that their effects are minimized. Global connectivity especially the marine environment makes the region vulnerable. This connectivity is increasing with the expansion of the Panama Canal and the inauguration of the international airport in St. Vincent and development plans for marinas in other OECS countries. The region has a naturally high vulnerability to IAS due to geophysical and ecological complexities. Small islands with high border to land ratio, steep hilly terrain that is often inaccessible makes it a haven for invaders. There is lack of awareness and data to influence IAS relevant policy especially among national resource allocators like the ministries of finance. Lack of coordination at the national level is both a cause and an effect of weak policy frameworks to address IAS. There is limited capacity and effective tools to prevent, control and manage IAS especially in a reactive context. There is insufficient collaboration among Caribbean states to tackle IAS. However, there are attempts to change this that this project can build on.

### *Root causes*

- 19 Global connectivity especially the marine environment makes the region vulnerable: The area of ocean encompassing the islands of the Caribbean, excluding Bermuda, is nearly 5 million km<sup>2</sup>. The total area of land is approximately 240,000 km<sup>2</sup>, a ratio of sea: land of about 20:1(5). This large ratio of water to land and the presence of many landing sites on the extensive coastline make it very demanding to conduct effective inspection and surveillance activities to prevent the introduction of IAS from entering and spreading within the Caribbean.
- 20 High vulnerability to IAS due to geophysical and ecological complexities: Marine environments present particularly challenging conditions for the control of bio-invasions. The absence of clear borders in the marine environment severely limits management options. Detection of IAS, particularly at low densities, is difficult. Species spread in a three-dimensional fluid system, where monitoring is a difficult and costly task. Moreover,



many eradication and control options (e.g. clearance, shooting, pesticides, herbicides, biological control etc.) that are used in terrestrial biota are harder to apply in the aquatic systems.

- 21 Other aspects of these geophysical and ecological complexities include the relatively low buffer capacity of small islands to severe environmental fluctuations and events. Species often become concentrated in small and fragmented areas. At these marginal breeding sites, they are subject to various natural and anthropogenic pressures that endanger their survival. Species that have evolved on islands have done so free from competition with large numbers of other species and therefore lack adequate defences and are susceptible to invasions by alien species. Some endangered species have below critical mass breeding populations. Their interchange is further restricted by habitat fragmentation.
- 22 This high rate of endemism on such a vulnerable, small and fragile habitat is of serious concern. As is the case of off shore islands in Barbados and the OECS. This sub region is also a nesting site for sea turtles, migratory terns and White Sea urchins and is both a marine reserve and a bird sanctuary. It is extremely vulnerable to IAS, arriving via natural pathways and/or human activity, such as avian influenza and rats, respectively.

#### Barrier Analysis

- 23 The project aims to remove the following key barriers that affect the effective prevention, control and management of IAS.

Numerous pathways for introducing IAS (to be addressed by components one and three):

- 24 There are numerous pathways for IAS introduction into and within the participating countries, and although this reality is widely understood and acknowledged, to date inadequate bio-security measures have been adopted. These pathways are linked to the “four Ts” -- Trade, Travel, Transportation and Tourism. A seminal study that examined the pathways for the introduction of pests that can affect plants in the wider Caribbean (Meissner, Lemay, Bertone, & Ferguson, January 9, 2009) identified nine pathways in which IAS are introduced into an island and then within and among islands. These pathways with their associated levels of risk are summarized in Table 4 below:

**Table 4:** Pathways and Risk Rating for IAS

<b>Very High Risk</b>	<b>Medium Risk</b>	<b>No Rating</b>
Human Movement	Airline Passenger Baggage	Maritime trade
Wood Packaging Material	Natural Spread	
Forestry Related Pathways	Mail	
Propagative Material		
Hitch-hikers		

- 25 Among the significant tourism, air sea and land transport pathways for the introduction of IAS are the aquaria and pet trade, ballast water (which is now governed by an international treaty), and the movement of used vehicles and tyres. The Caribbean Tourism Organisation (2016) reported that the wider Caribbean received 28.7 million visitors in 2015. This high level of visitor arrivals is an important pathway for the introduction of new IAS into the Caribbean, as demonstrated with the experience with the Pink Hibiscus Mealy Bug in the 1990s and the recent spread of the Red Palm Mite. Once an IAS enters an island in the Caribbean region, it is typically only a matter of time before it spreads to the other islands. It is a natural tendency for persons to take their favourite fruits and vegetables with them when they travel. These may not in themselves be invasive but may carry along with them spores or seeds of other invasive species that are inadvertently introduced. As can be seen in the following table, the number of visitors to Barbados and OECS countries is extremely high, in many cases outnumbering the number of residents on the islands, and severely straining the capacity of the limited staff to do proper surveillance.

**Table 5:** Cruise ship arrivals for 2015 and 2014 for participating countries

Country	Period	2015	2014	% Change
Antigua and Barbuda	Jan-Mar	320,401	270,262	18.6

<b>Barbados</b>	Jan-Mar	217,139	231,144	-1.3
<b>Dominica</b>	Jan-Mar	177,479	189,400	-6.3
<b>Grenada</b>	Jan-May	133,072	125,461	6.1
<b>St. Lucia</b>	Jan-June	399,746	364,278	9.8
<b>St. Vincent and the Grenadines</b>	Jan-April	52,219	54,853	-4.8

**Table 6:** Tourist arrivals for 2015 and 2014 for participating countries

Country	Period	Tourist Arrivals	% Change		
			overall	Winter #	Summer #
<b>Antigua and Barbuda</b>	Jan-Mar	36,300	3.3	4.3	-1.6
<b>Barbados</b>	Jan-Feb	171,299	15.3	15.3	-
<b>Dominica</b>	Jan-May	33,332	-1.3	-4.8	14.1
<b>Grenada</b>	Jan-Mar	38,000	4.7	4.2	-
<b>St. Lucia</b>	Jan-June	185,424	5.3	5.2	5.8
<b>St. Vincent and the Grenadines</b>	Jan-April	25,927	-0.1	-0.1	-

Source: (Caribbean Tourism Association, 2016)

Insufficient scientific data and information on economic impacts of IAS (to be addressed by components two and three):

- 26 Insufficient scientific data is directly related to the limited resources and capacity directed to the inspection, surveillance, identification and research of IAS at the national level in the Caribbean. At the international level there are many organisations dealing with IAS, which host databases and websites for information management, undertake public awareness, and facilitate regional and international collaboration to address IAS issues. However, little scientific data and information are submitted to these sources by OECS countries as a result of the limited work being done at the country level. Many regional and international organisations such as The Inter-American Institute for Cooperation on Agriculture (IICA), The Food and Agriculture Organization (FAO), CABI trading as CAB International, and the Caribbean Plant Health Directors Forum among others have attempted to document and disseminate information on IAS over the years. The reality is there is still insufficient scientific information on the impact that IAS are having in the Caribbean in general, and Barbados and the OECS in particular. More importantly, information of the impact of IAS on biodiversity is lacking, and as a consequence information to guide management options for the control of IAS is highly limited (with the exception of IAS that have a significant economic impact, such as the Pink Hibiscus Mealy Bug, and even then funding only becomes available after the IAS is well established).
- 27 The lack of updated and accurate information on IAS and their impacts on national economies and livelihoods is an impediment to convincing national governments to allocate sufficient resources and funds to IAS management. As in most countries, in the Caribbean the government ministries and departments that are responsible for managing IAS, such as the Ministries of Agriculture, Fisheries and the Environment, depend on budgetary allocations from the Finance ministries, but in the absence of concrete data on IAS impacts, they are typically unable to convince financial authorities to provide the financial resources necessary to manage IAS, or even to implement basic prevention programs.

Narrow agricultural focus of existing efforts to address IAS impacts (to be addressed by component one):

- 28 Work on IAS within the Caribbean has been largely focused on pest and diseases of major crops and livestock, rather than IAS impacts on biodiversity and ecosystem services. This agricultural bias is a self-defeating approach to tackling the devastating impacts of IAS, given that most IAS that impact agriculture also have an impact in the environment (or may survive in the natural environment and thereby pose an on-going threat to agriculture), and strategies for mitigating the impact on agriculture must include preventing their entry in the first place.

Limited technical capacity and effective tools to prevent control and manage IAS (to be addressed by components one, two and three):

- 29 The most cost effective strategy for dealing with IAS is prevention. However, to prevent the introduction of an IAS, a country must be very proactive, with high levels of surveillance at ports of entry. Unfortunately, in almost

all islands of the Caribbean, the human resources dedicated to surveillance activities for IAS are limited to a few plant quarantine officers, public health and veterinary officers. Furthermore, very few of these staff have been trained in identifying and dealing with the wide range of IAS (microbial, viruses, insects, plants and animals) that may be introduced into the region, and governments in general do not provide for the continuous updating of skills of those involved in surveillance activities. In many instances persons are not well trained, and specialist positions like virologist, mycologist, and bacteriologist are lacking in departments of agriculture or environment management units.

- 30 The shortage of technically trained personnel is linked to the current difficult economic conditions in the region, which greatly limit staff hiring; in some countries, when IAS surveillance staff retire or are promoted they are not replaced in their previous positions. Thus, for example, none of the islands participating in the proposed project has a Chief Invasive Species Officer or any dedicated public officer to oversee IAS management programs. Similarly, none of the islands has a dedicated committee or coordinating mechanism to deal with IAS, other than some coordinating bodies on plant and animal quarantine.
- 31 Another widespread problem is inadequate inspection and quarantine infrastructure. Although plant quarantine departments in all Caribbean countries were relatively better resourced in previous years, the declining importance of agriculture to the economies of the islands means that governments have reduced their capacities and resources inspection and quarantine and now face many challenges in executing their national and international obligations effectively. A regional workshop hosted by FAO and IICA in 2012 for the review of phytosanitary surveillance in the context of the IPPC Standard (ISPM6) identified a number of key constraints, including: Limited resources (human, financial, other); Lack of resources to access scientific information to establish surveys; Very high costs to implement IAS management (incl. skilled personnel, capacity building, digitizing data, tools, equipment, diagnostic services, etc.); Limited access to skilled personnel / subject matter specialists; Lack or deficiency of capacities / skills in most countries, including lack of diagnostic capabilities / services / support; Very high training needs (survey methodology, symptom recognition, data capture and management, management skills for technical heads); Transparency issues (countries might not be forthcoming with pest status due to potential bans on exports by importing countries) (FAO and IICA, 24-26 January 2012).
- 32 Finally, none of the participating countries has an effective database to record or share information on interceptions at air and seaports to assist in surveillance activities. The physical infrastructure in most countries is unable to meet the needs for the application of sanitary and phytosanitary (SPS) measures and quarantine functions to protect against the introduction of new pest and diseases for the agriculture sector. For example, none of the participating countries have a functional incinerator that can destroy any unauthorized risky imports that may contain IAS in passenger luggage at air or seaports.

Weak legal and policy frameworks for effective IAS management (to be addressed by component one):

- 33 The countries participating in the proposed project possess plant and animal health and quarantine legislation, which often encompass the management of invasive species and other biotic threats. Other legislation related to apiculture, coastal and marine environments, forest, protected areas and wildlife does in some cases related to invasive species in the territories of the respective countries and may regulate activities which may result in the introduction or export, internal spread and management of invasive species. For example, the Control of Live Fish Act in St. Lucia is effectively species-specific invasive species legislation, which indicates that impacts of the introduction of non-indigenous species were historically recognized. However, when the legal frameworks of these countries are examined against the Environmental Law Institute (ELI) model of state law for invasive species detection, control, and management (ELI, 2004), it is easy to conclude that the legal frameworks in these islands are deficient. In these countries, legal frameworks for IAS are not consolidated and instead relevant regulations are spread among many different legal documents, such as plant quarantine acts, environmental protection legislation, regulations for prevention and control of zoonosis, food safety legislation, and human health regulations and standards. It should be noted that Saint Lucia drafted model IAS legislation under the GEF-funded project Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASIC); unfortunately, the legislation was not given priority by the national authorities and remains in draft form. Fortunately, the regional priority and momentum for establishing a regime for the free movement of goods is expected to greatly increase the likelihood that legislation governing IAS will be passed by the respective parliaments in the OECS.

- 34 In order to deal effectively with IAS issues, legislative frameworks must be in place that consolidate and focus state efforts to manage IAS, for example by giving inspection and surveillance authorities and their staff the legal right to seize and destroy any material that could potentially introduce invasive species into an area. The poor legal and policy framework is compounded by inadequate enforcement: with a general rise in serious crimes and a focus of law enforcement officials on this, enforcement of existing legislation pertaining to the environment is generally lacking. Awareness of issues such as IAS and their impacts on the environment is also lacking among all arms of the legal fraternity such that if someone is brought to the courts for illegal trafficking in wildlife, the punishment may not be severe enough to serve as a deterrent.
- 35 The enactment and implementation of harmonised legislation across the Caribbean region, based on international standards and conventions will enable Caribbean countries to meet the requirements of international conventions such as Convention on Biological Diversity; the World Trade Organisation (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), and the Ballast Water Management (BWM) Convention of the International Maritime Organization (IMO); and also have the necessary precautions in place to limit the introduction of invasive species.

Inadequate national and regional coordination on IAS issues (to be addressed by component three):

- 36 Legal/policy frameworks must recognise the cross border implications of IAS and encourage countries to cooperate and collaborate to effectively combat IAS. Effective coordination must take place at the national, regional and international levels, and while such coordination exists for the Caribbean and globally, weaknesses at the national level limit the effectiveness of existing regional coordination mechanisms. A wide range of agencies at the national level, including the agriculture, health, trade, tourism, education, environment and the information and communication sectors, need to work together in order to address IAS issues, and yet communication and networking is largely lacking both within and between countries.
- 37 To effectively combat IAS issues requires the close collaboration of all stakeholders from both the public and private sectors to implement actions and policies to successfully combat the negative impacts of IAS on the various countries. However, such coordination mechanisms do not exist, and even with individual ministries there is often little coordination across departments. An even larger barriers is the very weak to non-existent coordination and collaboration between the public and private sectors on IAS management, with a few exceptions such as Antigua and Barbuda, where there is very good collaboration between public entities and the NGO community.

Inadequate awareness and information (to be addressed by components one, two and three):

- 38 Human beings are involved in all of the major pathways that introduce IAS into an area. The rate at which new IAS are introduced into the Caribbean speaks to the lack of general awareness of IAS and their impacts on agriculture and the wider environment, and as a result, the practice of casually transporting live animals and planting material remains too common. For example, the general public in the participating countries has very little idea of the economic impacts of IAS. Unfortunately, very few studies have been carried out of IAS impacts on livelihoods in the Caribbean, but a study conducted in six countries in East Africa on the economic impacts on smallholder mixed maize farming systems from five major IAS (*Chilo partellus*, Maize Lethal Necrosis Disease, *Parthenium hysterophorus*, *Liriomyza* spp. and *Tuta absoluta*) estimated combined annual losses of US\$0.9–1.1 billion (Pratt, Constantine, & and Murphy, 2017), and this provides some idea of the scale of the problem that IAS can pose for rural livelihoods.
- 39 Public education and general awareness targeting changes in human behaviour to reduce these risks are crucial to minimizing the impacts from IAS. It is increasingly becoming more apparent to scientists that socio-demographic factors, as well as the kind of species and the method used, are significant criteria to take into account when designing alien species control and eradication policies. Raising awareness and educating the general public should then become a priority in order to enhance the acceptance and success of such policies. However in order to conduct an effective public awareness programme the right message derived from proper research is critical.

No dedicated or sustainable funding mechanism focused on prevention (to be addressed by components one and three):





- 46 With the exception of St. Lucia none of the participating countries have a National Invasive Species Strategy and Action Plan. Also none of these countries have a functional coordinating body dedicated specifically to IAS. Antigua and Barbuda has multi-stakeholder committee that coordinates a range of environmental issues including IAS. However, all the countries have units and departments that do some work in IAS management and control. All have Plant Quarantine/Pest Management units that seek to prevent the entry of invasive crop pests. Surveillance units for animal diseases also exist in some form in these countries. Fisheries units also regulate the importation of live fish and baits. Public health units control the vectors that spread communicable diseases. These various units also attempt to meet their respective countries commitment as contained in the various MEAs.
- 47 In this context Antigua and Barbuda has an exceptional partnership between the Government and national and international NGOs in implementing the Offshore Islands Conservation Programme—a joint initiative of the Government of Antigua & Barbuda, Environmental Awareness Group, Fauna & Flora International and Durrell Wildlife Conservation Trust—has successfully removed rats and other invasive mammals from 15 islands to date and have done a considerable amount of work to control and manage IAS. This history of several decades of this partnership managing IAS will definitely be strengthened with the formal IAS strategy and action plan that will be developed under this project. Since the level of awareness among the technocrats is high, more than 80%, the environment in Antigua and Barbuda is conducive to successful adoption of IAS legislation and policies. Part of this successful collaboration is due to an existing environmental coordinating group that effectively coordinates the actions of all the major stakeholders pertaining to the environment.
- 48 St. Lucia completed both a National Invasive Species Policy (NISS) 2012-2020 and draft legislation under a regional GEF funded project. In 2010 a gap analysis was done for St. Lucia that informed the development of the NISS. Then it was noted that the problems of IAS have not yet attracted the attention they deserve in Saint Lucia. Nevertheless, most of the policies – especially those relevant to biodiversity management – provide the frameworks for the future inclusion of IAS management tools. In this instance reference is made to the Biodiversity Policy and 2nd National Biodiversity Strategy and Action Plan (NBSAP); National Environment Policy; the draft Revised Fisheries Management Plan; Hazard Mitigation Policy; National Forest Policy; and National Wildlife Policy. It was then pointed out that IAS management is not seen as part of a broader suite of policies and measures to conserve biodiversity. Neither is it integrated into the broader environmental management process. Policies relevant to IAS Management in Saint Lucia are covered in a range of agriculture and other policies in addition to those mentioned above, including: national agricultural policy within the Agricultural Policy Framework proposed for the OECS; Donations and Importation of Relief Supplies Policies and Guidelines in Saint Lucia after Disasters; the Medical Waste and other Bio-Hazardous Wastes Management Plan. Some policies did not indirectly allude to IAS such as the National Climate Change Adaptation Policy National and the Communicable Disease Surveillance Manual (2006).
- 49 Similarly, none of the countries have overarching IAS laws. However, despite being outdated the existing legislation does give the regulator some authority to impose fines but the penalties are invariably not much of a deterrent. The national legislations that are related to IAS in each of the project countries are summarised below:
- 50 **Antigua and Barbuda:**
- The Environmental Management and Protection Act, 2015
  - Animals Diseases and Importation Act (CAP 18)
  - Fisheries Act 2006
  - The Plant Protection Act 2012
  - Animals International Movement and Disease (CAP 19)
- 51 **Barbados:**
- Animal (Diseases and Importation) Act Chapter 253
  - Coastal Management Act (1998)

- Fisheries Act Cap 391
- Plant Pest and Disease (Importation control)
- Protection of New Plant Varieties Act
- CITES 2006-3 Act; Draft Zoos Act

**52 Grenada:**

- Animal (Disease and Importation Act) no 15 of No 1958. Amended by 9 of 1991
- Birds and other wildlife (protection) act no 26 of 1964 amended by Act no 10 of 1990.
- Importation of Fish (Regulation) Act no 146
- National Parks and Protected areas act No 206
- Noxious weeds Act No 213
- Quarantine Act 271, 1947
- Wild Animals and Bird Sanctuary Act No 339

**53 Dominica:**

- Animal diseases (Amendment) order 1995 SRO 10 of 1995
- Fisheries act chapter 61:60
- Plant Protection (Importation) Amendment (No. 2) Order SRO 9 of 2003.
- Plant Protection and Quarantine Act. Chapter 58:40

**54 St. Kitts and Nevis**

- National Conservation and Environmental Protection Act, 1987. The National Conservation and Environmental Management Bill is envisaged to replace the current law after the revision process is complete.
- The Animal Health Act, 2012
- The (Animal International Movement and Disease) Act (No.7 of 2012)
- The Customs Act, No.19 of 2014
- The Public Health, 1969
- Currently updating the Plant Protection Act Cap 14.09 and accompanying regulations
- Bio-safety Act 2012

**55 St. Lucia**

- National Conservation Authority Act (1999)
- Animal Disease and Importation Act (1956)
- Fisheries Act (1984)
- Forest Soil and Water Conservation Act (1946)
- Plant Protection Act (1988)
- Saint Lucia National Trust Act (1975)
- Control of Importation of Live Fish Act (1952)
- Quarantine Act (1944)
- Wild Birds Protection Act (1885)

**56 St. Vincent:**



- Plant Protection Act, 2005
- Many Laws and Policies that are in draft and needs to be given effect.

#### **Regional Policy context:**

- 57 According to the Organisation of Eastern Caribbean States (OECS) Commission the sub-regional political grouping is closer to removing all of barriers to free trade and strengthening its customs union. This move to establish the free movement of goods makes it imperative that each participating country harmonize their policies; regulations, technical and administrative protocols and structures in place to ensure the introduction, and spread of invasive species is minimized. (Trinidad Guradian, May 3, 2017)
- 58 Free Circulation of Goods in the OECS has been a critical component of the Revised Treaty of Basseterre which heralds the deepening of integration among the Member States of the OECS and the creation of an Eastern Caribbean Economic Union (ECEU). One of the main features of the ECEU is the establishment of an OECS Customs Union, which facilitates the free circulation of goods. Although the structures were not in place to make this provision fully operational, work by the OECS Commission over the past three years makes this imminent. Although sanitary and phytosanitary measures will remain largely unchanged it will make it imperative to strengthen the capacity of the SPS mechanisms and the human capacity in the context of the free movement of goods within the OECS.

#### **Regional Sectoral context:**

- 59 In Barbados and the OECS the issues pertaining to IAS are very similar. Some islands may have a bit more experience than others in dealing with certain pests and diseases and as well as some may have a wider capacity in different areas. However, overall they are all constrained in several ways as pointed out in the barrier analysis. Antigua and Barbuda's experience in eradication of IAS in 15 offshore islands can be shared with the other OECS countries with offshore islands that are infested with IAS such as rats and mongooses. St. Lucia can share its experiences with development of legislation and policies for IAS. Barbados can share its experience in dealing with a wide spread invasion such as the giant African sail. The free movement of people can also facilitate the movement of expertise in IAS with the region.

#### **Regional Institutional context:**

- 60 There are several regional agencies that address the issues of IAS either directly or indirectly. The Caribbean Agricultural Health and Food Safety Agency (CAHFSA) is mandated to perform a coordinating and organizing role for the establishment of an effective and efficient regional sanitary and phytosanitary (SPS) regime and to execute on behalf of Member States such SPS actions and activities that can be more effectively and efficiently executed through a regional mechanism. The Caribbean Public Health Agency (CARAPA) was formed in 2011 bringing together several public health agencies to function as a single agency for the Caribbean. They are tasked to deal with public health issues that are also IAS. Several IAS also vector some important diseases both in humans and animals. The Caribbean Plant Health Directors Forum and the CaribVet are two other regional institutions that deal with IAS that affect plants and animals respectively. Other regional institutions are engaged in IAS. These are addressed in section 2.5.

### **2.5 Stakeholder mapping and analysis**

- 61 The project will interact in different ways with a wide range of stakeholders. Each of them will have a particular role in the project activities either as a beneficiary, co-financier, technical partner, etc. The following table provides a summary of the stakeholders' involvement. It is worth noting that the stakeholder mapping and analysis will continue to evolve during project implementation, and therefore the project team will closely monitor these changes and/or record new partnerships or interactions.

Country/Stakeholder	Sector/Actor	Current Role or Function
<b>Antigua and Barbuda</b>		
Ministry of Health and the Environment	Government Agency/Environment Division.	Technical advice on matters pertaining to the environment. The Department of Environment will

Country/Stakeholder	Sector/Actor	Current Role or Function
		be the local partner and main contact for project implementation. A representative of this institution will be appointed as project focal point and will also be responsible for the monitoring and reporting of the national co-finance.
Ministry of Agriculture, Lands, Fisheries and Barbuda Affairs	Forestry Division, Development Control Authority, Fisheries Division, Land Division Agricultural Extension Division, Plant Protection Unit.	Development of and implementation of policies for forestry, fisheries, and agriculture. Land management. Plant quarantine and agricultural health.
Ministry of Tourism, Economic Development, Investment & Energy		Promotion of Antigua and Barbuda as a Tourist destination. Promoting investment for economic development.
Ministry of Legal Affairs, Public Safety, Immigration and Labour	Attorney General's Office, National Parks Authority; Mount Obama Committee.	International treaties. Responsible for national parks. Labour and industrial relations issues.
Ministry of Finance		Revenue collection and funding of public goods. National economic policies.
National NGOs	Environmental Awareness Group; Hotel and Tourist Association, Cruise Tourism Association, Historical Archaeological Society, Coast Guard, Caribbean Helicopters, farmer associations, tour operators (e.g. Dive shops).	Environmental conservation. Environmental education and awareness. Environmental advocacy. Clean up and restoration of sensitive environmental areas. Promotion of the safe use and enjoyment of environment.
<b>Barbados</b>		
Ministry of the Environment, Biodiversity Unit	Public Sector. Governing institution for MEAs on biodiversity, coordination of national action to conserve national biodiversity.	Environment Policy; biodiversity and genetic resources. Focal point for CBD. Will also act as National Project Executing agency
Ministry of Agriculture, Food, Fisheries and Water Resources	Public Sector.	To transform and reposition the Agricultural Sector in Barbados through the promotion of an agri-business approach to farming, with particular attention being paid to the effective use of resources, as well as border control of plant and animal imports. Competent Authority for the National Project Execution.
Ministry of Agriculture, Food, Fisheries and Water Resources – <b>Entomology Department</b>	Public Sector. This unit involved in the identification and management of insect pest problems on all economic crops and the development of control methods for these insects.	The production of extension materials, biological control of a variety of insect pests, control of new invasive species. Integrated pest management.
Ministry of Agriculture, Food, Fisheries and Water Resources – <b>Plant Pathology</b>	Public Sector. This section offers laboratory and technical assistance with the identification and control of plant diseases.	Identification of plant diseases that may come about the invasive species and development of control strategies and identification of plant diseases and development of control strategies.
Ministry of Agriculture, Food, Fisheries and Water Resources – <b>Plant Quarantine</b>	Public Sector. Provides for inspection and certification of ornamental and agricultural produce as well as technical assistance on matters related to the IPPC (International Plant Protection Convention).	Issuing of Permits, Phytosanitary Certification, and inspection of products that may harbour invasives.
Ministry of Health	Public Sector. To provide comprehensive health services.	Execution of Rat Eradication and Control Program.
Coastal Zone Management Unit	Public Sector. Coral reef monitoring, updating the inventory of coastal resources, consultations with the Town and	Monitoring of marine ecosystems

Country/Stakeholder	Sector/Actor	Current Role or Function
	Country Development Planning Office (TCDPO). Review of any coastal projects.	
Fisheries Division	Public Sector.	Monitoring of fish stocks and marine species management.
National Conservation Commission	Public Sector. Management of public parks, beaches and gardens.	Management of <i>Sargassum</i> seaweed.
University of the West Indies, Cave Hill Campus	NGO. Tertiary Intuition.	Research into the local species populations and the impacts of invasive species on their populations.
Bellairs Research Institute (McGill University)	NGO. Tertiary Intuition.	Research into the local species populations (marine and terrestrial) and the impacts of invasive species on their populations.
Barbados Agricultural Society	NGO. Represents the interest of farmers and agricultural community groups.	Provides assistance to farmers and agricultural communities.
Caribbean Agricultural and Research Institute	NGO. Development of commodities that ensure food and nutrition security.	Focuses on the threats, challenges and opportunities for managing Invasive Species and Climate Change.
Barbados Sea Turtle Project (University of the West Indies Cave Hill Campus)	Volunteer Group. To restore local marine turtle populations to levels at which they can fulfil their ecological roles.	Assists in the conservation of the endangered marine turtle species that forage around and nest on Barbados through research, education and public outreach as well as monitoring of nesting females, juveniles and hatchlings.
Caribbean Herpetological Society	Volunteer Group. Monitoring of reptiles and amphibians within the Caribbean.	Assists in the conservation of reptiles and amphibians, monitor species distributed among pet shops and the monitoring of invasive species that impact on local reptile and amphibian species.
Barbados Divers Association (Lionfish Activities)	Volunteer Group. To alert local authorities to sites where lionfish are spotted during dives.	To reduce the population of the invasive lionfish species through spear fishing and work with local restaurants in the use of lionfish in their menus.
Barbados Marine Trust	Volunteer Group. Promote environmental and socially sustainable use of marine areas in Barbados.	To assist Government and NGOs in marine management initiatives. Educational awareness on proper management of marine resources including coral reefs.
Pet Shops	Private sector. Trade in live pets and aquaria species.	Pathway to the entry of invasive plant and animal species into the local environment.
Barbados Primate Research Centre and Wildlife Reserve	NGO. Eco-Tourism site in Barbados.	Assists with the research and control of African Green monkey which is considered agricultural pests.
<b>St. Kitts and Nevis</b>		
Department of agriculture	Public Sector	Plant quarantine and agricultural health issues. Incentives for agriculture. Agricultural extension and promotion of good agricultural practices.
St. Kitts Tourism Authority, Nevis Tourism Authority	Public Sector	Promotion of St. Kitts and Nevis as a tourist destination.
Department of Legal Affairs and Justice.	Public Sector	Drafting of legislation and updating existing legislation.
St. Kitts Bird Watch Society (St. Christopher National Trust, Nevis Historical Society, St. Mary's Man and Biosphere community group, Sandy Pointers Inspiring Real Improvement Throughout-SPIRIT [Sandy Point community	NGOs	Environmental education and awareness. Environmental conservation and protection of native biodiversity.

Country/Stakeholder	Sector/Actor	Current Role or Function
group], Police Department.		
<b>Regional Organizations</b>		
UN Environment	Inter-Governmental organisation	UN Environment will be the implementing agency of the project. As such it will be part of the project's steering committee and will network with CABI, the countries and other partners. UN Environment will also provide technical advice when possible and provide monitoring and supervision services for the project.
CABI	Inter-Governmental Organization	CABI will be the regional executing agency of this project and as such it will be part of the steering committee and coordinate all the aspects related to project execution in close coordination with the participating countries, UN Environment and the partners. CABI's work includes publishing of scientific information on agriculture and the environment and the use of scientific information to improve livelihoods.
Caribbean Agricultural Health and Food Safety Agency-CAHFSA	Regional NGO	Regional coordinating body for agricultural health and food safety
Caribbean Agricultural Research and Development Institute (CARDI)	Regional Research in Agriculture	Dissemination of relevant information. Research in control and management of IAS. support to regional coordination on IAS issues
CARIBBEAN COMMUNITY SECRETARIAT – CARICOM	Regional Inter-Governmental Organisation	Promotion of the single market and the economy. Regional and international collaboration and cooperation.
Fauna & Flora International (FFI)	International NGO	Conserving threatened species globally.
Food and Agriculture Organisation (UN-FAO)	International NGO. Supports the efforts of the Member States to achieve agricultural development, food production and food safety.	Responsible for the implementation of the International Plant Protection Convention. Development of standards for movement and trade in plant and plant products. Dissemination of information.
International Maritime Organization (IMO)	International NGO.	Oversees the International Ballast water convention
Inter-American Institute for Cooperation on Agriculture	International NGO.	Supports the efforts of the Member States to achieve agricultural development and rural well-being.
Royal Society for the Protection of Birds (RSPB)	International NGO	Avian conservation internationally.
University of the West Indies (UWI)	Academic and research institution	Tertiary education and Research. Managing development projects.
United States Department of Agriculture / Animal and Plant Health Inspection Service (USDA/APHIS)	United States Public Sector	Safeguarding US agriculture.

\* National stakeholders for the other OECS participating countries have not been included because there are no national level activities taking place.

## 2.6 The baseline analysis and gaps

- 62 The issue of IAS in the Caribbean has been addressed by various organisations and countries themselves, with a mix of investments coming from the private and public sector as well as multiple donors. The investment on IAS related issues for the Barbados and the OECS sub region has been estimated at 2,825,000 USD for

2017. In addition, countries are also investing resources of their national budgets on IAS programmes and activities, mainly through the work of the departments and organisations pointed out in the stakeholders analysis. The countries' investment in IAS related issues for the next 5 years is estimated at 15 million USD.

- 63 A global programme of about 50 million USD is being developed by CABI. This initiative will contribute to the baseline and efforts that will benefit the OECS and the wider Caribbean region in dealing with IAS and in improving the **livelihoods** of poor rural households that are impacted by them.
- 64 A number of regional commitments have emerged in the international arena in the context of OECS countries. The Protocol Concerning Specially Protected Areas and Wildlife (SPA) Conference of Parties December 2014 Decision calls for support to regional IAS efforts in collaboration with various partners. The OECS Meeting of Ministers in October 2014, made a commitment to tackle IAS as a priority for the region which was followed up by a workshop sponsored by the OECS Secretariat. The Caribbean Community's (CARICOM) Ministerial Council for Trade and Economic Development (COTED) – Ministers of Agriculture which met in Suriname in October 2014 encouraged Member States to review the Caribbean Invasive Alien Species Strategy and Action Plan (coming out of the GEF funded Mitigating the Threats for Invasive Alien Species in the Insular Caribbean (MTIASIC) Project) for support and adoption. Furthermore, at the 3rd International Conference on SIDs in Sept 2014, participants called for support to enhance collaboration and improve efforts to eradicate and control and to develop and strengthen capacity to address IAS. At the regional level calls for concern and action are being made, but they lack supportive strategies to translate these assertions into meaningful action. The completed UN Environment-GEF Project, "Mitigating the Impacts of IAS in the Insular Caribbean" that was active in the Bahamas, Jamaica, Dominican Republic, Trinidad and Tobago, and St Lucia was a building block for this new GEF intervention. Likewise, other initiatives are taking place in the region that will contribute to the baseline for this project are:
- 65 The European Commission BEST (Biodiversity and Ecosystem Services in outermost regions and overseas countries and Territories) financing mechanism has a call for proposals which can benefit the English and Dutch speaking territories, which will be coordinated with this project.
- 66 The French Overseas territories have carried out some work which will be relevant to the six countries of the proposed project. This includes a diagnostic study carried out in Guadeloupe and Martinique on IAS ([http://www.side.developpement-durable.gouv.fr/clientBookline/service/reference.asp?INSTANCE=exploitation&OUTPUT=PORTAL&DOCID=IFD\\_REFDOC\\_0518755&DOCBASE=IFD\\_SIDE](http://www.side.developpement-durable.gouv.fr/clientBookline/service/reference.asp?INSTANCE=exploitation&OUTPUT=PORTAL&DOCID=IFD_REFDOC_0518755&DOCBASE=IFD_SIDE))
- 67 A website on IAS developed by the IUCN French Committee includes a species and bibliographic database, and numerous documents such as protocols for control, guidelines for preventive action and regulations currently in force (<http://www.especes-envahissantes-outramer.fr/>). CABI Caribbean and Central America Office collaborated with the IUCN to advance the 5th NBSAP for Trinidad and Tobago in 2016.
- 68 The Invasive Species Specialist Group of the IUCN Species Survival Commission is working on developing annotated inventories of alien and invasive species for all countries in the Caribbean including Cuba and EU overseas countries. Data will be shared with the project. Island Conservation has produced databases on invasive species impacts on threatened species in protected areas.
- 69 The Regional Strategy for the Control of Invasive Lionfish in the Wider Caribbean has also been developed (<http://www.car-spaw-rac.org/?International-partners-launch-plan>, 474). This strategy was developed with the active participation of CABI CCA (Caribbean and Central America) and the MTIASIC Partners from Bahamas and Jamaica. This strategy, supported by a manual on managing lionfish (Morris, 2012), informed the actions of lionfish management in almost all the Caribbean islands.
- 70 The USAID funded project "Reduce Risks to Human and Natural Assets Resulting from Climate Change (RRACC)" focuses in part on the issue of introduction of invasive species and provided initial consensus for the proposed project. FAO and CABI also hosted a regional workshop to conduct a preliminary analysis of IAS within forestry ecosystems in the Caribbean.
- 71 Following on from the Capacity building workshop for Small Island develop states to achieve Aichi Biodiversity Target 9 on invasive alien species that was held in June 2014 in Montreal, the CBD Secretariat sponsored a

Workshop for Caribbean SIDS on invasive alien species in September 2017 in Jamaica. This project will build on the outcome of those two initiatives during implementation of the project.

- 72 Despite these outputs and the support received through various sources, the region at large still remains at risk because a number of member states in the OECS have ineffective or no strategies to manage IAS. As have been discussed previously, once an IAS enters one island it quickly spreads to other islands in the Caribbean.

#### Antigua and Barbuda Baseline Activities:

- 73 Eradication of black rats (*Rattus rattus*) and, where present, small Asian mongooses (*Herpestes javanicus*), feral poultry (*Gallus gallus domesticus*) and goats (*Capra hircus*) from 15 islands off the North, East and West coasts of Antigua between 1995 and 2014 by the Antiguan Racer Conservation Project/ Offshore Islands Conservation Programme. Biosecurity surveillance systems established and maintained since 2002, including use of permanent bait stations to prevent rodent incursions. The removal of alien vertebrates has resulted in the near-exponential rise in many native animals and plants on the offshore islands, including the Critically Endangered Antiguan racer (*Alsophis antiguae*), whose population has increased from 50 to over 1,130 individuals. The project area is now globally recognised as a Key Biodiversity Area. Eradication and biosecurity work managed and implemented by the Environmental Awareness Group, Forestry Unit, Fauna & Flora International and Durrell Wildlife Conservation Trust. However, preventing incursions is a chronic challenge, especially in light of the rising numbers of visitors and boat traffic.
- 74 Development of project to restore Redonda: Feasibility study and key stakeholder consultations completed for removal of black rats and translocation of feral goats to Antigua to conservation of globally threatened species endemic to the island (including 3 extant Critically Endangered reptiles). Funding secured to commence implementation in 2016 Work led/ coordinated by Environmental Awareness Group, Environment Division, Fauna & Flora International and other partners, rat eradication has been completed and the proposed project will certify that Redonda is rat free in 2018.
- 75 Control of mongooses at a sea turtle nesting site on Antigua by the Antigua Turtle Conservation Project was an attempt at controlling an important IAS that continues to have significant impact on Biodiversity.
- 76 Giant African Snail (GAS) Eradication Program: Eradication of the GAS from Antigua and prevention of spread to Barbuda and other off-shore islands is a current priority. A GAS Eradication Task Force is in place and in early 2017 the government spent EC\$230,000 to purchase bait to manage this IAS. (Dias, 2017)
- 77 Lionfish Management Program: Management of the lionfish through education, removal and regional collaboration (Fisheries Division).
- 78 Current funding for IAS in Antigua and Barbuda among both the public and private sector is estimated to be at 1,500,000 US dollars per annum. With a projected 5% annual increase per annum this figure is expected to be 3,750,000 over the next five years.

#### Barbados Baseline Activities:

- 79 Barbados Primate Research Centre has as its main objective the control of *C. aethiops* which is an agricultural pest. There is also breeding of monkeys (wild and SPF captive-bred) for polio vaccine production, for local and overseas contract research projects. In addition, in the country there is also display of animals to promote eco-tourism, and gifts of monkeys to zoos to promote Barbados Wildlife.
- 80 Ministry of Agriculture expended considerable funds, human resources and efforts in managing the Giant African Snail (*Achatina fulica*). Initially this effort concentrated on the use of molluscicides programme from 2001-2009. Then from March 2009 to January 2013 a bounty programme was in place. The bounty was 0.50 Barbados or 0.25 US. For this period this yielded 392 tons of GAS or an equivalent of 12 million snails. (Gibs, 2013) Fisheries Division /CZMU/UWI – continues to carryout Lionfish (*Pterois volitans*) research and hosting lionfish derbys.

- 81 The Ministry of Agriculture over the years have undertaken some research on the management of important IAS. These include research and management of the Tropical Bont tick (*Amblyomma variegatum*); management of the Pink Mealy Bug; The entomology unit and the Cotton programme have successfully implemented biological control and integrated pest management programmes to control the PHMB and the cotton boll worm, among many other agricultural pest and diseases.
- 82 Ministry of Environment and Drainage /Working Group on Biodiversity and Plant Quarantine Unit continues to collaborate to minimize the importation of invasive species. Resulting in Restrictions/ Prohibitions on importation of fauna and flora partially based on the invasive attributes of the species and its potential as a host of other organisms.
- 83 National Conservation Commission continues to coordinate beach clean-up in response to Sargassum depositing on major beaches in Barbados.
- 84 Some significant conservation efforts are also taking place in Ministry of Environment and Drainage that has set up a Snake Task Force to protect the Barbados Threadsnake, which is relatively new to science. The University of the West Indies is engaged in a Sea Turtle Conservation Project. Preliminary surveys and consultations were held in 2013 to develop a 'mainland island' to conserve the Endangered Barbados leaf toed gecko (*Phyllodactylus pulcher*). A 'mainland island', sometimes called an ecological island, is an area enclosed by a pest-proof fence to exclude rats, cats and other harmful animals that are invasive. This Project being developed by University of West Indies, Fauna & Flora International and Durrell Wildlife Conservation Trust.
- 85 The current estimate for expenditure related to both public and private sectors is estimated at 2,500,000 US dollars per annum. With a projected 5% annual increase per annum this figure is expected to be US\$ 7,875,000 over the next five years.

#### Commonwealth of Dominica Baseline Activities:

- 86 Although there is no specific policy on invasive species in Dominica the Forestry Division has incorporated IAS in all sectoral programs. Restrictions/prohibition on importation of most flora and fauna into Dominica is based on the invasive attributes of the species itself and its potential as a host of other organisms.
- 87 The plant quarantine department in association with the customs department monitors both the air and seaports for the potential entry of IAS. The forestry and fisheries departments frequently conducts surveillance patrols in forest, beach and river patrols to identify new species introductions.
- 88 Dominica notes in its NBSAP that there has been a significant increase in the introduced seagrass, *Halophila stipulaceae* which is displacing local species such as *Syringodium filiforme*, which supports the growth of pelagic fish and now covers 92% of the seabed in some areas.
- 89 Dominica is currently employing some conservation programmes linked to IAS: The Dominica Mountain Chicken (native frog) captive breeding program-in association with the London Zoo to reduce impacts of the introduced chytrid fungus. The recently submitted OECS-GCCA Regional CCA-SLM Project: "Reforestation of degraded dry scrub forest affected by invasive alien flora species using agroforestry methods to help build resilience to climate change".
- 90 The estimated funding for IAS in Dominica is 200,000 US dollars per annum. This is further estimated to be approximately 1,500,000 US dollars over the next five years.

#### Grenada Baseline Activities:

- 91 A classical biological control for the Pink hibiscus mealybug, which was first seen in Grenada was successful completed in all of the OECS Countries and the wider Caribbean. Grenada also undertook several projects in the recent past to manage IAS that are negatively impacting both biodiversity and agriculture. These include: Mongoose Management project (on-going) addressing its predation of the Grenada Dove and other species in Grenada. This project was sponsored by the American bird conservancy. Rats that have been shown to be both a serious agricultural pest as well as impacting biodiversity. An on-going Fruitfly Programme

initiated in 2002 with support from USDA is taking place in most of the OECS countries with support for active surveillance and monitoring with the use of traps. Grenada has also managed a long-term programme for Banana Pest Control Programme which includes the Moko (1978 to present); Black Sigatoka (2006 to present); Mango Seed Weevil (ended in 2002), and a program for Lionfish management (2013 to present).

- 92 The current estimated funding for IAS related expenditures is 300,000 US dollars per annum. This is expected to be approximately 1,575,000 US dollars for the next five years.

#### St. Lucia Baseline Activities:

- 93 During the implementation MTIASIC St. Lucia significantly raised the awareness of IAS impacts on biodiversity in general and the threat to the native iguana in particular. A National Invasive Species Strategy (NISS) was developed under the MTIASIC project in addition to draft legislation for prevention, control and management of invasive species.
- 94 Since 1994 several agencies including the Forestry Department, Durrell Wildlife Conservation Trust, Saint Lucia National Trust and Fauna & Flora International, as part of Saint Lucia Whiptail Project, eradicated rats, mongooses, opossums, goats and sheep from Praslin Island, Rat Island and Dennery Island. Also as part of these initiatives biosecurity mechanisms and capacity was built to prevent new IAS introductions on Rat Island, Dennery Island, Praslin Island and both Maria Islands to conserve the globally threatened Saint Lucia whiptail lizard (*Cnemidophorus vanzoi*) (Vulnerable, to be up listed to Endangered) and the Saint Lucia racer (*Erythrolamprus ornatus*) (Endangered, to be up listed to Critically Endangered).
- 95 The former MTIASIC project evaluated methods to control and eradicate alien iguana in the Soufriere area. The project also conducted thematic analyses of IAS for: aquatic, fresh water and terrestrial ecosystems. The project also worked with stakeholders to produce voluntary codes of conduct for key pathways such as the ornamental trade. Capacity was built in managing IAS. An extensive public awareness campaign increased public awareness significantly.
- 96 The Forestry department is actively monitoring impact of feral animals on forestry ecosystems but has limited capacity to mitigate the serious threats posed in particular from feral pigs. The forestry department is also engaged in the control of invasive plants at the World Heritage site – the Pitons.
- 97 The agriculture department have successfully mounted many programmes to control and manage many AIS that affect agriculture sector. The Pink Hibiscus Mealy Bug was successfully controlled here as in the wider Caribbean using classical biological control. A feasibility assessment was conducted for establishing a “mainland island” – IAS eradicated- within a predator-proof fence to enable the reintroduction and recovery of threatened species such as the Saint Lucia racer and white-breasted thrasher. This feasibility study was conducted by Fauna & Flora International, Wildlife Management International, Forestry Department and Durrell Wildlife Conservation Trust.
- 98 The current estimated funding for IAS related expenditures is 300,000 US dollars per annum. This is expected to be approximately 1,575,000 US dollars over the next five years.

#### St. Kitts and Nevis Baseline Activities:

- 99 St. Kitts and Nevis has several ongoing initiatives to manage IAS undertaken mainly by the various departments of the Ministry of Agriculture. However, most of these projects are being undertaken with limited funds and human capacity consequently the results are varied. Some of these past and current initiatives include: The Primate (monkey) Control Project. National Response to Loss of Coconut Palms Project. Fruit fly Surveillance Programme (Carambola Fruit Fly, Mediterranean Fruit Fly). Monitoring for Invasive Alien Species at ports of entry. Lion Fish management programme. Control of the Tropical Bont Tick in the late 80's <http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2000.tb05308.x/abstract>
- 100 The current estimated funding for IAS related expenditures is 160,000.00 US dollars per annum. This is expected to be approximately 840,000 US dollars over the next five years.

#### St. Vincent and Grenadines Baseline Activities:



101 Traditionally an agriculture based economy has experience with many agricultural pest and diseases. Cycad scale (*Aulacaspis yasumatsui*) is a relatively new introduction that is affecting palms on the island. It is responsible for the death of several palms at the botanic gardens. Asian citrus psyllid is the vector of the dreaded citrus greening disease and is responsible for the spread of citrus diseases severely impacting this sector. Giant African Snail severe damage to agricultural crops potential threat to native snails as well as defacing building also a potential threat to human health is being managed. Red palm mite is currently affecting coconuts as well as a range of naturalized plants with potential to render the national tourism product less attractive. Fruit flies which restricts exports of tropical fruits to the USA and other countries is being controlled through a trapping programme. The fisheries department is working with other regional agencies to minimize the threats to the reef fisheries with its Lion Fish control programme

102 The current estimated funding for IAS related expenditures is 115,000.00 US dollars per annum. This is expected to be approximately 603,750 US dollars over the next five years.

## 2.7 Linkages with other GEF and non-GEF interventions

103 The project will be carried out in close coordination with other relevant GEF and non GEF projects/initiatives in the region.

104 The GEF funded project "Implementing Integrated Land, Water & Wastewater Management in Caribbean SIDS" implemented by UN Environment, is a project that will focus on the implementation of an integrated approach to water, land and ecosystems services management, supported by policy, institutional and legislative reforms, and implementation of effective appropriate technologies to accelerate contribution to global targets on access to safe and reliable water supplies and improved sanitation, and contributing to improved ecosystem functioning in the Caribbean.

105 Sustainable Financing and Management of Eastern Caribbean Marine Ecosystems. This regional project is funded by the GEF and implemented by the World Bank through The Nature Conservancy. Its purpose is to improve the management of existing and expanded marine protected area networks through the establishment of sustainable financing mechanisms including 5 of the 6 OECS countries. The experiences and lessons learnt from this project will be considering in the setting of a dedicated fund for dealing with common IAS in the region.

106 USAID/OECS Climate Variability, Change and Mitigation Project: The USAID climate change support for the countries in the Eastern Caribbean will complement overlapping initiatives it previously supported under its biodiversity support to the region.

107 Global Climate Change Alliance (GCCA) project on Climate Change Adaptation and Sustainable Land Management in the Eastern Caribbean. The proposed project will explore exploring links with this project with respect to the connection of climate change and the spread of invasives.

108 Reduce Risks to Human & Natural Assets Resulting from Climate Change (RRACC). The planned activities will be implemented over a 5-year period and is funded under the Climate Change programme of the United States Agency for International Development (USAID). The six independent Member States of the OECS (viz Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, Saint Lucia, and St Vincent and the Grenadines) will benefit from investments allocated for financial and technical support and the project will allow for activities in vulnerable communities and areas, including cross support to addressing the introduction of invasive species.

109 The Critical Ecosystem Partnership Fund (CEPF) in the Caribbean Islands Biodiversity Hotspots as implemented by the Caribbean Natural Resources Institute (CANARI) is a joint initiative of l'Agence Française de Développement, Conservation International, the Global Environment Facility, the Government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank. The goal of the CEPF is to support the work of civil society in developing and implementing conservation strategies, as well as in raising public awareness on the implications of loss of biodiversity and features a special emphasis on invasives.

- 110 The GEF funded “Regional implementation of biosafety frameworks for the Caribbean”, implemented by UN Environment, a project that is aimed at improving the biosafety capacities in the region to fulfil their obligations towards the Cartagena protocol. Interaction with this project which funded by the GEF with the UWI as executing agency and UN Environment as the implementing agency will be particularly useful for border control and monitoring mechanisms.
- 111 The UNEP-GEF Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco) project is a five-year multi-focal area regional project with four components; (1) Development and Implementation of Integrated Targeted Innovative, climate-change resilient approaches in sustainable land management (SLM), integrated water resources management (IWRM) and maintenance of ecosystem services; (2) Strengthening of the SLM, IWRM and ecosystems monitoring, and indicators framework; (3) Strengthening of the policy, legislative and institutional reforms and capacity building for SLM, IWRM and ecosystem services management taking into consideration climate change resilience building and (4) Enhancing knowledge exchange, best practices, replication and stakeholder involvement. The project will be implemented through a network of international, regional and national partners in accordance with their comparative advantage. UNEP is also implementing agency of the IWEco project and as such, synergies between both projects will be sought through constant communication between the task managers and when needed through periodic invitations to members of the IWEco project to participate in project meetings. In particular component number 4 of IWEco project could be linked with component 3 of this project since both speak about enhance knowledge and capacities and sharing of information.
- 112 Global Biological invasions affect poor, rural communities disproportionately as they are more heavily dependent on natural resources and healthy ecosystems. CABI is therefore seeking \$50m investment to coordinate a unique, global programme with the aim of protecting and improving the livelihoods of 50 million poor rural households that are impacted by the worst invasive species. Working with partners from around the world, this programme aims to find solutions to reduce the threats of biological invasion and contribute to increased food security, trade and help protect natural ecosystems. CABI believes that this programme will contribute to increased food security, trade, and help protect agricultural and natural ecosystems. This regional initiative will benefit from these actions, outputs and activities from the global level.

### **SECTION 3: INTERVENTION STRATEGY (ALTERNATIVE)**

#### **3.1 Project rationale, policy conformity and expected global environmental benefits**

- 113 The project is framed under the scenario of existing social and economic interaction within SIDS of the OECS, and their lack of national policies, awareness and capacity to effectively deal with IAS. The lack of regional cooperation is also a major impediment, especially with regard to the management of pathways and therefore, failure of one SIDS to effectively manage IAS means that all other islands are at increased risk.
- 114 Due to this “regional” characteristic of high trade and movement of people, tourism, etc., within the OECS countries, the issue of IAS prevention and management becomes of paramount importance. In this sense, the project has been designed in a way that it will create an enabling environment to support the management, control, and eradication of IAS in the region through national and regional interventions. The project was designed under the premise that regional understanding of the problem and barriers, as well as improved national capacities to better respond to the IAS problem, are key for success. In this sense, the project has been designed in a way such that it will foster a suitable environment for regional cooperation (component 3) where aspects that are of common importance for the participating countries will be discussed and tools will be produced for the use of the wider Caribbean region. In addition, the project will also foster an enabling environment for national improvement in their response to the IAS problem. This will be done through the development of national strategies to manage, control and eradicate IAS (component 1) and in situ support (through component 2 pilots) to address particular IAS problems, which will generate important lessons and experiences that can be transferred to all the region; and through technical tools that will support the implementation of the national strategies.
- 115 The project will therefore rely on a two tier approach to achieve its objective and will promote the idea that regional cooperation and knowledge management become the main elements for the development of more advanced and appropriate national measures.

- 116 The intervention logic of the project builds on the assumption that lessons learned by the countries will be shared openly with their neighbours and that the lessons learned from that exchange will be eventually embraced by the various Caribbean states to improved their capacity to manage IAS.
- 117 Free Circulation of Goods in the OECS has been a critical component of the Revised Treaty of Basseterre which heralds the deepening of integration among the Member States of the OECS and the creation of an Eastern Caribbean Economic Union (ECEU). One of the main features of the ECEU is the establishment of an OECS Customs Union, which facilitates the free circulation of goods. Although all the structures are not in place to make this provision fully operational, full implementation of the free circulation of goods is imminent. Although SPS measures will still be enforced, the freer movement of people and goods will likely to result in greater movement of IAS.
- 118 The above context makes the timing of this project most opportune. Although some capacity building has been done with the training of 38 plant quarantine officers under the EU funded SPS project, much more needs to be accomplished to effectively reduce the risks posed by IAS to the endemic and native biodiversity. The project will identify high risk pathways and build capacity to conduct risk assessments and provide practical tools to facilitate more effective surveillance and the identification of IAS at ports of entry. In addition the Specially Protected Areas and Wildlife protocol (SPAW) has as one of its objectives to develop a strong regional capability for the coordination of information exchange, training and technical assistance in support of national biodiversity conservation efforts. This relates to some of the activities embraced by this initiative in particular the efforts that the project will do to eradicate and manage IAS, that will contribute to biodiversity conservation.
- 119 The project aims to address the issue of invasive alien species at the national levels in Antigua and Barbuda, Barbados and St. Kitts and Nevis through the generation of knowledge pertaining to IAS and their pathways; development of policy and regulatory frameworks; capacity building, IAS prevention and management. The project will also address the issue sub-regionally through the development and implementation of a sub-regional biosecurity plan, which will additionally encompass the Commonwealth of Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines. This will largely be achieved by engaging with stakeholders at the national and regional levels, and within all socio-economic groups, thereby providing these groups with the necessary skills to control and manage IAS in their areas. A greater understanding of the problems caused by IAS, and participation in the management and control of the species by all stakeholders will lead to greater benefits in terms of preserving local biodiversity and protecting new areas from the costs of invasions. The expected global environment benefits include contributions to reduce biodiversity loss in various ecosystems, as well as reducing the negative impacts and costs of IAS on livelihoods and economic development.
- 120 This project will greatly assist these countries to fulfil their commitment under the CBD as it directly contributes to Aichi target 9 and Program 4: Prevention, Control, and Management of Invasive Alien Species. For the GEF-6 this project is aligned with BD program 4, and will focus on island ecosystems. *"The GEF will support the implementation of comprehensive prevention, early detection, control and management frameworks that emphasize a risk management approach by focusing on the highest risk invasion pathways. Targeted eradication will be supported in specific circumstances where proven, low-cost, and effective eradication would result in the extermination of the IAS and the survival of globally significant species and/or ecosystems".* This focus is driven not only by programming demand, but by an ecological imperative: IAS are the primary cause of species extinctions on island ecosystems and if not controlled can degrade critical ecosystem services on islands such as the provision of water. The focus also responds to the opportunity offered by the stronger interest to advance IAS management on the part of island states and countries with island archipelagos, and the opportunity that island ecosystems provide to demonstrate success in addressing the problem of IAS. Over time actions of this project are expected to benefit the species listed in Appendix 17, which details the native species in Barbados and the OECS.

### 3.2 Project goal and objective

- 121 The project goal is to manage the risks and costs of IAS on important ecosystems, species and genetic diversity in Barbados and the OECS region.

122 The objective of this project is “Prevention, early detection, control and management frameworks for invasive alien species (IAS) that emphasize a risk management approach by focusing on the highest risk invasion pathways of Barbados and OECS countries”.

### 3.3 Project components and expected results

123 The project will attempt to achieve its results through 3 components. Components 1 and 2 address needs of Antigua and Barbuda, Barbados and St. Kitts and Nevis in relation to national frameworks for IAS management and control, and actual work on the ground that will lead to improved local capacity to deal with particular IAS. Component 3 is regional, and as such will be oriented towards addressing common needs of seven OECS countries (Antigua and Barbuda, Barbados, St. Kitts and Nevis, Commonwealth of Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines) in relation to IAS.

**Component 1: IAS Policy, Institutions and Capacity** (1,505,457 USD from GEF financing and 2,747,707 USD from co-finance)

**Outcome 1.1** *Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems.*

124 This outcome will be achieved via the following outputs:

#### Output 1.1 (3) Critical Situational Analyses completed

125 During the PPG at both the national and regional consultations a preliminary assessment was done of the national priority needs to effectively address the impact of IAS on the general economy, and specifically on biodiversity. This preliminary analysis also identified high risk pathways for IAS introductions (accidental and deliberate), i.e., fisheries, agriculture, horticulture and landscaping, shipping (including ballast and fouling organisms, and cruise ships), air transportation, construction projects, aquaculture, tourism, and aquarium and pet trade. However during the project this information will be complemented with emphasis on species of global biodiversity significance. A critical situation analysis (CSA) will use national teams from Antigua and Barbuda, Barbados and St. Kitts and Nevis that will verify the initial assessment and conduct a more in-depth review of the national legislation and policies for IAS management. This review will also include the commitments made by these countries to the various MEAs dealing with IAS to assess to what extent they have fulfilled their respective national commitments and what is lacking to fully realize this. Then the CSAs will review the key stakeholders currently engaged in IAS management and assess their current level of coordination and collaboration through feeding in the process of partnership building. Their inherent strengths, weaknesses, opportunities and threats will be assessed in determining the best coordination mechanism that will be viable for these countries to both prevent the introduction of IAS and to manage those that are already in the country and impacting livelihoods and biodiversity. In elucidating the current situation in each of these countries with respect to IAS, the project will advocate for detailed case studies of how key IAS were managed in the past. It will demonstrate how the current lack of adequate policies and legislation has stymied efforts to prevent IAS introductions in the first place and then why early response and rapid eradication have failed. Since the skill sets required to accomplish these CSAs will require intimate knowledge and experience with varying ecosystem types, it will be very difficult to find one individual or firm with the required skill set. As such, the CSAs will be supported by three separate risk assessments, for the marine environment; for the pet and aquaria trade, and for international travel. It will also document the lessons learnt in managing and controlling these key IAS in a manner that will make a compelling case for ensuring the other outputs of component one are achieved. It will also inform the process of developing the national invasive species strategy and action plans and other outputs of component one.

#### Output 1.2 (3) National Invasive Species Strategies and Action Plans (NISSAPs) developed to address risks and promote cross sectoral collaboration in 3 countries

126 The CSAs will be used to engage the key stakeholders from all relevant sectors affected by IAS to develop in a participatory manner three NISSAPs, which will become overarching national strategic policy documents for IAS management. The NISSAPs will prioritize habitats and species to be protected in order to support decision making based on sound scientific information. The active participation of the private sector, policy makers and government institutions will also be crucial to their agreement and implementation. At the beginning of the

project, based on the preliminary assessment during the PPG, cross-sectoral National Steering Committees (NSCs) for project implementation will be set up in each of the three countries (Antigua & Barbuda, Barbados, and St. Kitts and Nevis) to oversee development of a NISSAP as well as to guide the overall strategic direction of the project and to ensure coherence and integration of the project components. At the end of the project, a cross-sectoral working group, based on the NSC and including representatives of the major IAS stakeholders, will be constituted in each country to provide on-going coordination of actions relating to IAS at a national level. More details on the constitution of the cross-sectoral working group will be defined during the process of development of the NISSAP. In addition, in collaboration with the OECS Commission and the CARICOM Secretariat, the project will review existing mechanisms for cross sectoral and regional coordination of actions on early detection and rapid response of IAS at the sub regional level, information that will be used to feed the NISSAPs. It will also further explore new joint arrangements that can be supported by the project, for example the management of a regional database on interceptions by the OECS Commission that can facilitate the free movement of goods and services among OECS Member States as well as support effective and sustained cross sectoral national coordination on IAS issues among OECS member states. By the end of the project, the three countries are expected to possess a functional multi-sectoral IAS coordination mechanism as well as a NISSAP. By extension, the sharing of this experience with the other countries in the sub region will be encouraged to adopt similar approaches as part of the suite of actions towards managing IAS sustainably in the future. It is worth noting that a CBD workshop on IAS that took place in September 2017 in Jamaica, was the forum for discussions in which the Secretariat of the CBD (SCBD) was identified as a key project partner for this activity, since ideally the project will share information during the NISSAP development with the SCBD in order to ensure fulfilment of convention obligations and technical accuracy and to ensure no duplication of efforts while enhancing coordination and cooperation.

Output 1.3 (3) Legal frameworks for IAS developed or upgraded in 3 countries (regulatory guidance, protocols, codes of conduct)

- 127 It is universally accepted that prevention is the most cost effective strategy for dealing with IAS. To have effective prevention taking place, national IAS policies and legislation must give those engaged in surveillance unambiguous permission to seize and destroy suspected materials or materials with reasonable risk of harbouring IAS. Most laws dealing with IAS are out-dated and lack clarity as to what is an IAS and what actions can be taken to prevent their introduction. The project will work with the legal stakeholders to strengthen the legal framework for prevention and early detection of IAS, and will use the information generated by Outputs 1.1 and 1.2 as the basis for this work, with the CSAs providing an overview of what is needed, and the NISSAPs guiding the process of establishing priorities. Based on this the project will support the: 1) development of laws and regulations aimed at prevention, Early Detection and Rapid Response (EDRR) and control of IAS, e.g. development / agreement on a dirty list or clean list approach to importation of new species, limiting pet importations to species that would not be able to live in the wild should they escape, registering all captive breeding operations, etc. 2) development of regulatory guidance and protocols for identified high risk pathways and species (regional, tailored for national) with prioritization of habitats and species to be protected; and 3) enhancement of capacity to prevent export of invasive species to other islands including assessment of use of ports for transshipments.
- 128 The project will also undertake activities to create greater awareness regarding IAS regulations and the assessment of impacts will provide the necessary information for the key stakeholders in the national implementing agencies to engage with their legal departments to convey the urgent need for such legislation. The active participation of policy makers and government institutions will also be crucial to their agreement and implementation.
- 129 Enacting properly drafted IAS legislation is the ideal outcome that the project will seek to accomplish. National and regional consultations suggest that the momentum is appropriate in the context of the proposed free movement of goods and services within the OECS member states. However, past experiences suggest that this is highly dependent on political will. For this reason, in addition to addressing laws, the project also will support the creation of new protocols that can function on their own with or without IAS legislation, including updated and published protocols and best practices on: i) activities in the marine environment (except ballast water) in order to minimize the risk of new marine IAS introductions; ii) activities in the pet, aquaria and horticulture trades to minimize the risk of new IAS introductions; and iii) activities in international passenger travel.

Output 1.4 (3) Awareness and capacity building programs developed & implemented (internalizing IAS threats, impacts, and new controls and regulations)

- 130 Under this output, the project will seek to raise awareness and build capacity among stakeholders (the public and private sectors as well as the general public). Public awareness campaigns will focus on making all stakeholders aware of the damage that can be done through the introduction of IAS. Some of the topics that will be part of the campaign are: IAS and their negative impact on biodiversity, minimizing entry of IAS through identified high risk pathways (International Travel; Pet, Aquaria and Horticulture trades), and promoting the National Invasive Species Strategy and Action Plan (NISSAP), among others.
- 131 Campaigns like the USDA's "Don't Pack a Pest" initiative could be utilised as a model for sensitizing international travellers to the risks associated with the introduction of invasive species. To change or encourage behaviour in the general public to reduce the risk of new introductions, there is a need for both enhancing awareness and building capacity to deal with any introductions that may occur in the future. The project will create awareness of the various global open access data sources and will support and/or train national staff in strategies for understanding and efficiently making use of various data sources, including a step-by-step approach to accessing and using tools such as CABI's Invasive Species Compendium, the Global IAS Data base, Fish base, and [www.caribherp.org](http://www.caribherp.org), among others, as well as regional sources such as the National Herbarium in Trinidad and the Smithsonian, which have compiled databases on plant species in the Caribbean. Project findings will also be fed back to the Compendium, providing a means to disseminate them globally.
- 132 Materials produced under this output could be used at the pilot site activities under Component 2, including activities with local stakeholders where awareness materials will promote IAS management and control with site managers, protected area staff, local governments, and local communities. The project will develop national electronic networking initiatives and strengthen the regional CIASNET.org (see Output 3.2.2), which will also be used to disseminate information generated under this output, thereby allowing other countries not directly involved in the development of these materials (i.e. those that only participate in Component 3) to benefit from them.
- 133 During the PPG, on-going demand for training on general issues related to the management and prevention of IAS was reported due the fairly dynamic movement of staff and the dearth of local expertise to conduct the training. As such, the project will adopt an approach of using experienced consultants where they are available in the region and when not available they will be sourced outside of the region. The approach will be to train trainers and deliver as part of their consultancies training material and conduct training of trainers courses. This will build capacity to conduct further training in the future with minimum resources. E-learning modules/training courses will also be made accessible via CIASNET.org to encourage self-learning. The focus will be mainly on the development of courses on conducting IAS risk assessment and measuring impact on biodiversity and the economy of small island developing states. The capacity building programme will target multiple sectors of agricultural and public health; national resource managers of parks and protected areas; bio-security and border officials, tourism operators; educators, as well as policy makers.

Output 1.5 (3) Support to the design and implementation of National cost recovery financial mechanisms

- 134 National and regional consultations during the PPG phase noted that these small island states tend to be more reactive than proactive in dealing with IAS, although funds are available for staff engaged at border control. In many instances, the required funds to conduct for example a rapid survey when a new IAS has been detected or for eradication are generally not mobilized rapidly. Also information to validate possible control strategies for the necessary adaption to local conditions is not made available quickly enough. More importantly, where such funds do exist they are not protected and can be easily lost to competing interest. The seriousness of the loss of biodiversity warrants the setting up of a dedicated sustainable funding mechanism to combat IAS at the national level. Such a mechanism can also contribute to joint public private sector collaboration on IAS. The project will review successful models and provide costed models for adoption for the 3 countries. This will be based in the work under component 3, output 3.1.3 where the project will evaluate potential IAS management activities for financing as well as potential sources of revenue for the region, such that those countries who will pilot the cost recovery mechanisms (Antigua and Barbuda, Barbados and St. Kitts and Nevis) do that in alignment with what will be developed as a regional proposal for a financing system for IAS. A range of possibilities will be explored such as: an import levy on all goods entering the country, especially those which pose a significant risk such as horticultural/ornamental plants and pets; fees for export certification/clearance

services, to be recovered from exporters of certain products and live animals; charges from transport, travel & tour operators, and agriculture & construction machinery owners, traders transporting livestock, agricultural products and related goods; a tourism levy similar to that imposed on visitors to Galapagos, a large percentage of which will be used for IAS management; fines for non-compliance with IAS management requirements and through general taxation; and levies on water usage (invasive woody and aquatic invasive species use copious amounts of water). The appropriateness of these for likely success in the OECS will be explored in conjunction with the work under output 3.1.3 under component 3. CABI, working together with UN Environment, has developed cost-recovery mechanisms for Ghana, Uganda, Ethiopia, Zambia and Indonesia, and the project will draw on those experiences. The project also will assess IAS management costs that need to be covered by the financial mechanisms, including for example infrastructure needs (quarantine units, access to laboratory services, holding structures for IAS at ports of entries) for early management of IAS, the costs building post entry quarantine facilities where plants could be kept in a secure area until diagnostics prove that they are not infested or infected with pests, etc.

**Component 2: Control and management of IAS impacts** (1,032,929 USD from GEF financing and 2,270,770 USD from co-finance)

**Outcome 2.1** *Eradication and/or improved control of IAS impacting globally significant biodiversity, thereby reducing threats to key species.*

135 This component will include eradication and control of IAS that are already present on specific sites, and protection measures for sites of high conservation value. The restoration of ecosystems during and after removing an IAS is of major importance in preventing new invasions, hence appropriate measures and techniques have been identified and documented in pilot project documents developed during the PPG phase for Barbados, Antigua and Barbuda and St. Kitts and Nevis (see annexes 16.1; 16.2 and 16.3).

136 The project will partner with the national implementing organisations and key stakeholders. In Barbados this will include the department of the environment; the University of the West Indies; the primate research centre; the coastal zone management authority; the plant quarantine department; the veterinary department. In Antigua and Barbuda the main partners in executing the pilot project are the department of the environment; the Environmental Awareness Group; the Coast Guard; Flora and Fauna International; the Durrell Wildlife Trust. In St. Kitts and Nevis the main collaborator will be the Department of Agriculture. This outcome will be achieved via the following outputs:

**Output 2.1 A) Antigua and Barbuda Pilot**

Additional details on the proposed pilot site activities in Antigua and Barbuda are provided in Annex 16.1 of the UN Environment Project Document.

2.1a1 Eradication of IAS on, Green Island, Smith Island and Maiden Island. Establishment of new and improved biosecurity mechanisms on Redonda and other critical offshore islands

137 The primary goal of this pilot project is to advance biodiversity conservation on four islands and islets that support many of Antigua & Barbuda's most endangered wildlife. The target islands range from Green Island—one of the more attractive and popular offshore islands for tourism and recreation—to Redonda—the country's most rugged and least accessible island. Together, these islands represent two Important Bird Areas, two Key Biodiversity Areas and at least one Alliance for Zero Extinction site (see Appendix 16.1 in the UN Environment Prodoc for additional details). They support some of the most important seabird colonies in the Caribbean and encompass most of the ranges of at least nine nationally endemic terrestrial reptile species (five of them Critically Endangered, including the iconic Antiguan racer snake and Redonda ground lizard), the globally threatened West Indian whistling duck, nationally endemic invertebrates, rare and regionally endemic plants, and the foraging and nesting grounds of three globally threatened sea turtle species.

138 As noted in Annex 16.1, considerable progress has already been made on many of these islands to eliminate invasive alien rats, mongooses, goats and certain plants, but preventing incursions is a chronic challenge, especially in light of the rising numbers of visitors and boat traffic. The pilot will eradicate black rats, which are frequently identified with catastrophic declines of birds on islands<sup>1</sup>, from Green Island, Smith Island and Maiden

<sup>1</sup> Global Invasive Species Database

Island (West) by baiting the islands in 5m square grids. Trapping will also take place for mongooses, which is blamed for the extirpation of the Antiguan racer on other islands in the country. This will benefit important biodiversity, including: Antiguan racer (Critically Endangered, but has increased from 50 to over 1,100 since 1995 thanks to the removal of rats and mongooses); Antiguan ground lizard (*Pholidoscelis griswoldi*) (Near Threatened); Antiguan spotted tree lizard (*Anolis leachii*); Antiguan pygmy gecko (*Sphaerodactylus elegantulus*); Caribbean brown pelican *Pelecanus occidentalis occidentalis* (Regionally Endangered, but increasing in the project area); Least Tern (*Sternula antillarum*) (Regionally Vulnerable); West Indian whistling duck (Globally Vulnerable—Antigua & Barbuda contains the world's second largest population, with dozens of pairs on the offshore islands); White-crowned pigeon (Globally Near-threatened—Now common on offshore islands). The islands also have important nesting beaches for sea turtles, especially the hawksbill turtle (Critically Endangered). They support a number of regionally and globally threatened vegetation types, including Leeward Islands Dry Forests (WWF Ecoregion NT0220: Critical/ Endangered), Leeward Islands Xeric Shrub (NT1310: Vulnerable), Lesser Antilles Mangroves (NT1416: Critical/ Endangered).

- 139 Previously, rats were eradicated from 16 islands in Antigua and Barbuda. Re-invasion has occurred in 4 islands. The project will therefore build capacity to develop and implement a biosecurity plan for 16 offshore islands. In addition, the project will leave in place a more effective and robust biosecurity (protection of biological resources from foreign or invasive species) protocols and capacity to prevent future (re) invasions by species that threaten native biodiversity on Redonda and the other aforementioned islands.
- 140 Though only 1.5km across, Redonda supports rare and important biodiversity e.g. five endemic reptile species, four of which are Critically Endangered (Redonda ground lizard (*Ameiva atrata*), Redonda anole (*Anolis nubilis*), Redonda skink (*Copeoglossum redondae*) and Redonda pygmy gecko (*Sphaerodactylus sp. nov.*) and is a global Important Bird Area<sup>2</sup>. Surveys have confirmed severe on-going declines in the diversity and abundance of fauna and flora. The main drivers of biodiversity loss and desertification are feral goats (*Capra hircus*) and black rats (*Rattus rattus*) left by miners. Redonda is the highest priority island in the country for eradicating IAS due to its threatened wildlife and excellent prospects of lasting success. This project will eradicate the rats, translocate the goats to Antigua (where the Department of Agriculture wishes to study and preserve this rare breed), and expedite the recovery of native species and habitats. This project has firm backing from the Governments of Antigua & Barbuda and Montserrat and civil society, who share a common vision for Redonda as an internationally recognised centre for conservation and research.
- 141 By eliminating these invasive alien mammals - the single greatest threat to Redonda's biodiversity and ecological processes - this pilot project will have a swift, highly positive and permanent impact. The likelihood of this island being reinvaded is minimal because it is uninhabited and remote; and this project will leave in place an effective, affordable biosecurity regime. A management plan will be developed for Redonda Island and steps will be taken to declare the island as protected area. This will involve public outreach and consultations drafting the legal instruments to declare the island a protected area. Formally protecting the island will further serve to pre-empt any future anthropogenic threats. Having eliminated the greatest threats to biodiversity, the costs of managing this site as a Protected Area after the project ends are expected to be low and sustainable. A protected area management plan will set out the required actions and costs, and make strategic use of existing resources where appropriate (e.g. the Coastguard to assist with surveillance as part of its routine circuits around Redonda).
- 142 Note must be made of the Redonda Restoration Programme (RRP), which has been undertaken by Fauna & Flora International (FFI) in conjunction with the Environmental Awareness Group (EAG) and the Department of Environment (DoE). The implementation phase began in October 2016, and the project has been successful in the eradication of rats (estimated population 6,000) and the removal of feral goats (estimated population 65). As explained in the Appendix 16.1, as of 2017 there were no rats on Redonda. However, to declare the island rat free it must be demonstrated that no signs of rats were seen for a period of two years. This two year rat eradication check to confirm Redonda as rat free will take place in 2018 under this proposed GEF project.
- 143 Based on the experiences and lessons learned from project activities on the pilot islands, the project will seek to strengthen national and regional approaches and capacities for IAS management. The project will cooperate with the national authorities to develop IAS guidelines and protocols for coastal developments, which frequently

<sup>2</sup> <http://www.birdlife.org/datazone/sitefactsheet.php?id=19939>



introduce IAS via equipment and landscaping plants, both on the main land and the offshore islands to prevent IAS introductions to the offshore islands in the future. The project also will develop national capacities to measure the economic impacts of IAS (through components 1 and 3), which will be used to quantify the economic values of IAS-free offshore islands. This will encourage national policies for biosecurity of the offshore islands. Finally, the experiences of Antigua and Barbuda will be published, including how to eradicate IAS in offshore islands, in order to encourage other countries to do the same.

### **Output 2.1 B) Barbados Pilot(s)**

144 Additional details on the proposed pilot site activities in Barbados are provided in Annex 16.2 of the UN Environment Project Document.

#### 2.1b1 Biosecure site(s) for threatened native reptiles established

145 The project will support the establishment of biosecure site(s) for threatened native reptiles at UWI (or at the South-East coast where they are currently found). Sufficient population size and gene flow will be taken up in the experimental design of the pilot. The status of Barbados' endemic reptiles is much less well understood than the Jamaican iguana (for instance), as both the Barbados leaf-toed gecko (*Phyllodactylus pulcher*) and the Barbados threadsnake (*Tetracheilostoma carlae*) are small and cryptic and/or nocturnal. Recent assessments of *Phyllodactylus* indicate their presence in coastal limestone cliff habitats, but how their distribution and abundance is affected by invasives (rats, mongoose and house geckos) is currently unknown. Establishment of a bio-secure site will offer opportunities to study these little known species, and a place to breed them for reintroduction into the wild, as necessary. Eradication of rats and mongoose from the entire island of Barbados is not proposed, but will be done in the small biosecure site. After this, the baseline population of the leaf-toed Gecko in the biosecure site will be determined, and its behaviour will be studied to determine what other practical measures (other than the removal of IAS) can be applied to enhance the breeding population. Once established, biosecurity could be maintained by regular trapping and poisoning (poisons will be placed in bait stations that should prevent non-target organisms from consuming the bait), for which small-scale funding would be sourced on an on-going basis to be sought by the University of the West Indies (UWI).

#### 2.1b2 Monitoring program on effectiveness of control of invasive alien plant species in place and supporting implementation of the Integrated Gully System Management Plan

146 The project will support the development and implementation of a long term monitoring program on the effectiveness of control measures for invasive alien plant species in support of the country's Integrated Gully System Management Plan. The gully ecosystem consists of forested valleys in Barbados where native understory shrubs are being displaced by invasive alien species, mainly of the Rubiaceae and Myrtaceae families (see annex 16.2). In the Gully Ecosystem Management Study carried out in 2003, the most abundant exotic and invasive plant species were Sweet Lime (*Triphasia trifolia*) found in 15.5% of all gully segments, Mother-in-Law's Tongue (*Sansevieria hyacinthoides*) found in 13.3% of all gully segments, and Macarthur Palm (*Ptychosperma macarthurii*) found in 1.3% of all gully segments. A native shrub (*Phyllanthus andersonii*) is found in moist forests such as gullies where species such as Sweet Lime and Mother-in-Law's Tongue may threaten. The Macaw Palm (*Aiphanes minima*), endemic to the Lesser Antilles, may also be under threat through competition with the Macarthur Palm, as both species exist in the scattered lower canopy below the main closed tree canopy of gullies. The River Tamarind (*Leucaena leucocephala*) is another invasive species that was found the most frequently (52.1% on average); this is a very aggressive species which has a high rate of reproduction, it produces many seeds rapidly and frequently, and is highly abundant, adaptable, and relatively viable and its effect must be assessed. These four (4) invasive alien species will be the focus of the pilot study. Activities will include the development of a manual on how best to identify the target species (including seedlings) and how to eradicate them. Sustainable financing of the monitoring program will be taken up by the Drainage Division, Ministry of Environment and Drainage, as well as the Ministry of Agriculture, through recurrent government financing and cost recovery mechanisms to be explored under component 1, such as a water levy.

147 The pilot also will seek to determine any impact of these invasive plants on native reptiles. It is not known how these invasive plants affect species such as the Leaf Toe Gecko and the Threadsnake, but a study of native lizards in Australia showed that they avoid invasive plants. In that case, areas of Rubber vine (*Cryptostegia grandiflora*), which is an environmental weed that frequently invades riparian habitats in northern Australia, were avoided by native reptiles; although the Rubber vine composed some 40% of the vegetation in the riparian habitat, none of the 132 lizards observed were found in the rubber vine vegetation, even though this vegetation

contains features that superficially resemble native habitat used by lizards, such as leaf litter (Valentine, 2006). The four invasive plant species listed above will be controlled in pilot plots, which will be monitored for increased presence and recovery of native reptiles and native plant species. The results of this work will inform management plans by the National Implementing agency for managing invasive plants both for the benefits of native reptiles as well as important watersheds in Barbados. It will therefore enhance efforts advanced under activity 2.1b1 to stabilize and eventually increase the populations of endemic reptile species, and furthermore will contribute to the conservation of valuable ecosystem services (watershed protection) provided by the Gully System.

#### 2.1b3 Rat and mongoose control program in place at selected hawksbill turtle (*Eretmochelys imbricata*) nesting beaches.

148 Barbados is currently home to the second-largest nesting population of hawksbill turtles (*Eretmochelys imbricata*) in the Wider Caribbean, with up to 900 females nesting per year. This data will be updated in the first 3 months of the project implementation to establish accurate baseline information. A reduction in predation of turtle eggs will have a measurable impact towards increasing and stabilizing populations of hawksbill turtles. Mongoose predation on hawksbill eggs is confined to particular beaches (one of which, Bath, has a population of mongoose that is genetically distinct from the rest of the island) and the behaviour may be socially transmitted. Trapping to reduce predation pressure of mongooses (and rats?) at these locations can correlate to higher numbers of hatchlings emerging. The project will reach out to potential hotel and local community partners to collaboratively design the program for trapping of rats and mongooses and to seek their support in sustaining trapping efforts over the long-term; these partners will be trained in trapping and safe handling and provided with the necessary equipment. Sustainable financing of the continuous control of rats and mongoose will be explored through the hotel industry (on inhabited beaches), in partnership with the Barbados Sea Turtle Project (University of the West Indies Cave Hill Campus), the Ministry of Health and its Vector Programme, and cost recovery mechanisms to be explored under component 1, such as a levy on tourists viewing the laying of eggs or the release of hatchlings. Another possible alternative may be the implementation of a small bounty by the Government as was used in the Giant African Snail control. The population of turtles will be monitored to determine the efficacy of the actions undertaken.

#### 2.1b4 Lionfish assessment and management project in place at high biodiversity value reef sites

149 Focused lionfish control efforts in strategic locations through targeted interventions have been found to have sustainable impacts in increasing recruitment at key life stages of coral reef fish such as the fairy basslet (*Gramma loreto*), bridled cardinalfish (*Apogon aurolineatus*), white grunt (*Haemulon plumieri*), bicolor damselfish (*Stegastes partitus*), several wrasses (*Halichoeres bivittatus*, *H. garnoti*, and *Thalassoma bifasciatum*), and striped parrotfish (*Scarus iserti*). Lessons learned from targeted removal experiences (baited traps for instance) in The Bahamas, Bonaire, and Cayman Islands will be integrated into project design. The project also will build on the biodiversity assessment conducted by CERMES in the early phase of the lionfish invasion to conduct an economic impact assessment of lionfish on livelihoods and biodiversity. A baseline survey will be conducted within three months of project inception to determine the extent to which the lionfish has had an impact from the preinvasion baseline data by determining the changes in the key indicator species. This information will be valuable in the attempt to develop a sustainable funding mechanism for common IAS approaches in the region and to share passive methods for reducing Lionfish numbers, such as fish pot designs developed in Jamaica and Bahamas under the last GEF project.

150 Sustainable financing of continued removals and monitoring of lionfish at targeted sites of high biodiversity value will be taken up by: a) the recurrent financing of the Coastal Zone Management Unit (CZMU), which is responsible for *inter alia* coral reef monitoring, regulation of marine research, public education of coastal conservation and the review of any coastal projects; b) the Fisheries Division; c) partnerships with the dive community and dive shops, which have been successful in a number of countries, including The Bahamas, Bonaire, and Little Cayman Islands; d) partnerships with potential lionfish fishers and restaurants / markets; and e) cost recovery mechanisms to be explored under component 1.

### **Output 2.1 C) St. Kitts and Nevis**

151 Additional details on the proposed pilot site activities in St. Kitts and Nevis are provided in Annex 16.3 of the UN Environment Project Document.

2.1c1 Management plan developed for the sustained control and management of the monkey (*Chlorocebus aethiops*) populations in protected areas

- 152 Prior to the submission of the PIF, there was no agreement on the implementation of any pilot site activities for the management or control of any invasive species in St. Kitts and Nevis. However, the GEF Focal Point and the stakeholders during the national consultation highlighted the urgency of assisting the country with the African Green (or Vervet) monkey (*Cercopithecus aethiops*). The Vervet Monkey was introduced from West Africa approximately 300 years ago as a pet and subsequently became an invasive alien species. The impact of the monkey on biodiversity is unquantified in St. Kitts although some attribute it as the cause of the extinction of the St. Kitts endemic subspecies of the Puerto Rican Bullfinch. The Vervet monkey has the most omnivorous diet of all primates, eating all of the types of food including leaves, gum, seeds, nuts, grasses, fungi, fruit, berries, flowers, buds, shoots, invertebrates, bird eggs, birds, lizards, rodents, and other vertebrate prey. The monkey has a strong preference for fruit and flowers, which are seasonal resources, and from month to month they vary their diet tremendously to cope with fluctuations in food availability.
- 153 This dietary behaviour was confirmed in a preliminary survey conducted in 2017 by the Environmental Awareness Group (EAG) in three of the country's protected areas (the Central Forest Reserve, the Nevis Peak and Camps River Watershed Protected Area, and the Booby Island Marine Reserve). In a preliminary report to the Government of St. Kitts and Nevis, the survey concluded that "...non-native mammal signs and sightings and must infer these animals are placing an immense pressure on native species throughout St Kitts and Nevis. The monkeys in particular appear to have a far-reaching ecological impact, not only through directly feeding on huge quantities of plants and small animals, but there appears to be a positive correlation between the abundance of monkeys and black rats, which benefit from fruits and other foods dropped on the forest floor. Monkeys are responsible for high levels of damage to plants. The lack of bromeliads and orchids, as noted by the project botanists, may be largely due to the monkeys. Palm hearts, fruits and other foods were found to be very commonly dropped by monkeys on the forest floor and subsequently eaten by rats, which also appeared to occur at exceptionally high densities in the forests. Vervet monkeys were the most widespread and frequently detected invasive mammal, recorded in 57% of the timed searches, followed by rats (51%), mongooses (50%), goats (42%) dogs (22%) and pigs (3%)."
- 154 On St. Kitts, where agricultural foods are readily available in the landscape and in condensed areas such as on plantations, large numbers of the Vervet monkey can be supported in a much smaller space. Population densities are estimated at 255 individuals per square kilometre on St. Kitts, as compared to 9 individuals per square kilometre at the Segera Ranch in Kenya to (Cawthon Lang, 2006). This species occurs on both of the islands of St. Kitts and Nevis, and otherwise only in Barbados within the West Indies (a con-generic, *C. mona* occurs in Grenada). Population estimates for St. Kitts vary widely from 1,200 to 5,600-8,400. The Nevis population is estimated to be 2,000, based on 100 troops mostly located in ravines around the island's central mountain. The Chief Agricultural Officer of St. Kitts noted that this species is a major pest of all crops grown in St. Kitts and Nevis. While some conservationists see the monkey as part of the country's existing biodiversity, and stakeholders in the tourism sector see it as a natural asset to the tourist product, it is clearly now a species that presents a significant threat to the islands native flora and fauna.
- 155 The project proposes to first conduct a critical review of control strategies employed locally and regionally, and to validate capture techniques (following standard humane practices) for the green monkey under local conditions. This will be followed by an evaluation of the feasibility of cost recovery mechanisms for sustainably managing the monkey population utilizing the validated methods, in order to minimize negative impacts and to quantify the impact of the Vervet monkey on native biodiversity and economic sectors (e.g. agriculture). It will then incorporate the results of these assessments into a management plan that will reduce any negative impact on biodiversity and agriculture while preserving its value to the tourist sector. Once completed, the management plan will then be taken up by the local authorities for further implementation post-project.

**Component 3: Regional Biosecurity (7 countries)** (768,530 USD from GEF financing and 1,071,000 USD from co-finance)

**Outcome 3.1** Increased collaboration among Caribbean states to tackle IAS.

156 This outcome will be achieved via the following outputs:

Output 3.1.1 Regional strategy for prevention and surveillance at ports of entry (i.e. customs) developed and Regional IAS Working Group established:

157 For effective IAS management in small island developing states across the Caribbean, it is critical to have coordination and collaboration within countries, as it has been shown repeatedly that once an invasive species enters the region, it is only a matter of time before it spreads to neighbouring countries. Activities under this component will therefore seek to provide collaborative mechanisms and to build capacity to enable individual countries to collaborate at the regional level in preventing the introduction of IAS. The project structures will serve as a hub and spoke mechanism through regional IAS working groups. The national coordinating mechanisms that will be created under Component 1 will be linked to form a regional coordinating mechanism where other countries (not only those parts of Component 1) will participate. Initially the regional coordination will be done at the level of the international project steering committee (IPSC) and support will be sought from the SCBD as well as regional partners such as USDA/Aphis, CARAPHA, CaribVet, CPHD, the CARICOM Secretariat and the OECS Commission, so that this will become eventually a separate Regional IAS Working Group that will endure over the long-term. To ensure buy-in from these important partners, the project team will share outputs and updates from the project with them on regular basis, and whenever possible they will be invited to join the IPSC meetings.

158 Current procedures and practices at ports of entry will be reviewed, to identify gaps in surveillance activities. This information will be discussed in the regional working groups and used to review and update the existing Regional Invasive Alien Species Strategy and Action Plan, with a focus on upgrading biosecurity infrastructure. Once completed, the updated strategy and action plan will be presented to national and regional policy makers for adoption and implementation on various forums where there is information is pertinent. The project will also support the dissemination of international best practices for biosecurity at ports of entry, and will provide capacity building to adopt such practices, as part of a regional strategy for prevention and surveillance. This enhanced biosecurity will allow for greater trade while reducing the risks of introduced IAS.

Output 3.1.2 Database established for interceptions at ports

159 A critical review of biosecurity and surveillance in ports of entry will be conducted in participating countries, which will be used to support the design of a standardized database system to satisfy the needs of the key stakeholders. Current interceptions at ports of entries in all participating countries are documented in a manual system, but this information is not shared among stakeholders within the country or with other countries. A standardized database for recording data and information will be established to allow sharing of information in real time, thereby enabling practical collaboration between countries in preventing introductions to the region as a whole. The database that will be developed will assist in recording interceptions and in giving surveillance officers information on potential risks that may be posed by passengers arriving from particular destinations. The database will also generate reports that describe risks and allow these to be shared among stakeholder within a country. CABI conducted a scoping study to determine a roadmap for building a similar tool in 2014, but the roadmap has not been implemented pending finalization of an agreement on the free movement of goods in the region. The project will revive this initiative, and the information generated by this database will provide the managers of national biosecurity systems with information pertaining to the potential IAS threats and the origin of these threats

Output 3.1.3 A Strategic plan for the Regional Financing System for shared IAS developed

160 For Barbados and the OECS Region, the involvement of regional umbrella organisations such as the OECS Commission and the CARICOM Secretariat and the regional programmes they manage that have an interest in IAS will be key in determining how any potential regional IAS funding system will be structured and managed. The project will work with these institutions to examine the legal and financial constraints to setting up, hosting and managing such a fund sustainably. The project will evaluate potential IAS management activities for financing as well as potential sources of revenue; produce a financial plan with mechanisms for collection and mobilization; gain endorsement of the financing plan from relevant stakeholders, and submit the plan to national authorities for implementation. These will be linked with the activities under output 1.5 of component 1 for National cost recovery financial mechanisms, where the 3 countries part of that component will be supported to tailor those mechanisms to their local operations and capacities, and to adopt them, providing important lessons

for the further development of the regional process, and vice versa. The intention under this component will not be to establish a new mechanism but rather to identify any existing structures and strengthen those where possible to achieve the sustainable funding of actions for managing common IAS in the region. The other critical action will be to make a case for the establishment of funding mechanisms and to identify potential funding mechanisms.

- 161 Efforts to develop a strategic plan for financing IAS management at the regional level will be based on lessons learned from coordinated approaches to other common environmental problems affecting multiple states, such as oil spills and other man-made disasters in the Caribbean. For example, the International Convention on Oil Pollution Preparedness, Response, and Co-operation (OPRC 1990), the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region, (Oil Spills Protocol 1983) under the Convention for the Development and Protection of the Marine Environment of the Wider Caribbean Region, (Cartagena Convention 1983), and the Caribbean Island OPRC Plan 2008, all have systems in place which include regional cooperation in dealing with oil spills. These approaches will be reviewed to examine what lessons and best practices can be applied to managing common IAS problems among multiple states in the OECS sub region.

***Outcome 3.2 Enhanced regional IAS management through early warning system, response measures and capacity building***

- 162 This outcome will be achieved via the following outputs:

**Output 3.2.1 Regional technical capacity developed to conduct risk assessment and measure economic impact of IAS**

- 163 The second part of component three seeks to enhance regional and national cooperation to reduce the risks associated with the introduction of IAS. It will valorise some of the results and outputs in Component 1 to benefit the wider Caribbean since some of the lessons learned on effective strategies from Component 1 (i.e. development of national IAS strategies, revised legal frameworks, and awareness campaigns) will be shared throughout the region. The pillars for an improved regional capacity will rest on the following project activities: improving risk assessments, upgrading infrastructure where feasible, building human capacity, and adopting best practices for surveillance and early detection.

- 164 The project will support the development of national and regional technical capacities to conduct risk assessments and to measure the economic impacts of IAS as well as the benefits of IAS management through training for the 7 participating countries. The project also will provide training for port officials on detecting, capturing, detaining and eliminating possible IAS threats at points of entry, which will lead to greater detection of IAS and better handling and treatment of intercepted samples. In addition, a model for early EDRR will be developed and will be tested at high risk entry points that will be selected during project implementation. Capacity building also will include training on measuring the economic impact of IAS through completing at least one economic impact assessment of an invasive alien species in each country. The results of these studies will be compiled and circulated to key decision makers to sensitize them on the true economic impact IAS is having on economic sectors and livelihoods in the region.

**Output 3.2.2 CIAS.NET strengthened as a learning network for IAS**

- 165 During project implementation, the current CIAS.NET will be updated to serve as a communication and coordinating hub both for the project as well as regional IAS issues in general. All of the training courses done under the project will be posted as e-learning modules on CIAS.NET so that the site will be used as an online open source to support national capacity building efforts to manage IAS. The site will contain materials specific to trainers to use for training others. Material will also be available to encourage new recruits engaged in IAS management to improve their skills while on the job. Reports from the database of IAS interceptions at airports and seaports will also be posted on the site. Participating countries will have country pages to highlight their national IAS lists, black lists of species to be kept out of the countries, and commodities and species that are free to be traded. The current skills database on the site will be updated to include IAS experts currently active in the participating countries as well as those whose capacity to manage IAS will be developed by the project. During project implementation the various baseline data for IAS in participating countries will be translated into distribution maps and made available on the site, which will address a significant gap in this type of information in the Caribbean.

- 166 A key input for CIAS.NET will be new information on invasive plant species in the target countries. Although numerous studies have been carried out in the region on IAS fauna, information on the impacts of IAS flora is much less available; although it is widely held that invasive plants have changed the ecology / ecosystem functions of environmentally sensitive areas in the target countries, for example by reducing suitable nesting habitats for native birds. For this reason, the project will carry out surveys of invasive plants; however, prior to undertaking any surveys, the project will first consult with the Smithsonian Institute, the University of the West Indies, the Centre for Marine Environmental Sciences, and the National Herbarium of Trinidad and Tobago (CABI has existing relationships with all of these institutions) to assess their existing data on species distribution. Following that, rapid surveys will be carried out of suspected IAS flora that have not been covered in previous surveys and are believed to have significant impacts on native biodiversity.
- 167 Awareness modules on the open sources of data for identifying IAS will be tailored to those working in sectors such as agriculture, health, wildlife and forestry, fisheries, as well as NGOs, community organizations, academia, volunteers and national security personnel engaged in surveillance. Stakeholders will be able to use the hub as a source of data on IAS in the Caribbean (with links to the mobile app described below) and as a link to other online open data sources on IAS such as the CABI Invasive Species Compendium. The site will be both a repository of information on IAS in the Caribbean as well as a valuable resource of contact information on key stakeholders in the region, and it will facilitate linkages with other regions, for example the Pacific where both UN Environment and CABI work with other stakeholders to manage IAS.
- 168 CABI and the project team will work with existing regional partners to ensure that this hub will continue to operate post-project. Lessons learned from the previous MTIASIC project and stakeholder inputs during project preparation indicate that this site should be managed by stakeholders in the region. However, should this prove to be unsustainable or if regional agencies such as the OECS Secretariat or CARAPHA are unwilling to continue to manage the site as a regional resource, the site will be migrated to a CABI-managed online resource such as the Invasive Species Compendium or a new resource to be developed as part of a Global Initiative on Invasive Species.

Output 3.2.3 Regional App or ID IAS risk cards for prioritized species that can affect important biodiversity, agriculture, and human health developed for ports of entry

- 169 A mobile App will be developed to create awareness on IAS that can affect important biodiversity across a wider group of people and also to aid national efforts in terms of prevention and EDRR. To do this, the project will design and produce an IAS identification guide, which will be then transferred into an App for ease of use. The mobile App will be linked to existing data resources on IAS taxa and native species (see Output 1.4) once permission from these sources is obtained. For example, [www.caribherp.org](http://www.caribherp.org) provides information on reptiles of the Caribbean that will make it easy for those doing surveillance to distinguish which animals are native or exotic. Risk cards for prioritized species that can affect important biodiversity, agriculture, and human health will also be developed for use at ports of entry in situations where it is not possible to access the mobile app while conducting surveillance activities.

### **3.4 Intervention Logic and Key Assumptions**

- 170 The logic for intervention includes an incremental factor since it will build on several regional and national initiatives that were recently concluded such as the MTIASIC project that was completed in 2014, and the sub regional component of the Sanitary and Phyto Sanitary (SPS) project completed by IICA and the OECS Commission in March 2016. It will also continue from actions started by the University of the West Indies in protecting native biodiversity in Barbados as well as building on work done by the EAG with support from FFI and others in Antigua and Barbuda, and efforts from the Government of St. Kitts and Nevis in assessing the potential impact from the Vervet Monkeys. In addition, the project's logic is based in the fact that all the participating countries have had at one point or another to deal with IAS from the Pink Hibiscus Mealy Bug to Sargassum sea weed. However, comprehensive policies and national and regional structures are weak, and therefore there are common problems to be addressed. This means that there is great opportunity for cost-effectiveness and cooperation, which is the reason why this project also has a regional component (see Theory of Change in Annex 20).

171 On 25-26 February 2015, the OECS hosted a Regional Consultation to formulate a Plan of Action for invasive species for the OECS. The Consultation assessed the gaps, challenges, priorities and capacity building needs regarding invasive species. The consultation took place with approximately 30 leaders from different sectors (fisheries, agriculture/forestry, and tourism, maritime) in the member states and beyond to draw on their expertise and included academic institutions, government agencies and national and local authorities. This meeting began the participative approach to develop the project. Since then the project has been developed in an integrative and comprehensive manner, with consideration for all relevant sectors and stakeholders involved in and affected by IAS. The project during the PPG phase also participated in a CBD sponsored capacity building workshop for addressing the Aichi Biodiversity Targets.

172 In addition the intervention strategy of this project is based in the interest of addressing the environmental problems derived from IAS in the OECS countries through a cost effective approach that will create capacity at a national and regional level, with high potential for application and sharing of lessons learned. This approach is expected to result in a cost effective way of implementation of the activities, and in a good investment of the GEF resources in terms of impact. Another important aspect of the intervention logic was the need for having a technically solid partner for the execution of the project. This is with the aim of maximizing the opportunities for networking and technical cooperation amongst the participating countries and other stakeholders. In addition, the intervention logic is also based on the regional initiative for free movement of products in the Caribbean region. This creates the perfect timing for the project since this will facilitate to get the political buy-in and support for the NISSAPS and other important project products. The project also comes soon after the former MITISAC project; this will allow the project to build on partnerships that were already created.

173 Attempts were made to incorporate stakeholders both in implementing activities under the project in a collaborative manner but to also proactively target them with information generated by the project. As far as it was practical the key stakeholders should both be aware of the project prior to its implementation and participate in its execution. The submission of co-finance letters is an indication of this commitment both at the regional and national levels.

174 Key assumptions for the project are:

- a. Other organizations are willing to share information and recognize the usefulness of the data to be produced and the knowledge to be generated
- b. National institutions in three countries prioritize the development and upgrading of legal frameworks and policy formulation as an essential first step. And stakeholders and decision-makers are receptive to incorporating project outputs into national IAS policy formulation processes and are willing to collaborate with all national stakeholders for policy success.
- c. Expressed political will for action at the highest levels translates to middle and lower levels that will need to implement actions for sustainable change.
- d. Human resources that are required at the national level to carry out both the project and actions post project will be assigned by the national authorities
- e. Sustainable funding mechanisms are put in place to ensure continued actions post project
- f. National authorities are willing to collaborate across borders to implement a framework for implementing a regional biosecurity plan

### 3.5. Risk analysis and risk management measures

175 Risk analysis and risk management measures are summarized in the table below:

<b>Project Risks</b>				
<b>Description</b>	<b>Type</b>	<b>Impact / Probability:</b> On a scale from 1 (low) to 5 (high)	<b>Mitigation Measures</b>	<b>Owner</b> (who has been appointed to keep an eye on this risk)
Obtaining the necessary behaviour change to prioritize prevention over	Political	P= 3 I = 2	Early warning systems, emphasizing risks associated with key pathways	Project management and GEF OFP

management in terms of cost effectiveness				in participating countries.
Changes in internal conditions, such as movement of staff (e.g due to promotions) or the shifting of national local implementing partners to another Ministry, may lead to the delays in some components.	Operational	P=2 I=3	Institute a knowledge management strategy that allows for documentation of all decisions and actions taken in order to permit quick resumption of activities by any new staff. In addition, the use of UN Environment's project management tool ANUBIS will serve to mitigate this risk since all project related information is stored there.	Project Management Unit (PMU)
Unsustainable Financing (non-materialization of co-finance and/or insufficient project funds due to unexpected changes in economies, availability of local professionals, transportation, etc.)	Operational	P=2 I=3	Co-financing commitments have been secured prior to the start of project implementation. Actively follow up during the project to ensure pledged commitments are realized. Undertake annual budget revisions to ensure funds are allocated for key project activities based on the current situation at that time.	PMU; National Implementing Organization (NIO)
Increased international tourism, trade and transport increases the risk of IAS entry and spread within the target countries	Environmental	P=4 I=4	Develop and implement a strategy to engage the private sector through targeted public awareness. Mitigation will occur during the entire implementation life of the project.	PMU, NIO
Climate change related habitat shifts and destruction create conditions for spread of Invasive Species	Environmental	P=3 I=3	Increased study and surveillance of invasions, data collection and development of management plans to address problems. The project itself will respond to this risk through its activities.	NIO
Limited access to data due to possible trade implications	Political	P=2 I=3	Regional forums for exchange of data; collaboration with international databases such as the CABI Invasive Species Compendium and the Global IAS Database.	PMU; NIO
Limited buy in from national communities	Socio-political	P=2 I=3	The project will take advantage of its communication strategy that targets key stakeholders and will use the right media to reach them. In addition, the project will not be working in isolation; it will work closely with local partners and Governmental institutions to secure their support.	NIO
Changing government priorities through change in governments or ministers in charge	Political	P=2 I=3	Keep the GEF and other national focal point informed at all stages; keep regional bodies and fora updated on the project.	PMU; NIO;
Lack of regional Buy-in	Socio-political	P=2 I=3	The project will take advantage of its communication strategy that targets key stakeholders and will use the right media to reach them. In addition the project will not be working in isolation; it will work closely with regional partners and institutions to secure	PMU



			their support. Key partners will also be invited to project meetings (i.e CARICOM; OECS; SCBD). The Basseterre treaty would also add to the mitigation of this risk, since better management of IAS will have an impact on the region's trade.	
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### 3.6 Consistency with national priorities or plans

#### Antigua and Barbuda:

176 The Antigua and Barbuda National Biodiversity Strategic Action Plan (2014-2020) lists the 20 most recent invasives, and identifies invasives as a threat to coral reefs and a cause of forest fire (lemon grass invasion). Recommended actions specifically call for regulations to curb the importation of potentially invasive species that pose a danger to biodiversity. The following indicators are suggested as a measure of success for the achievement of Aichi Target 9: Reports on the identification of invasive species and the pathways identified; Number of border control officers (and any other agencies responsible for monitoring species) trained in identifying alien species; and monthly monitoring reports from the relevant agencies within the Ministry of Agriculture and all other relevant ministries and NGOs

177 The following activities are outlined:

- Completed protocol document on managing the relevant invasive species.
- Collate existing information on the programs currently under way on the management of invasive species as baseline for effective management of invasive species.
- Initiate training programs for border control officers on invasive species identification and management.
- Support the establishment of biosecurity measures at air and seaports e.g. systems for confiscation and destruction of illegal plant and animals or their products; use of canines to increase detection of potential bio-security risks.
- Establish reporting links between the Environment Division and relevant NGOs on work being undertaken regarding invasive species.
- Utilize the Environmental Information Management and Advisory System (EIMAS) to initiate monitoring and management of invasive species.
- Source regional and international information to strengthen the work at the national level on invasive species.
- Develop a legal policy document on invasive species.

178 Target 12: By 2020 implement protection measures for threatened species including the racer snake, marine turtles, Redonda Dwarf Gecko, Redonda Ground Lizard, threatened plants, and threatened birds.

Indicators:

- Population densities for identified species
- Successful re-introduction of ex-situ specimens
- Successful eradication of known alien invasive predators
- Establishment of a sanctuary for ex-situ specimens within the Botanical gardens and other relevant areas
- Protection of critical habitats for threatened species

179 Activities to be implemented:

- Support the current work being undertaken to identify threatened species as indicated in the target.
- Initiate a process aimed at identifying ex-situ specimens for re-introduction to the country.
- Initiation of work to identify known alien invasive predators of the species being protected and means of ensuring their eradication.
- Initiation of work to identify critical habitat areas for the identified species and the means of ensuring their preservation.

## Barbados:

180 Barbados' Fourth National Report to the CBD of 2011 noted that IAS was a major threat to biodiversity after habitat loss and fragmentation. Other threats identified were overharvesting of species, pollution, unregulated shooting of birds, resource extraction and natural disasters. These threats not only contribute to species loss, but also alter natural habitats.

181 The NBSAP identified the following actions with respect to IAS:

- Objective 3: To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity
- Strategy 1: Establish a National Research programme to document the status of, threats to and value of biodiversity. The specific action identified is Prepare and implement a prioritized programme on biodiversity research, incorporating appropriate governmental and non-governmental agencies, students and staff of UWI, polytechnics and colleges, schools, communities and user groups in appropriate elements of the programme. The programme will include the following research and monitoring elements that will include inter alia:
  - Research on the presence, distribution and abundance of alien and genetically modified species and the development of a GIS compatible database; and
  - Development/support of monitoring projects designed to assess impacts of exploitation, habitat loss, pollutants and alien species on the distribution and abundance of terrestrial, marine and freshwater biodiversity, alien, indigenous and rare species

## Dominica:

182 The Dominica National Biodiversity Strategy and Action Plan (2014-2020) According to the NBSAP IAS are one of the five most serious threats facing Dominica with an "increased incidence of invasive species." "Despite the efforts implemented under the 2001 NBSAP, Dominica has suffered from the negative impacts of alien species" and highlights the presence of the lionfish and the invasive grass, *Halophila stipulacea*, and "laments the presence of the *Puerto Rico crested anole*, the *chytrid fungus* and the *palm mite*." It states that the "Ministry of Agriculture needs to strengthen its quarantine procedures and expand its *ex-situ* conservation efforts to increase the local gene pool of endangered species."

183 Dominica's 5<sup>th</sup> National Report identifies the control of IAS as a high priority based largely on the impacts of introduced alien species which are having a serious negative impact in sectors "such as; forestry (cane frog), agriculture (black sigatoka disease) and fisheries (lion fish and sea grasses)." Of all of the threats highlighted in the last Report the threat of IAS is the only one that has increased with the "trans-boundary movements" of "problem species" a major cause of concern. Recommended actions involve resource allocation to "counter" introductions and increased awareness. The document proposes the revision of existing legislations and adaptation of new legislations with respect to the regulation of the introduction of alien species. It further suggests the development of public education programs to raise awareness on the impact of invasive alien species on biodiversity, the creation of a comprehensive species database, and the protection of threatened species and areas.

## Grenada:

184 Grenada's 5<sup>th</sup> National Report to the CBD dated July 2014 asserts that "Grenada's wildlife species face habitat destruction, unsustainable extraction and bad hunting practices. The main reasons for these threats include lack of or limited public education, limited enforcement and monitoring, lack of adequate legislation and invasive alien species. Furthermore, the marine and coastal ecosystem of coral reefs, mangroves and sea grass beds which provide spawning, hiding, recruitment and foraging habitats for assemblages of reef species, migrant pelagic and vagrant species are also threatened by invasive alien species. The report calls for capacity to be built to contend with the threat of invasives. The endangered Grenada Frog is now threatened by the globally challenging *Batrachochytrium dendrobatidis* fungal infection detected in 2009, and competition from the invasive Johnstone frog (*Eleutherodactylus johnstonei*) (Berg, 2011). In 2014, the iconic Grenada Dove continues to be threatened by intense pressure on its habitat largely from physical development, invasive species and climate change. Predation by invasive species primarily mongoose, rats and possibly feral (wild) cats is without a doubt causing a reduction in the Grenada Dove population. The

invasive lion fish (*Pterois volitans*) is stated to be a key factor in the decline of reef fish stock. Target 9 for action is "Invasive alien species prevented and controlled".

#### **St Kitts and Nevis:**

185 The 2008 National Biodiversity Strategy and Action Plan (revised 2014 NBSAP to be made available soon) makes reference to the impact of IAS, namely the pink hibiscus mealybug and the tropical bont tick, and notes that many other invasive crop pests have been brought under successful biological control. However, it notes that "the specific route for the introduction of the invasive species is generally not known." Reference is also made to the red-legged tortoise and the mountain chicken (*Leptodactylus fallax*) both of which are threatened, amongst others, by mongoose predation and the accidental introduction of the Cuban tree frog which may pose a threat to native frog species. Other IAS such as the African vervet monkey, white-tailed deer and rat species are also mentioned. The NBSAP takes cognisance of the fact that IAS can outcompete native species and that this has "certainly occurred in St Kitts and Nevis, but to what extent is not known." The NBSAP does not provide for any actions with regard to IAS management despite acknowledging that they pose a threat to biodiversity.

#### **St. Lucia:**

186 The St. Lucia 4<sup>th</sup> National Report to the CBD in 2010 references introduction of invasive alien species such as feral pigs and species from the pet trade that have found themselves in the wild. The report also notes increases in alien pests and diseases of external origin which are impacting the biodiversity sector and food security. Invasives are considered in the top three threats to trees, plants invertebrates, amphibians, reptiles and birds. One of the root causes for the declines in the island's diverse range of forest species, including the Fer-de-lance and other reptilian species were given as alien invasive animals such as the opossum (manicou), rats, dogs, cats, feral pigs, the mongoose and other alien invasive reptiles and amphibians. Mongooses, introduced in the late 19<sup>th</sup> Century, could be the main cause of many reptiles and ground-nesting birds declining. Feral pigs are increasing in number, damaging the forest and endangering a variety of wildlife. Alien green iguanas could compete and hybridize with the Saint Lucia iguana.

#### **St Vincent and the Grenadines:**

187 The Fourth National Biodiversity Report of St. Vincent to the UNCBD notes that Invasive species are also on the rise, presenting much challenge to forest biodiversity. One example of this is the non-native? Cattle Egret (*Bubulcus ibis*) that roost in large numbers on mangrove trees are linked to the death of Mangrove at the Brighton beach area. It appears that toxins caused by build-up of fecal deposits have polluted wetland soil, destroying plant roots. Another example is that of the introduced Armadillo (*Dasypus novemcinctus*) which has done considerable damage to the ecosystem in the Vermont watershed, undermining trees, accelerating erosion and thereby threatening native biological resources. (InERT, 2006: 33). While the National Report of Saint Vincent and the Grenadines to the Third International Conference on Small Island Developing States July 2013 notes that the impact of IAS on agriculture is very high and increasing; for forest and coastal forest/mangroves it is high with increasing impact; while for marine, coastal, coral reefs and inland waters it is moderate impact but increasing.

188 The government of Saint Vincent has signed the St. Georges Declaration (SGD) of Principles for Environmental Sustainability in the OECS, ratified the Convention on Biological Diversity (UNCBD) and met all of the obligations associated with these agreements. The government has also ratified the United Nations Framework Convention on Climate Change (UNFCCC), the Convention to Combat Desertification (UNCCD) [and fight land degradation], the Cartagena Protocol on land based sources of marine pollution, and the Stockholm Convention on persistent organic pollutants (POPs). St. Vincent and the Grenadines has also signed on to the Caribbean Challenge Initiative (CCI) with the pledge to protect 20% of its near shore marine and coastal resources by 2020. All of these efforts are designed to conserve the island's natural resources, manage its biodiversity resources and ensure a clean safe and healthy environment.

### **3.7 Incremental cost reasoning**

#### Baseline Scenario (without GEF support)

- 189 In absence of GEF support, the region will continue to attempt to address problems arising from IAS in the context of limited capacities and resources and ineffective coordination. Some countries may continue with the development of their national IAS strategies and others who already have a strategy (e.g. St. Lucia) may move towards its implementation. In addition, other partners will continue to invest in the region in support of the eradication, management and control of IAS; for example, the work being done by USDA/Aphis and FAO in supporting the eradication of IAS impacting the agriculture sector. Nonetheless these efforts are unlikely to be enough to equip the region with the needed capacities to improve their ability as a region to manage, control and eradicate IAS. GEF funds will complement these efforts and will leverage resources that will have a prompt impact on the ground contributing to the safeguarding of local biodiversity.
- 190 One significant constraint that will not be easily addressed in the absence of the GEF support is fostering of regional cooperation and collaboration beyond the agriculture sector. GEF support will offer the possibility to undertake regional activities, share lessons and experiences, and foster south - south cooperation. Regional workshops such as those organized by the CBD, FAO and USDA/Aphis will continue to provide a platform for coordination on IAS in agriculture, but these will have much more limited scope and impact. In the last decade, Barbados and the OECS have seen a decline in agriculture production and a rise in tourism, and this shift in the economies of these small island states has resulted in increasing imports of food and other goods. These changes have been coupled with the opening of new routes: there are now direct flights between Brazil and Barbados; an international airport was opened in St. Vincent in 2017; and the expanded Panama Canal is contributing to increase trade in the region. The alarming increase in the rates of agricultural pest and diseases is an indication of the increase in the potential of IAS that is harmful to biodiversity to enter this region. In summary, increased imports and increased tourist arrivals significantly increase the chances of both deliberate and unintended introductions of IAS, especially as hitchhiker pests in passenger luggage.

#### Alternative Scenario (with the GEF support)

- 191 With the support of the GEF, actions will be undertaken that will make it possible to address the barriers to stemming the tide of IAS invading the Caribbean. The GEF support will offer a timely intervention to more precisely define the problem and recommend the best policies and management tools that will contribute to the sustainable management of the problem in the future.
- 192 Key elements of the proposed project include the identification of pathways with the highest risks for IAS introductions, and the development of national policies and action plans to reduce the entry and spread of IAS, which constitute the main threat to biodiversity in the participating countries and also have a significant negative impact on the national economies of these SIDS. In addition, because of the urgent need for effective collaboration between the various stakeholders, the project will set up national IAS working committees with the participation of all sectors to enhance coordination within and between sectors. The project also will build capacity to identify IAS risks and manage them via early detection and rapid response. The proposal also calls for providing the various stakeholders with the tools to effectively achieve this in a sustained manner into the future.
- 193 The project will be incremental to existing efforts being made by the national governments, the private sector, NGOs and regional and international organizations. The project involved many of these stakeholders during the PPG phase and will continue to work directly with them during the implementation of the project. This involvement will seek to develop as part of the improved policies "codes of conducts" for stakeholder groups that operate in the high risk groups such as the pet and aquaria trade, the horticulture trade, and those in the important tourism sector, to participate voluntarily and provide peer pressure to other operators in the sector.
- 194 An important aspect of this project will be the contribution of valuable tools such as a mobile app that will identify potential IAS, which will be available free of charge not only to those engaged in surveillance but also to the general public. This will allow farmers, home owners, natural resource managers and the general public to engage in surveillance and afford the widest possible participation in the conservation of the Caribbean native biodiversity.

#### Global environmental benefits

- 195 As the fifth most important of 35 global biodiversity hotspots, the wider Caribbean is home to some of the world's most unique and threatened species of plants and animals. According to Conservation International, 50.4% of

plants (6,550 species), 46.1% of mammals (41 species), 27% of birds (163 species), 93.4% of reptiles (69 species), 100% of amphibians (170 species), and 34% of freshwater fishes (65 species) found are in the Caribbean Islands are endemics. The previous is actually older data and it is now known that there are at least 750 reptile species in the Caribbean Islands ([www.caribherp.com](http://www.caribherp.com), viewed July, 2017). Experts predict that this number will climb to nearly 1,000 over the next decade. It is estimated that at least 36 different genera of birds are endemic to the region, as well as two endemic families: the palmchat (*Dulus dominicus*) of the family Dulidae and the todies (family Todidae). Forty-eight bird species endemic to the hotspot are threatened with extinction, including the Puerto Rican nightjar (*Caprimulgus noctitherus*, CR), Zapata rail (*Cyanolimnas cerverai*, EN), Zapata wren (*Ferminia cerverai*, EN), and Grenada dove (*Leptotila wellsi*, CR). Estimates by Conservation International (2008) indicate that 13 bird species have already gone extinct, with several parrots in the OECS region endangered, such as the St. Vincent parrot (*Amazona guildingii*, VU), the Saint Lucian parrot (*Amazona versicolor*, VU), and the Imperial parrot (*Amazona imperialis*, EN) of Dominica.

- 196 The Caribbean region is globally recognized as being especially rich in species of reptiles, with 150 endemic species of anoles (*Anolis* spp.), 82 endemic species of dwarf geckos (*Sphaerodactylus* spp.), and 23 endemic species of curly tail lizards (*Leiocephalus* spp.). The region also boasts the world's smallest snake, *Leptotyphlops bilineata*; the most threatened rattlesnake in the world - the endemic Aruba rattlesnake (*Crotalus unicolor*, CR) of which only 250 individuals are thought to still be alive; and the rarest snake in the world, the Saint Lucia racer (*Liophis ornatus*) of which only 20 individuals are thought to be alive. In addition to its reptile populations, the region is also globally recognized as having very high amphibian endemism with most species being endemic to single islands. The second largest frog found in the Western hemisphere, *Leptodactylus fallax*, otherwise known in Dominica as "mountain chicken", is considered extinct in St Lucia, St Kitts & Nevis and Martinique (maybe others). There is a tiny population on Montserrat, recently augmented by reintroductions from captive stock, plus a very small and fragmented (but larger than Montserrat's) population on Dominica.
- 197 The expected global benefits of this project include improved management frameworks to prevent, control and manage IAS and thereby contribute significantly to the reduction in loss of biodiversity. Project benefits are also expected to reduce the negative impacts of IAS on national economies and local livelihoods, as it is widely acknowledged and understood that IAS have a significant impact on the goods and services provided by ecosystems and that their management can contribute significantly to ecosystem function (Charles, 2008). Overarching global environmental benefits will be the reduction of IAS that are a high risk to biodiversity from entering Antigua and Barbuda (44,000 ha); Barbados (43,100 ha); and St. Kitts and Nevis (26,100 ha). Furthermore, species extinction will be avoided throughout the OECS as a result of enhanced IAS management – through reporting on invasives, early warning systems, early detection and rapid response measures, and capacity building for management of IAS at the regional level, with expected improvements over the life of the project. Comprehensive prevention, early detection control and management frameworks that emphasize risk management approach at highest risk invasion pathways will deliver the GEF goal of reducing new invasions, while cost recovery mechanisms embedded into enabling environments will assure the sustainability of GEBs.
- 198 The project will further reduce the impact of IAS on a number of species of global significance. In Antigua and Barbados, the project will undertake activities to eliminate IAS (rat and mongoose) on selected islands that prey on the following native species: Redonda ground lizard (*Ameiva atrata*), Redonda anole (*Anolis nubilus*), Redonda skink (*Copeoglossum redondae*) and Redonda pygmy gecko (*Sphaerodactylus* sp. nov.). In Barbados, the project will strengthen the conservation of the leaf-toed gecko (*Phyllodactylus pulcher*) and the Barbados threadsnake (*Tetracheilostoma carlae*) through establishment of a biosecure site for these species. In addition, in Barbados the project will help to improve the breeding success of IAS-threatened Hawksbill sea turtles (*Eretmochelys imbricata*) by reducing populations of rats and mongooses, while project activities for the targeted removal of lionfish (*Pterois* spp.) on key coral reef sites of high global biodiversity significance will have global benefits including enhanced recruitment and critical life stages of key coral reef fishes such as the fairy basslet (*Gramma loreto*), bridled cardinalfish (*Apogon aurolineatus*), white grunt (*Haemulon plumieri*), bicolor damselfish (*Stegastes partitus*), several wrasses (*Halichoeres bivittatus*, *H. garnoti*, and *Thalassoma bifasciatum*), the striped parrotfish (*Scarus iserti*), and dusky blenny (*Malacoctenus gilli*), among others. In St. Kitts and Nevis, enhanced management of the green Vervet monkey is expected to reduce the impact of this IAS on numerous native species as well as agricultural crops; the Vervet believed to be at least in part responsible for the extinction of the St. Kitts Bullfinch. Although no detailed study on the impact of Vervet monkeys on St. Kitts biodiversity has been undertaken, a recent rapid survey (as described in Appendix 16.3) notes that the monkeys are impacting plant groups such as bromeliads, orchids, native palms and heliconias; birds by preying on their eggs and adults; lizards frogs and other invertebrates as part of their voracious diets.

### 3.8 Sustainability

- 199 The issue of capacity and building capacity is a recurring issue in these small island developing states, where trained staff are promoted up or move to the private sector, resulting in a constant demand for new training. For this reason, the project will not conduct one-off training events, but will rather build a cadre of trainers who will be provided with the knowledge and training materials to conduct on-going training into the future. Training materials will also be available online to permit new staff to familiarize themselves with concepts such as risk assessments and surveillance for the prevention of new IAS introductions, and personnel will be encouraged to pursue self-learning as part of the initiation process of new staff.
- 200 The development and implementation of three National Invasive Species Strategies and Action Plans (NISSAPs) and a regional strategy with IAS management strategies for selected species will also make a significant contribution to ensuring that IAS management activities are sustained. The strategies and action plans will encourage departments and units with responsibilities for IAS to plan their annual work plans in a more coordinated manner, and will also assist by better defining roles and responsibilities so that different institutions can undertake coordinated actions more harmoniously. This process will also be based on the work of the national cross-sectoral committees, which will be proposed as permanent structures for support in the new NISSAPs, which will secure their continuation beyond the project, once the NISSAPs are approved on the respective countries.
- 201 The project is designed to produce some valuable tools that will contribute to sustained actions in the Caribbean in managing IAS. Tools such as IAS Identification Guides and mobile Apps (which will also include information on best management practices), will ensure that those who engage in risk assessments, surveillance and rapid response are more successful in detecting and destroying IAS that are in the process of entering the sub-region.
- 202 Through strong co-financing and key alliances with major stakeholders (local and regional) and other relevant institutions, the project guarantees the necessary actions and resources to undertake activities through the project's life and sustain the results beyond its completion. The participation of national government agencies such as ministries of environment and agriculture will contribute to project sustainability since the management and control of IAS is part of their work plans as per the national priorities stated in each country's NBSAP. This will also be the case for the national and regional cross-sectoral working groups. The national coordinating mechanisms that will be created under Component 1 will be linked to form a regional coordinating mechanism where other countries (not only those parts of Component1) will participate. During project's life, the regional coordination will be done at the level of the international project steering committee (IPSC) and support will be sought from key partners (SCBD, USDA/Aphis, CARAPHA, CaribVet, CPHD, the CARICOM Secretariat and the OECS Commission) so that this will become eventually a separate Regional IAS Working Group that will endure over the long-term. To ensure buy-in from these important partners, the project team will share outputs and updates from the project with them on regular basis, and whenever possible they will be invited to join the IPSC meetings. As a result, project outcomes have strong potential to be sustainable over time due to the fact that the national authorities have prioritized IAS matters and are actively investing in tackling IAS.
- 203 Another expected output of the project is the establishment of a sustainable funding mechanism for managing IAS that is common to the participating countries. This will complement national efforts at ensuring funding for IAS management; increased awareness generated by the project at the national level will contribute to increasing national expenditures on IAS. Targeted actions to achieve concerted private sector participation will also contribute to financial sustainability.
- 204 Support from organisations such as UN Environment, OECS, CABI and the UWI will be of great importance in providing and building up technical expertise, information and strong networking mechanisms for the participating countries, which will also add to the efforts towards the sustainability of the results.
- 205 Financial sustainability post project will benefit from several actions that will be implemented by the project these include:

- Incorporating the private sector and air and sea ports as far as possible during the project implementation in developing strategies, policies and action plans
- Targeting the private sector in all the awareness raising activities
- Examining and recommending a workable model for a designated fund to work on common IAS problems in the region. This will be done in close collaboration with regional organizations and the OECS commission sustained implementation post project
- Trainers will be trained to continue to build capacity post-project, supported by training manuals and teaching aids
- The project will work closely with the OECS secretariat that is currently implementing a regime of free movement of goods and services; in this context the risk assessment and surveillance protocols developed will be continued to be implemented post project
- Tools to be developed under the project such as the mobile app for the identification of IAS and identification manuals will assist with surveillance and increase interceptions at air and seaports, which will offer protection to economic sectors such as agriculture and tourism while protecting globally important biodiversity
- Management eradication of key IAS on 3 offshore islands and management plans for managing important IAS will also contribute to financial sustainability since countries will be better equipped to apply the management plans and prevent future re-invasions.

### 3.9 Replication

206 The majority of SIDS in the Caribbean have similar barriers to effective IAS management, such as a lack of effective policies and low levels of awareness and capacity about IAS issues. Considering that this is a regional project, several OECS countries that are not direct beneficiaries of this project can benefit from scaling up via the OECS commission and their plans for implementing free movement of goods in the sub-region. The outcomes of this project will be disseminated to the wider Caribbean via the Caribbean Plant Health Director's Forum and CaribVet meetings, which will guarantee that its outputs could be widely used by other countries or actors as needed.

207 The project will lay the foundations to ensure that there will be potential for scaling up in the future. The development and updating of legal frameworks and capacity building will all contribute to scaling up of IAS management activities in the future. The development of baseline data on the distribution of IAS and their impacts, together with some cost-benefit analyses, will provide policy makers and government officials with the necessary information to develop and implement additional policies together with financing mechanisms to manage IAS more effectively. The development of identification tools will also make more information available on how to identify and best manage IAS, information largely lacking to date in OECS countries. Modelling best practices at the strategic, management and operational levels, including learning modalities, will set the foundation for IAS management in the OECS sub-region and will facilitate broader regional and inter-regional cooperation (e.g. with Pacific SIDS). This cooperation will be facilitated by UN Environment, which is the IA for another GEF funded regional IAS project in the Pacific.

### 3.10 Public awareness, communications and mainstreaming strategy

208 The project's knowledge management strategy will be based on: generating information of interest, which can be shared; and learn from experiences of other projects and countries. In this sense, the project due to its regional nature will ensure that under component 3, spaces for discussion and networking are made available.

209 Since component 1 and 2 of this project are specifically for 3 countries, the results of these components and the lessons learned from these 3 countries (Antigua and Barbuda, Barbados and St. Kitts) will be shared during the steering committee meeting and in other regional forums, to ensure that other countries from and outside the region, can benefit from these practical experiences. Because UN Environment is also an implementing agency of a regional IAS project in the Pacific region, synergies between both projects will be sought. In addition, following GEFSEC advice, sharing of experiences will also be sought from the Cuba IAS project. To do this, a Cuban representative will be invited to join the inception workshop and share their experiences.

210 In addition, project's success is partially dependent on an effective public awareness, communication and mainstreaming strategy as a mean to disseminate key products, collect data, foster networking and share lessons learned. In this sense, the continuous communications and mainstreaming of project interventions at

local, national, and international level is critical to the success of the project. Thus, a communications, education and public awareness (CEPA) strategy will be ready for endorsement by participating countries at the inception workshop.

211 The strategy will seek to:

- Understand the baseline knowledge of key actors and other stakeholders in relation to IAS
- To continuously assess data gaps and needs
- Effectively communicate in a language tailored to various audiences, the threats posed by IAS, and actions needed to avoid invasion, spread and control measures.
- Disseminate information about the project, its objective and the measures being taken by the OECS countries.
- Share lessons learned and network with key partners.
- Streamline regional communication.

212 Key messages for the CEPA will be: potential effect of IAS on the Caribbean biodiversity, possible economic and social impacts, and opportunities for change. Target audiences identified during PPG are: government employees directly related with IAS control, politicians and decision makers, local communities, regional organizations and forums where IAS related issues could be discussed (i.e. OECS, CARICOM, CAHFSA, etc.); as well as private sector and industries who could potentially play a role in either mitigation the impact of IAS, or supporting their control. The strategy will be gender sensitive on its approach, and therefore when developing the tools, documents and messages, the different roles that women and men could play in relation to IAS will be taken into account.

213 The CEPA strategy will utilise wherever possible the existing platforms for these messages to be disseminated. Some of the platforms identified so far are: CABI and UN Environment's websites, BIOPAMA platform within the UWI, Caribbeanbiosafety.org, local government databases and websites, amongst others. Social media has proven to be useful not only to communicate messages and raise awareness, but also to measure people's interest and reactions to particular issues. In this sense, a more specific approach towards this will be developed during project inception phase.

214 The strategy will enhance the cias.net website to facilitate regular bulletins on the status of project implementation and the outputs that are produced, as well as a mean to obtain visibility and support the sustainability of the project through presenting the problem, solutions, and actions taken so far to a wider audience which can bring along future investments on IAS for the region.

215 The project will also try to take advantage of other successful experiences. In this regard, a very effective Public Awareness Strategy was developed and implemented by St. Lucia during the MTIASIC project. This included the use of a regional IAS on-line group; television and radio programmes; print media; ciasnet.org as well as national online sources. These experiences will inform the CEPA strategy. The strategy for each country will be informed by the surveys and build on national actions like those that are conducted routinely by the EAG.

216 Finally, component 3 of the project will be key to the CEPA strategy, as some of the outputs such as the mobile app and identification guide would complement communication on and raise awareness of IAS via citizens' science.

### **3.11 Environmental and Social Safeguards**

217 In accordance with the GEF and UN Environment's Policies on Environmental and Social Safeguards, safeguard measures have been part of project design and will be considered in project implementation. UN Environment's Social and Environmental safeguards tool will be used to assess the possible impacts of the project on the participating countries, their communities, and environment. This tool will continue to be used to monitor project activities, in particular if there are changes from the original plan of actions.

218 This project is expected to achieve positive environmental and social impacts by strengthening the policy environment for actions on prevention, early detection and rapid response in controlling and managing IAS. It is expected to clear IAS for key offshore sites in Antigua and Barbuda that will begin the restoration of severely degraded Redonda Island. The enhancement of the biosecurity of the sub region can potentially lead to drastic reduction of future invasion of IAS. It is therefore expected that the project will generate both environmental and social benefits. Environmental benefits will include safeguard of local biodiversity by



increasing the breeding populations of endemic / native species. Indirectly, if fewer pests and diseases are introduced this will result in lower cost of production through lower usage of pesticides that will have benefits to the environment. Social benefits will include improve agricultural productivities, prevent forest fires due to reduction of IAS, and sustain tourism investments, among others. While the intention is to bring environmental and social benefits, a precautionary approach will be applied by the project to avoid inconvenient preconditions or bring unintended and indirect negative consequences.

219 Invasive species have significant negative and sometimes positive impacts, and so how they are managed has consequences. Gender affects people's experiences, concerns and capabilities in natural resource management and gender relations influence how environments are managed and used over time (Masika and Joeke, 1997). Similarly to other issues in natural resource management, taking a gender perspective on invasive species can:

- Improve understanding of the impacts
- Increase the effectiveness of invasive species prevention and management
- Contribute to social equality

220 In relation to the loss of biodiversity due to IAS; it was noted, that indigenous women may utilize a wide variety of plants for nutritional, medicinal, cultural and other purposes, so invasives that reduce that biodiversity would more immediately impact women. Biodiversity loss can also impact ecotourism. National parks and reserves and the biodiversity they contain are the basis for major tourism industries in a number of Caribbean countries, and reduction of that biodiversity reduces their attractiveness. Different jobs in the tourism industry may be done more by one or other gender, so all suffer when tourism is affected (Fish et al, 2010).

221 It is also important to consider whether there are any gender differences in perception of IAS risks and management. Gender differences in risk perception are well documented in the literature (eg Bord & O'Connor, 1997), many showing that men rate risks lower than do women. In the context of IAS, risk perception is important in prevention, not only by the risk analysts but by the general public who may introduce an invasive species. Where legislation exists and is enforced, the perception of the risk of getting caught comes into play. In invasive species management, the risk of the control methods may be perceived differently by men and women (Fish et al, 2010). This is an important point that the project will take into account when supporting the countries on activities such as the drafting of NISSAPs, guidelines, and in streamlining regional cooperation.

222 The project has also taken into consideration gender related issues, such as the differentiated roles that women and men have on various areas such as agriculture, tourism, biodiversity preservation, education and households. The activities of the project will be undertaken under the no-discrimination approach, making opportunities available to both, men and women; paying particular attention to support whenever possible those groups that have a key role in bringing income to families and/or who's involvement on particular activities could boost their potential for future work engagements.

223 The project will collect and disaggregate the gender in its reporting and ensure where possible that project implementation is gender sensitive. From casual observations it seems that activities such as risk assessment and public awareness and communication are dominated by women while surveillance is balanced but eradication activities could be male dominated.

224 The project will apply gender targets to project activities including seeking at least 50% participation of women among persons receiving training in IAS procedures, among field workers at the project pilot sites, and in participation in site-level co-management groups and in decision-making fora. Gender indicators have been included in the project's log-frame. Efforts will also be made to enhance awareness among women: gender sensitive awareness materials will be developed, and workshops will be scheduled to ensure that women can participate (and in some cases, separate workshops for women may be convened to allow them to comment and participate more freely in issues pertaining to IAS). The communications, education and public awareness (CEPA) strategy will be gender sensitive in its approach, and therefore when developing the tools, documents and messages, the different roles that women and men could play in relation to IAS will be taken into account.

## SECTION 4: INSTITUTIONAL FRAMEWORK AND IMPLEMENTATION ARRANGEMENTS

- 225 Institutional framework: the project internal and external structure diagrams and description of the roles and responsibilities of the various actors are presented in detail in Appendix 9.
- 226 UN Environment, as the implementing agency, will be in charge of Project supervision, tracking and evaluation, including supervision of the mid-term and final evaluations, and revising and approving semester and annual reports (both financial and technical). It will as well offer guidance regarding global environment benefits (GEB), analysis and technical support in pertinent fields, and other liaison and coordinating actions necessary for correct Project implementation.
- 227 This Project will be managed by CABI which will act as executing agency. The project coordinator will work closely with the UN Environment Task Manager and CABI Project Board as well as with the countries' representatives.
- 228 In relation to the agreements for implementation, a Project Cooperation Agreement will be signed between CABI and UN Environment for the implementation of this project. CABI in turn will sign a project cooperation agreement with Antigua and Barbuda, Barbados and St. Kitts and Nevis with the aim of facilitating the execution of activities at a national level (i.e. components 1 & 2). The agreements will be signed with their designated national executing agencies. This will be the respective Departments of the Environment in Antigua and Barbuda and Barbados and the Department of Agriculture in St. Kitts and Nevis. These three countries will designate both a technical and administrative person to facilitate communication on technical and financial issues including regular reporting functions. The persons will be paid by the project but will be expected to continue working with the National Implementing Organisations.
- 229 Project management: A Regional Project Coordinator (RPC) will be appointed to provide overall coordination and support to project execution and will be based at the CABI offices in Trinidad. The regional project coordinator will be the main contact for all the project partners, serving as the main project focal point for the countries, UN Environment, co-financiers and the project's steering committee. (ToRs for this position are on appendix 10). The project internal and external diagrams are presented in Appendix 9.
- 230 National participation/coordination: Countries will appoint a project focal point, who will represent each country on the project steering committee. The focal point will also be the person responsible for supervising and ensuring delivery of project activities at a national level.
- 231 Project Steering Committee (PSC): The regional project coordinator, UN Environment's task manager, national representatives from each of the participating countries in addition to regional collaborators will constitute a Project Steering Committee. This committee will meet face to face in an inception workshop and then at least once per year. The project coordinator and the technical representatives from each of the country will meet virtually at least once per month. Strategic partners (see diagram on annex 9) will be invited to join PSC meetings as needed to ensure buy-in and technical support from important partners.
- 232 In practical terms the PSC is responsible for ensuring that the project meets the goals outlined in the project results framework by helping to balance conflicting priorities and resources. The PSC's main functions will be to assure compliance with the Project's objectives, carry out tracking of its activities, offer strategic guidance and supervise compliance with the annual work plans, collaborate in inter-institutional coordination, and guarantee the active participation and compliance with the commitments acquired by the institutions they represent, as well as revising the reports of Project evaluation, monitoring and tracking, at mid-term and at the end of the process.
- 233 The Project partners (members of the PSC and other strategic partners), will contribute to implementation of the different activities included in the Project, financing initiatives in all three components, as well as providing information, technical and institutional support, and assistance in implementing pilot projects.
- 234 The Project Management Unit (PMU): will be responsible for operational planning, managing the budget and the execution of all Project activities, as well as drafting terms of reference and selecting the necessary outside consultancies. It will prepare the coordination meetings with the different partners and the PSC, as well as

the Project's annual plans, evaluation and monitoring reports and others as needed. The PMU will consist of the regional project coordinator, the project administrative assistant (PAA) and CABI regional IAS coordinator based in Kenya, Africa.

235 UN Environment's Regional and sub-regional offices: UN Environment's sub-regional office in Jamaica will play a key role supporting the project activities and in particular streamlining networking and coordination with other initiatives managed from that office. In addition, a representative from the sub-regional office will be invited to join the PSC meetings to ensure that this synergies and support can actually occur. One important area for which the participation of both the regional and the sub-regional offices will be key is to integrate the project with the UN Multi-Country Sustainable Development Framework for the Caribbean (MSDF) for 2018.

236 ANUBIS SYSTEM: The project will use UN Environment's project management system, ANUBIS, which is an online platform to manage project information. The anubis will serve not only as a project management tool, but also as a data repository for project information, reports, and documents for the executing and implementing agencies.

## SECTION 5: STAKEHOLDER PARTICIPATION

237 During the project preparation grant key stakeholders were consulted in seven national consultations and additional regional events. During the consultation stakeholders identified what were the priorities IAS and some of the constraints experienced in managing these. A special effort was made to engage the representatives from the respective ports of entry as well as the private sector. Special efforts will be made during the implementation of the project continue to engage key stakeholders in the private sector. The national consultations endorsed the project and its proposed objectives.

238 CABI also promoted the proposed project to the other regional entities such as the Caribbean Plant Health Directors; CAHFSA, IICA, USDA/APHIS, UWI, with the aim to secure their support throughout the project life to the development of a sustainable financing mechanism for common IAS in the Caribbean. The project will also participate and collaborate with the CBD's initiative for Caribbean Small Island Developing States towards Aichi biodiversity target 9.

239 During project implementation, stakeholder participation will include the provision of co-financing, participation of technical staff in workshops, training, and tools development, the facilitation of project events and processes, the provision of project oversight through participation on the PSC, and as data sources and technical expertise relevant for the formulation of IAS strategies. Stakeholders at a national and regional level will also actively participate, and have a key role, in institutionalization of project results and lessons learned to allow for upscaling, replication and sustainability. The following table provides information on the role of the stakeholders on project's implementation.

Country/Stakeholder	Role in project's implementation
<b>Antigua and Barbuda</b>	
Ministry of Health and the Environment:	Technical advice on matters pertaining to the environment. Possible member of the national cross sectoral committee
Ministry of Agriculture, Lands, Fisheries and Barbuda Affairs	Technical advice on matters pertaining to the Agriculture. Possible member of the national cross sectoral committee
Ministry of Tourism, Economic Development, Investment & Energy.	Technical advice on matters related to the impact of IAS in the tourism sector and vice versa. Possible member of the national cross sectoral committee
Ministry of Legal Affairs, Public Safety, Immigration and Labour:	Legal and technical support to the project in the development of the strategies.
Ministry of Finance	Possible partner in the development of the cost-recovery mechanisms.
National NGOs	Partners for environmental education and awareness.
<b>Barbados</b>	

Country/Stakeholder	Role in project's implementation
Ministry of the Environment, Biodiversity Unit	Technical advice on matters pertaining to the environment. Possible member of the national cross sectoral committee
Ministry of Agriculture, Food, Fisheries and Water Resources	Technical advice on matters pertaining to the Agriculture. Possible member of the national cross sectoral committee
Ministry of Health	Technical advice on matters pertaining to the Health. Possible member of the national cross sectoral committee
Coastal Zone Management Unit	Support for monitoring activities.
Fisheries Division	Support for monitoring activities.
National Conservation Commission	Support for monitoring activities.
University of the West Indies, Cave Hill Campus	Technical support. Provider of data on research into the local species populations and the impacts of invasive species on their populations.
Bellairs Research Institute (McGill University)	Technical support. Provider of data on Research into the local species populations (marine and terrestrial) and the impacts of invasive species on their populations.
Barbados Agricultural Society	Partners for environmental education and awareness.
Caribbean Agricultural and Research Institute	Technical support for the management of IAS
Barbados Sea Turtle Project (University of the West Indies Cave Hill Campus)	Technical support for the management of IAS
Caribbean Herpetological Society	Technical support.
Barbados Divers Association (Lionfish Activities)	Technical support for monitoring activities
Barbados Marine Trust	Technical support for monitoring activities and support for awareness activities.
Barbados Primate Research Centre and Wildlife Reserve	Technical support.
<b>St. Kitts and Nevis</b>	
Department of agriculture	Technical advice on matters pertaining to the Agriculture. Possible member of the national cross sectoral committee
St. Kitts Tourism Authority, Nevis Tourism Authority	Technical advice on matters related to the impact of IAS in the tourism sector and vice versa. Possible member of the national cross sectoral committee
Department of Legal Affairs and Justice.	Legal and technical support to the project in the development of the strategies.
St. Kitts Bird Watch Society (St. Christopher National Trust, Nevis Historical Society, St. Mary's Man and Biosphere community group, Sandy Pointers Inspiring Real Improvement Throughout-SPIRIT [Sandy Point community group], Police Department.	Partners for environmental education and awareness.
<b>Regional Organizations</b>	
UN Environment	UN Environment will be the implementing agency of the project.
CABI	CABI will be the regional executing agency of this project
Caribbean Agricultural Health and Food Safety Agency-CAHFSA	Will be invited to participate of the meetings of the IPSC for technical and political advice and support.
Caribbean Agricultural Research and Development Institute-CARDI	Will be invited to participate of the meetings of the IPSC for technical and political advice and support.
CARIBBEAN COMMUNITY SECRETARIAT – CARICOM	Will be invited to participate of the meetings of the IPSC for technical and political advice and support.
Fauna & Flora International (FFI)	Technical support.
Food and Agriculture Organisation (FAO)	Technical support and coordination for synergies and cooperation.
Royal Society for the Protection of Birds (RSPB)	Technical support.
University of the West Indies (UWI)	Technical support.

Country/Stakeholder	Role in project's implementation
United States Department of Agriculture / Animal and Plant Health Inspection Service (USDA/APHIS)	Technical support.

## SECTION 6: MONITORING AND EVALUATION PLAN

240 The project will follow UN Environment standard monitoring, reporting and evaluation processes and procedures. Substantive and financial project reporting requirements are summarized in Appendix 8. Reporting requirements and templates are an integral part of the UN Environment legal instrument to be signed by the executing agency and UN Environment.

241 The project M&E plan (Appendix 7) is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Appendix 4 includes SMART indicators for each expected outcome as well as mid-term and end-of-project targets. These indicators along with the key deliverables and benchmarks included in Appendix 6 will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification and the costs associated with obtaining the information to track the indicators are summarized in Appendix 7. Other M&E related costs are also presented in the Costed M&E Plan and are fully integrated in the overall project budget.

242 The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. Day-to-day project monitoring is the responsibility of the project management team but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Manager to inform UN Environment of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

243 The project Steering Committee (PSC) will receive periodic reports on progress and will make recommendations to UN Environment concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight to ensure that the project meets UN Environment and GEF policies and procedures is the responsibility to the Task Manager in UN Environment-GEF. The Regional Project Coordinator will review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

244 At the time of project approval 100% of baseline data was not available. Baseline data gaps in the levels of awareness will become available by the inception workshop. Project supervision will take an adaptive management approach. The Task Manager will develop a project supervision plan at the inception of the project, which will be communicated to the project partners during the inception workshop. The emphasis of the Task Manager supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring. Progress vis-à-vis delivering the agreed project global environmental benefits will be assessed with the PSC at agreed intervals. Project risks and assumptions will be regularly monitored both by project partners and UN Environment. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

245 In-line with UN Environment Evaluation Policy and the GEF's Monitoring and Evaluation Policy the project will be subject to a Terminal Evaluation. Additionally, a Mid-Term Review will be commissioned and launched by the Project Manager before the project reaches its mid-point. If project is rated as being at risk, a Mid-Term Evaluation will be conducted by the Evaluation Office instead of a MTR.

246 The Evaluation Office will be responsible for the Terminal Evaluation (TE) and will liaise with the Task Manager and Executing Agency (ies) throughout the process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of

impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UN Environment, the GEF, executing partners and other stakeholders. The direct costs of the evaluation will be charged against the project evaluation budget. The Terminal Evaluation will be initiated no earlier than six months prior to the operational completion of project activities and, if a follow-on phase of the project is envisaged, should be completed prior to completion of the project and the submission of the follow-on proposal. Terminal Evaluations must be initiated no later than six months after operational completion.

247 The draft Terminal Evaluation report will be sent by the Evaluation Office to project stakeholders for comments. Formal comments on the report will be shared by the Evaluation Office in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six point rating scheme. The final determination of project ratings will be made by the Evaluation Office when the report is finalised and further reviewed by the GEF Independent Evaluation Office upon submission. The evaluation report will be publicly disclosed and may be followed by a recommendation compliance process

248 While a TE should review use of project funds against budget, it would be the role of a financial audit to assess probity (i.e. correctness, integrity etc.) of expenditure and transactions.

249 The direct costs of reviews and evaluations will be charged against the project evaluation budget.

250 The GEF tracking tools are attached as Appendix 15. These will be updated at mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report. As mentioned above the mid-term and terminal evaluation will verify the information of the tracking tool.

## **SECTION 7: PROJECT FINANCING AND BUDGET**

### **7.1 Overall project budget**

251 The overall project budget is presented in detail in Appendix 1 (budget by project components, by year and UN Environment budget lines) and Appendix 2 (co-financing by source and UN Environment budget lines)

Cost to the GEF Trust Fund	US\$ 3,747,945	% 36.0
Co-financing	US\$ 6,656,477	% 64.0
Total budget	US\$ 10,404,422	%100.0

### **7.2 Project co-financing**

252 Co-financing by project lines is presented in Appendix 2.

### **7.3 Project Cost-effectiveness**

- 253 The incrementality of this Project is based on maximizing the impact of the present investments by the many national and regional stakeholders in combating the threats of IAS to both the biodiversity and the economic sectors. To ensure this is achieved, the project will provide capacity building and tools to those who are currently engaged in early detection, rapid response and management and control of IAS. In addition, the legal and policy framework will be addressed to create a more favourable environment for those currently engaged in IAS management while empowering them to build the capacity of additional persons in both the private and public sectors to ensure a critical mass of human capacity is available to address this issue.
- 254 The regional nature of the project also adds to its cost-effectiveness, since a pool of resources will be used to generate tools that are of importance for various countries, therefore avoiding replicating the same action on each of the countries. The selection of CABI as executing agency is also an important aspect in relation to the cost-effectiveness since CABI will directly contribute to the generation and revision of technical products ensuring high quality and impact. Along the same lines, UN Environment works closely with various countries of the region on other GEF national and regional projects. This adds to the cost-effectiveness since it will facilitate networking, sharing of lessons, and (if possible) cooperation amongst projects or actors that could result in savings.
- 255 In considering Project cost effectiveness, it is important to keep in mind that one key Project focus is communication and replicability of the lessons learned beyond just the intervention areas, by working in close collaboration with local, regional and national authorities in such a way as to maximize the impact of the expected results within the Project countries and the wider Caribbean.
- 256 The current efforts to promote a free movement of goods and services in the OECS will definitely benefit from this project in particular the database that will be created to record the interception of IAS at the ports of entry. The intelligence generated from this data base will assist the limited resources available to better target their surveillance for greater success in prevention. The project will also provide some equipment for destroying suspected IAS at the ports of entry.
- 257 The project will explore ways for a joint funding of common IAS in multiple countries. This will result in greater success for tackling common problems resulting in more value for funds expended on IAS control.
- 258 Finally, cost-effectiveness is ensured through a prescribed project management process that will seek the best-value-for-money. UN Environment and CABI's rules employ a transparent process of bidding for goods and for services based on open and fair competition and selection of best value and best price alternatives.

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## Appendices

- Appendix 1: Budget by project components and UN Environment budget lines (separate file)
- Appendix 2: Co-financing by source and UN Environment budget lines (separate file)
- Appendix 3: Incremental cost analysis
- Appendix 4: Results Framework
- Appendix 5: Work plan and timetable
- Appendix 6: Key deliverables and benchmarks
- Appendix 7: Costed M&E plan
- Appendix 8: Summary of reporting requirements and responsibilities
- Appendix 9: Decision-making flowchart and organisational chart
- Appendix 10: Terms of Reference
- Appendix 11: Co-financing commitment letters from project partners (separate file)
- Appendix 12: Endorsement letters of GEF National Focal Points (separate file)
- Appendix 13: Draft procurement plan
- Appendix 14: Checklist for Environmental and Social Issues
- Appendix 15: Tracking Tools (separate file)
- Appendix 16: Pilot Projects (component 2)
- Appendix 17: List of Endemic Species in Barbados and the OECS.
- Appendix 18: Response to STAP comments
- Appendix 19: Response to GEFSEC comments
- Appendix 20: Theory of change (separate file)

**Appendix 1: Budget by project components and UN Environment budget lines (separate file)**

**Appendix 2: Co-financing by source and UN Environment budget lines (separate file)**

### Appendix 3: Incremental Cost Analysis

BASELINE	ALTERNATIVE	INCREMENT
(A)	(B)	(B) - (A)
<b>COMPONENT 1:</b> Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems.		
Without the GEF intervention, invasive species management in Barbados and the OECS will continue to be managed in silos with weak coordination within countries and little or no coordination among countries participating in the project and the wider the Caribbean. This Management will continue to use methods that are more reactive than proactive, resulting in less than optimum results for monies expended. There will be very little joint efforts at managing common problems.	With the GEF intervention, it will be possible to provide draft strategies and policies and possibly even draft legislation to create a more favourable environment for combating IAS in the Caribbean. Cross sectoral coordinating arrangements will result in faster response times to identified outbreaks and more importantly streamlining of efforts at surveillance and early detection of IAS. The project will generate knowledge and information on the impact of IAS on biodiversity in these small island states in the Caribbean. The project will also share with the global audience information on IAS in these small island developing states.	Awareness of the impact of IAS increased. Policy environment made more favourable for stakeholders from both the public and private sectors to act to prevent IAS introduction or to respond more rapidly in a coordinated fashion to reduce the impact of IAS and by extension protect native biodiversity.
<b>COMPONENT 2:</b> Eradication and/or improved control of IAS impacting global biodiversity significance, reducing threats to key species.		
Antigua and Barbuda has 30 offshore islands. Several invasives were removed from 16 islands; 10 islands are IAS free. Eradication and maintaining rat free offshore islands which are home to several endemic species as well as some threatened migratory bird species will continue.	In the alternative with GEF support, the project will eradicate rats from three to four additional offshore islands in Antigua and Barbuda and implement a biosecurity plan for 14 offshore islands, leading to greater levels of conservation of threatened biodiversity.	Pressures and threats from IAS on native biodiversity and ecosystems in Antigua and Barbuda, Barbados and St. Kitts and Nevis reduced.
The management of IAS that are threatening native biodiversity in Barbados will continue with limited initiatives in surveillance and monitoring of the impact of IAS on native biodiversity. These efforts will continue to be hampered by limited human capacity, resources and tools.	The GEF contribution will assist in establishing a clearer understanding of the status of the house gecko and the threadsnake and the impact IAS is having on these endemic species that are threatened. It will establish a biosecure site that will allow for the increase population of these threatened species. It will also generate valuable information on the ecology of these species that will contribute to their protection in the future.	
In St. Kitts and Nevis, the Vervet monkey will continue to be a threat to native species, a major pest of all crops grown, and a nuisance to significant numbers of householders. Its control and management in agricultural areas will remain ineffective in the absence of a	The GEF Project will quantify the impact of the Vervet monkey on biodiversity and different economic sectors; evaluate effective methods of control; and explore possible cost recovery methods to finance the control of the Vervet monkey in the future. The project will produce a comprehensive	

<b>BASELINE</b>	<b>ALTERNATIVE</b>	<b>INCREMENT</b>
(A)	(B)	(B) - (A)
management plan rooted in sound science and employing best practices.	management plan for controlling this IAS.	
<b>COMPONENT 3:</b> Increased collaboration among Caribbean states to tackle IAS. Species Extinction avoided as a result of enhanced IAS management -- through early warning system, response measures and capacity building for management of IAS at the regional level (7 countries)		
A working committee for free movement of goods in the OECS in existence will continue to focus on the agricultural sector. The OECS Plant Health Directors and Chief Vets discuss IAS concerns pertaining to agriculture at CARICOM meetings. Efforts for managing IAS will continue to be uncoordinated among countries in the region, and there will continue to be little or no sharing of information among ports of entry with respect to IAS interceptions.	With the GEF contribution, a regional strategy and action plan will be devised for enhancing surveillance at ports of entry to reduce, with the aim of preventing, the introduction of new IAS. A model for cost recovery to sustainably fund actions to control and manage IAS in the future will be developed and promoted to governments and regional organisations for adoption and implementation post project. The project will enhance the capacity of key stakeholders to conduct risk assessment and measure the economic impact of IAS. The project will also leave valuable tools to aid in the surveillance at ports of entry as well as allow the wider public to participate using a citizen science approach.	Enhancing the capacity of stakeholders to conduct surveillance at the ports of entry; provision of tools to aid the trained staff will result in the drastic reduction of IAS entering the region thereby reducing the risks and threats to biodiversity from IAS.
<b>BASELINE COST</b> <b>TOTAL: US\$2,825,000</b>	<b>ALTERNATIVE COST</b> GEF: US\$3,747,945 Co-financing: US\$6,656,477 Baseline: US\$2,825,000 <b>TOTAL: US\$13,229,422</b>	GEF: US\$3,747,945 Co-financing: US\$6,656,477 <b>TOTAL: \$ 10,404,422</b>

#### Appendix 4: Results Project Outcome framework

Outcome	Objectively verifiable indicators					
	Indicators	Baseline conditions	Mid-term targets	End of Project targets	Means of Verification	Assumptions
<b>Component 1: IAS Policy, Institutions and Capacity (Antigua and Barbuda; Barbados; St. Kitts and Nevis)</b>						
1.1 Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems	Increased score in the GEF IAS Tracking Tool (Mid-term and end of project)	<p><u>Antigua</u>: Some cross-sectoral collaboration in effect. Public sector coordinates with NGOs on offshore islands but little with the private sector.</p> <p><u>Barbados</u>: No systematic cross-sectoral framework in existence.</p> <p><u>St. Kitts and Nevis</u>: no cross-sectoral framework in existence.</p>	<p>National Cross Sectoral Coordinating committee in place and at least two quarterly meetings held in each country.</p> <p>National Invasive Species Strategies 75% complete</p>	<p>National cross-sectoral coordinating mechanism in place in 3 countries providing management oversight on IAS issues across sectors.</p> <p>Stakeholders meeting their commitment in implementing Three National IAS Strategies and action plan that was developed in a participatory approach.</p>	<p>National Invasive Species Strategy and action plan circulated among stakeholders in Antigua and Barbuda; Barbados and St. Kitts and Nevis</p> <p>Reports of regular meetings circulated</p>	<ul style="list-style-type: none"> <li>• Private sector willing to participate</li> <li>• Cross sectoral coordinating committee functional in all participating countries</li> <li>• Co-finance will materialize from countries to make operational the cross sectoral mechanisms and the strategies.</li> <li>• Resources are enough to prevent entering of IAS in the 3 countries</li> </ul>
		Limited Risk assessments done only for agricultural commodities but even here invasiveness is not taken into account. No protocols exist for high risk pathways	Regional IAS Protocol for high risk pathways 75% complete (including draft codes of conduct)	At least 50% of the recommendations from the three high risk pathways assessment implemented to minimize economic impacts of IAS	Risk assessments reports and codes of conduct produced circulated and posted on line.	
	# of persons and # of department/offices targeted by the awareness campaign, applying information on IAS threats, impacts, and new controls and regulations	<p><u>Antigua and Barbuda</u>: 83% estimated % of awareness among technicians; 33% estimated for the general public;</p> <p><u>Barbados</u>: 85% estimated % of awareness among technicians; 30% estimated for general public</p> <p><u>St. Kitts and Nevis</u>: 75% estimated % of awareness among technicians; 23% estimated for general public</p>	<p>50% of the Regional Awareness campaign implemented inclusive of a plan to measure effectiveness of the strategy.</p> <p>At least 2 different departments (per country) offices sensitized about IAS, and at least 2% increase in awareness from stakeholders in</p>	<p>Through the Regional Awareness campaign, awareness of IAS threats raised among technicians raised by 5% and among the general public by 25%</p> <p>At least 3 different departments (per country) offices sensitized about IAS, and at least 5% increase in awareness from stakeholders in comparison to baseline. (surveys to be used at</p>	<p>Regional Protocol developed for minimizing risks to IAS introductions adopted by OECS Commission</p> <p>Awareness raising materials</p>	

Objectively verifiable indicators						
Outcome	Indicators	Baseline conditions	Mid-term targets	End of Project targets	Means of Verification	Assumptions
		<p><u>Antigua</u>: An estimated 1,500,000 US\$ per annum is invested on IAS.</p> <p><u>Barbados</u>: An estimated 2,500,000 US\$ is invested on IAS per annum</p> <p><u>St. Kitts and Nevis</u>: An estimated US\$160,000 is invested on IAS per annum</p>	<p>comparison to baseline. (surveys to be used at start of the project to confirm baseline)</p> <p>3 Drafts of national cost-recovery mechanisms</p>	<p>start of the project to confirm baseline)</p> <p>15% increase over baseline in funding</p> <p>Investment in IAS per annum: Antigua: US\$ 1,650,000 Barbados: US\$ 2,750,000 SKN: US\$ 176,000</p>	<p>National cost recovery strategy approved by relevant authorities</p> <p>Annual budgetary allocations. Post project. Co-finance during project years.</p>	
	Financing mechanism in place to support IAS related activities	No dedicated IAS financing mechanism in place	Potential funding mechanism identified and feasibility assessed by midterm.	3 countries participating in a cost recovery mechanism to manage IAS	<p>End of project report on cost recovery mechanism</p> <p>Fund in operation</p>	
<b>Outputs for Component 1:</b> 1.1 (3) Critical Situational Analyses completed 1.2 (3) National Invasive Species Strategies and action plan developed to address risks and promote cross sectoral collaboration in 3 countries 1.3 (3) Legal frameworks for IAS developed or upgraded in 3 countries (regulatory guidance, protocols, codes of conduct). 1.4 (3) Awareness and capacity building programs developed & implemented (internalizing IAS threats, impacts, and new controls and regulations) 1.5 (3) Support to the design and implementation of National cost recovery financial mechanisms						
<b>Component 2: Control and Management of IAS Impacts</b>						
2.1 Eradication and/or improved control of IAS impacting global biodiversity significance,	<p><u>Antigua</u>: Stabilizing populations of critically endangered native species:</p> <ul style="list-style-type: none"> <li>• Redonda ground lizard (<i>Ameiva atrata</i>)</li> <li>• Redonda anole (<i>Anolis nubilus</i>)</li> </ul>	<p>Baseline surveys in 2014 recorded</p> <ul style="list-style-type: none"> <li>• Peregrines (1 pair)</li> <li>• Zenaida doves (3 pairs)</li> <li>• Brown Boobies (≥774 pairs)</li> <li>• Masked Boobies (≥164 pairs)</li> <li>• Red-footed Boobies (&gt;150 pairs)</li> </ul>	Native species population stabilised or increased	Native species population (as in baseline) stabilised or increased	<p>-Verification survey report</p> <p>-Biosecurity plan circulated</p> <p>-Field trips reports</p>	<p>Weather does not unduly affect access to the island</p> <p>Co-finance materialises</p>

Outcome	Objectively verifiable indicators					
	Indicators	Baseline conditions	Mid-term targets	End of Project targets	Means of Verification	Assumptions
thereby reducing threats to key species	<ul style="list-style-type: none"> <li>Redonda skink (<i>Copeoglossum redondae</i>)</li> <li>Redonda pygmy gecko (<i>Sphaerodactylus sp. nov.</i>)</li> </ul>	<ul style="list-style-type: none"> <li>Magnificent Frigate-birds (<math>\geq 119</math> pairs)</li> </ul> <p>Lizard densities were:</p> <ul style="list-style-type: none"> <li>Ameiva atrata 147/ha</li> <li>Anolis nubilus 771/ha</li> </ul>				
	<p><u>Barbados:</u> Increased stability of populations of:</p> <p>1. Endemic reptiles Barbados leaf-toed gecko (<i>Phyllodactylus pulcher</i>), Theadsnake (<i>Tetracheilostoma carlae</i>), and Hawksbill turtle (<i>Eretmochelys imbricata</i>) nesting population</p> <p>2. Indicator coral reef fish species at high biodiversity reef sites: Parrotfish (<i>Scaridae spp.</i>); Grunts (<i>Haemulidae</i>); Surgeonfish (<i>Acanthuridae spp.</i>)</p>	<p>Leaf Toe Gecko: Surveys in 2014 estimated total population at 12,000</p> <p>Threadsnake: Populations at pilot site will be determined at the start of the project</p> <p>Hawksbill: 713 nesting turtles were observed nesting in 2016 in Barbados</p> <p>Parrot fish rank #1; Grunts rank #2; Surgeonfish rank #3 at high biodiversity reef sites</p>	<p>Biosecure site(s) for threatened native reptiles established.</p> <p>Control strategy developed and being implemented for IAS impacting on native reptiles</p> <p>Nesting females increased by 10% and Hatchling survival by 25%.</p> <p>Key indicator species maintain their ranking and lionfish numbers remain in check.</p>	<p>Leaf toe gecko population stabilised or increased</p> <p>Threadsnake population stabilised or increased</p> <p>Nesting population stabilised or increased</p> <p>Key indicator species maintain their ranking and lionfish numbers remain in check.</p>	<p>-Declaration of the biosecurity site</p> <p>-Verification survey report</p> <p>-End of project Pilot project report</p> <p>-Field trips reports</p> <p>Survey reports</p> <p>Reef Surveys</p>	<p>-Authorities agree on the declaration of a new biosecurity site</p> <p>-Climate change does not affect the coastline in the short term</p> <p>-Funds are enough to increase stability of populations.</p>
	<p><u>St. Kitts:</u> Improved capacity to manage and control Vervet monkey (<i>Chlorocebus aethiops</i>) to sustainably control their numbers in the wild.</p>	<p>-No effective management plan to control monkeys (<i>Chlorocebus aethiops</i>)</p>	<p>Management plan developed and implemented employing proven control strategies in a humane way.</p>	<p>Cost recovery options incorporated in the plan to ensure sustainability to ensure control measures post project continue to keep population in check.</p>	<p>Time sighting reports</p> <p>End of pilot project site report highlighting population size and impacts</p>	<p>Funds enough to undertake this pilot</p> <p>Population studies done by the Ministry of finance as co-finance</p>



Outcome	Objectively verifiable indicators					
	Indicators	Baseline conditions	Mid-term targets	End of Project targets	Means of Verification	Assumptions
					Field trip reports	
<b>Outputs for Component 2:</b> <b>2.1 A) Antigua &amp; Barbuda Pilot</b> 2.1a1 Eradication of IAS on Green Island, Smith Island and Maiden Island. Establishment of new and improved biosecurity mechanisms on Redonda and other critical offshore islands. 2.1a2 Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands <b>2.1 B) Barbados Pilot</b> 2.1b1 Biosecure site(s) for threatened native reptiles established 2.1b2 Monitoring program on effectiveness of control of invasive alien plant species in support of the Integrated Gully System Management Plan. 2.1b3 Rat and mongoose control at selected hawksbill turtle ( <i>Eretmochelys imbricata</i> ) nesting beaches. 2.1b4 Lionfish assessment and management project in place at high biodiversity value reef sites. <b>2.1 C) St. Kitts and Nevis Pilot</b> 2.1c1 Management plan developed for the sustained control and management of the monkey ( <i>Chlorocebus aethiops</i> ) populations in protected areas						
<b>Component 3: Regional Biosecurity</b>						
3.1 Increased collaboration among Caribbean states to tackle IAS	Increase in the number of invasive or potentially invasive species interceptions at ports resulting from regional collaboration	Total # of interceptions in 2016: A&B 200, BRB 900, SKN 160, GRN 0, DOM 287, SVG 60, SLC (not available)  Little or no sharing of information among ports of entry with respect to IAS interceptions	5% increase in interceptions from baseline  Database for interceptions at ports operational by PY2	25% increase in interceptions from baseline  At least 3 countries inputting data on interceptions into a database that can be viewed in real time by other countries	Reports of interceptions shared at IPSC meetings Information available in database	Sharing of data will not lead to trade implications.
	Active IAS working network beyond agriculture sector cooperating on a regional IAS programme ( <i>taking into account fair gender participation</i> )	No Regional strategy for IAS and no working group specific to IAS exist (working committee for free movement of goods in the OECS in existence)	Regional IAS strategy developed (including gender considerations) and Regional working group operational with at least one face to face meeting per year and women participation	Regional IAS Strategy adopted by the OECS Commission. At least 3 meetings (virtual) of the regional working group (proof of women participation).	Strategy document Working group meeting reports Reports of Regional IAS Working Group	Regional coordinating group will be formally adopted into the national public service structure and remain functional post project.
3.2 Enhanced regional IAS management through	# of persons with increased capacities among participating countries for IAS prevention, EDRR,	Risk assessment limited to threats to public health and agriculture. No risk assessment to biodiversity done in the sub region.	At least 7 persons -1 per each participating country (in good ratio of male to female) trained on	At least 14 persons -2 per each participating country (in good ratio of male to female) trained, with participants completing at	Training reports. Course material online.	Cost recovery Mechanism will be acceptable to the policy makers and













[illegible]



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## Appendix 6: Key deliverables and benchmarks

OUTPUTS	ACTIVITIES	DELIVERABLES	BENCHMARKS
<b>Component 1: IAS Policy, Institutions and Capacity (Antigua and Barbuda; Barbados; St. Kitts and Nevis)</b>			
<b>Outcome 1.1 Strengthened invasive alien species management framework and cross sectoral arrangements reduce IAS threats in terrestrial, marine and coastal ecosystems</b>			
1.1 (3) Critical Situational Analyses completed	1.1.1 Risk Assessment for Marine Environment developed and published	Threats from marine IAS prioritized	Risk assessment report circulated with threats prioritized and recommendations for prevention (Y1Q4)
	1.1.2 Risk Assessment for pet and aquaria trade developed and published	Potential IAS threats being introduced via the pet and aquaria trade identified	Risk assessment report circulated with action for reducing risks (Y1Q4)
	1.1.3 Risk Assessment for International Travel developed and published	Threats of introducing IAS via international trade quantified	Risk assessment report with recommendations for reducing IAS introductions via international travel circulated (Y1Q4)
1.2 (3) National Invasive Species Strategies and Action Plans (NISSAPs) developed to address risks and promote cross sectoral collaboration in 3 countries	1.2.1 National multi-stakeholder Coordinating Mechanism established for cross sectoral IAS Management	Multi-stakeholder committee with functional	Committee endorsed by policy makers (Y1Q1)
	1.2.2 Hold meeting at least quarterly and produce minutes	Regular meetings of National IAS steering committee to enhance coordination among stakeholders	Approved Minutes of meetings circulated (Y3Q4)
	1.2.3 NSC provides oversight to the development of the NISSAP and serves as coordinating mechanism for IAS.	Plan for development National IAS strategy approved	Work plan for NISSAP circulated (Y1Q4)
	1.2.4. Develop content of the NISSAP	Task team/working groups formed to develop NISS	TOC for NISSAP finalized and circulated to stakeholders
	1.2.5 Prepare and disseminate NISSAP	Consultations with national stakeholders held to develop NISSAP	Strategy produced and circulated with stakeholders role in implementation identified (Y1Q4)
	1.2.6 Prepare and disseminate non-technical version of NISSAP for wider dissemination.	NISSAP repackaged to appeal to general populace to change behaviour to minimize risks	Flier highlighting key priorities and actions of the NISSAP circulated. (Y1Q4)
	1.2.7 Establish International Project Steering Committee (IPSC) with four meetings held	Regular committee meetings held	Minutes of meetings circulated (Y1Q1)
	1.2.8 Review with the OECS Commission existing mechanisms for cross sectoral coordination of actions on early detection and rapid response of IAS at the sub-regional level.	Meetings held with the OECS Commission to enhance regional coordination	Decisions of the coordinating meeting submitted to national policy makers. (Y1Q4)
	1.2.9 Cross sectoral national coordination in place and networked at the regional level	Regular national committee meetings held	Meeting minutes circulated (Y2Q1)
1. 3 (3) Legal frameworks for IAS developed or upgraded in 3 countries (regulatory guidance, protocols, codes of conduct)	1.3.1 Hire national consultant to review current status of legislation and determine gaps also consider attempts and experiences in updating legislation	Gap analysis of current legislation and status for updating legislation completed	Gap analysis circulated to stakeholders (Y2Q1)
	1.3.2 Legal drafters develop draft legislation in collaboration with AG Chambers	IAS legislation drafted	Draft legislation circulated (Y2Q2)
	1.3.3 Draft legislations publicized for comments	Comments from stakeholders received	Draft legislation updated (Y2Q3)
	1.3.4 Incorporate comments and send final draft legislation to AG Chambers for updating legislation	IAS legislation updated	Draft legislation submitted to AGs office and line minister.(Y3Q1)
	1.3.5 Update Protocols and best practices (except ballast water) of users of the Marine environment to minimize risk of new marine IAS introductions and publish.	Best practices for minimizing IAS in marine environments developed in a participatory manner	Best practices for minimizing IAS in marine environments minimized. (Y1Q4)

OUTPUTS	ACTIVITIES	DELIVERABLES	BENCHMARKS
	1.3.6 Update Protocols and best practices for stakeholders in the Pet and Aquaria and horticulture trades to minimize risk of new IAS introductions and publish	Best practices for minimizing IAS introductions via pet; aquaria; and horticulture trades developed in a participatory manner	Best practices for minimizing IAS introductions via pet; aquaria; and horticulture trades in circulated to stakeholders ((Y1Q4)
	1.3.7 Update Protocols and best practices for stakeholders engaged in International Passenger travel and published.	Best practices for minimizing IAS introductions by international travellers developed in a participatory manner	Best practices for minimizing IAS introductions via international travellers circulated to stakeholders (Y1Q4)
1.4 (3) Awareness and capacity building programs developed & implemented (internalizing IAS threats, impacts, and new controls and regulations)	1.4.1 Develop a National Public Awareness and Communication Strategy for Antigua and Barbuda; Barbados and St. Kitts and Nevis	National public awareness strategies developed and role of project defined	Public awareness strategy circulated identifying the what will be done with GEF funds and co-finance (Y1Q3)
	1.4.2 Develop and execute a campaign to raise the awareness of IAS and their negative impact on biodiversity link to existing activities where possible for example World Biodiversity Day; Wetlands day; St. Patricks Day celebrations.	Public awareness campaign developed to raise awareness of IAS threats to biodiversity with clear guidelines for measuring efficacy	Survey reports of the efficacy of the programme. (Y3Q3)
	1.4.3 Develop and execute a campaign to minimize entry of IAS through identified high risk pathways: International Travel; Pet and Aquaria and Horticulture trades.	Public awareness campaign developed to raise awareness of high risk pathways with clear guidelines for measuring efficacy	Survey reports of the efficacy of the programme. (Y3Q3)
	1.4.4 Develop and execute a campaign to promote the National Invasive Species Strategy and Action Plan (NISSAP)	Public awareness campaign developed to gender behaviour changes	Survey reports of the efficacy of the programme (Y3Q3)
	1.4.5 Develop a "Training of Trainers" short courses on IAS identification; impact assessment; risk analysis; early detection and rapid response etc.	Course materials for "Training of Trainers" developed for five short courses on IAS control and management	Course material circulated (Y1Q3)
	1.4.6 Conduct regional training of trainers on above short courses	At least two trainers per country trained	Report of trainings (Y1Q4)
	1.4.7 Make available short courses online	Courses posted on line and tertiary institutions encouraged to use them	Course materials available on the web. (Y2Q1)
	1.4.8 Experiences shared at national/regional consultations and informs NISSAP and place in post-secondary school curriculum	Information and knowledge generated from stakeholders fed back to NISSAP process	NISSAP updated to address concerns from stakeholders (Y2Q2)
	1.4.9 Experiences on impact of IAS and their control and management documented and shared via website, publications and general marketing campaign	Real stories of IAS impact documented	Marketing campaign reports highlighting stories of IAS from surrounding communities. (Y2Q4)
	1.4.10 Design and produce an information platform for monitoring interceptions at ports of entry catering for sustainability of the system	Specifications for the information platform for monitoring IAS interceptions at ports of entry developed	Database specification report circulated (Y2Q1)
	1.4.11 Design and build platform to meet the demand catering for sustainability of the system	Databased completed	Database used and regular interception reports circulated (Y2Q2)
1.5 (3) National cost recovery financial mechanisms designed and implemented	1.5.1 Identify potential sources / mechanisms for financing EDRR of IAS sustainably and assess their feasibility.	Literature review of funding mechanisms for environmental issues completed	Review report submitted. (Y2Q2)
	1.5.2 Prioritize potential sources of revenue and potential annual contribution	Feasibility of various models for sustainably funding IAS control and management assessed.	Report on feasibility of sustainably funding IAS control circulated to stakeholders (Y2Q3)
	1.5.3 Produce and circulate report to policy makers and stakeholders	Stakeholders discuss submitted report	Stakeholders' recommendations submitted to Policy makers (Y2Q4)

OUTPUTS	ACTIVITIES	DELIVERABLES	BENCHMARKS
<b>Component 2: Control and Management of IAS Impacts</b>			
<b>Outcome 2.1 Eradication and/or improved control of IAS impacting global biodiversity significance, thereby reducing threats to key species</b>			
<b>2.1 A) Antigua Pilot (See Annex 16.1)</b>			
2.1a1 <i>Eradication</i> of IAS on Green Island, Smith Island and Maiden Island. Establishment of new and improved biosecurity mechanisms on Redonda and other critical offshore islands	2.1a.1.1 Finalise Operational Plans for eradicating rats from target islands (Green Island, Smith Island and Maiden Island)	Operational plan for rat eradication on each offshore island completed	Operational plan circulated (Y1Q4)
	2.1a.1.2 Prepare island(s) for eradication operation and deploy bait	Bait stations set up and bait deployed	Field teams reports (Y2Q1)
	2.1.a.1.3 Intensive monitoring to verify whether and where any rats remain	Regular monitoring visits to very absence or presence of rats	Monitoring visit reports (Y2Q3)
	2.1.a.1.4 Conduct final check after 12 months to verify the eradication operation was successful	Verification visit	Eradication report circulated to stakeholders (Y3Q3)
	2.1a.1.5 Finalize monitoring plan employing best practices methods and ensure local personnel have capacity and tools to monitor biodiversity on priority islands	Tools and equipment for biosecurity monitoring procured	Project monitoring reports ((Y1Q3)
	2.1a.1.6 Conduct annual monitoring of native flora and fauna on the target islands	Annual monitoring visits by multi-disciplinary teams	Monitoring reports circulated (Y3Q3)
	2.1a.1.7 Present findings from biodiversity monitoring programme in peer review journal and PA campaign.	Biodiversity status of offshore islands compiled by multi-disciplinary team	Biodiversity reports circulated and published on the web. (Y3Q1)
2.1a2 Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands	2.1a.2.1 Review existing biosecurity protocols and identify gaps and solutions	Biosecurity gap analysis completed	Biosecurity gap analysis report circulated (Y1Q2)
	2.1.a.2.2 Build capacity of personnel involved in implementing improved biosecurity protocols	Training programme developed	Training material circulated (Y1Q3)
	2.1. a.2.3. Develop a "Best Practices in Biosecurity for Offshore Island" standard training programme and train all necessary stakeholders	Personnel engaged in implementing biosecurity measures trained to adopt best practices	Training report circulated. ((Y1Q2)
	2.1.a.2.4 Appoint an Island biosecurity officer to serve as lead coordinator for implementing improved protocols working in collaboration with a wider team of government and NGO field technicians	Biosecurity officer recruited	Biosecurity officer assumes position. ((Y1Q2)
	2.1.a.2.5 Implement an effective biosecurity protocol to keep priority islands free of IAS	Biosecurity protocol developed	Biosecurity protocol circulated (Y1Q3)
	2.1.a.2.6 Raise awareness of the importance of eradicating IAS and how and why to prevent the spread of IAS on priority offshore islands	Appropriate signage erected on offshore island	Project monitoring reports (Y3Q3)
	2.1.a.2.7 Complete stakeholder and inter-agency consultations to establish Redonda as a Protected Area (PA)	National consultations completed	Consultation report circulated (Y3Q1)
	2.1.a.2.8 Establish a functioning inter-agency committee to support the management of the protected area	Protected area management committee set up for Redonda Island	Committee meeting minutes circulated (Y3Q3)
	2.1.a.2.8 Produce a protected area management plan, incorporating IAS management requirements	Protected area management plan developed for Redonda Island	Management plan circulated (Y3Q1)
<b>2.1 B) Barbados Pilot (See Annex 16.2)</b>			
2.1b1 Biosecure site(s) for	2.1.b 1.1 Confirm baseline population of leaf-toed Gecko in the biosecure site at	Population estimates completed at beginning and end of project	Project monitoring reports (Y1Q1 and Y3Q4)

OUTPUTS	ACTIVITIES	DELIVERABLES	BENCHMARKS
threatened native reptiles established	beginning of pilot and assess population at end of project		
	2.1.b.1.2: Establishment of bio-secure site for augmenting native reptile population	Special fencing constructed to secure native reptiles from mammalian IAS	Project monitoring reports (Y1Q3)
	2.1.b.1.3: Eradicate IAS and monitor for re-invasion	Trapping for rats and mongoose implemented	Project monitoring reports (Y1Q3)
	2.1.b.1.4: Study leaf-toe gecko behaviour to enhance conservation	Study completed on behaviour of leaf-toe gecko	Completed study (Y3Q3)
2.1b2 Monitoring program on effectiveness of control of invasive alien plant species in support of the Integrated Gully System Management Plan	2.1.b.2.1 Baseline study to confirm severity of invasive plants in gully system	Study on extent of coverage of invasive plants	Completed study (Y1Q3)
	2.1.b.2.2 Establish management / control plots	Management plan for invasive plants developed gully system	Management plan circulated (Y1Q4)
	2.1.b.2.3 Monitor control plots	Regular monitoring visits to assess spread of invasive plants	Monitoring visit reports (Y3Q3)
	2.1.b.2.4 Assess recovery of native species	Monitoring visits to assess condition of native species	Monitoring visit reports (Y3Q3)
2.1b3 Rat and mongoose control at selected hawksbill turtle ( <i>Eretmochelys imbricata</i> ) nesting beaches	2.1.b.3.1.1 Baseline study of sea turtles	Updated population estimates for sea turtles	Population report (Y1Q3)
	2.1.b.3.1.2 Establish trapping programme for rats and mongoose	Trapping for rats and mongoose implemented	Project monitoring reports (Y1Q3)
	2.1.b.3.1.3 Monitor recovery in turtle population	Regular monitoring of turtle population	Monitoring visit reports (Y3Q3)
2.1b4 Lionfish assessment and management project in place at high biodiversity value reef sites	2.1.b.4.1.1 Conduct baseline survey to compare with pre-invasion/early invasion data	Assessment of lionfish impacts on native species	Assessment report (Y1Q3)
	2.1.b.4.1.2 Promote the use of passive capture of lionfish	Creation of awareness and education materials on passive capture	Awareness and educational materials (Y3Q3)
	2.1.b.4.1.3 Evaluate the economic Impact of lionfish on livelihoods	Impact on livelihoods and biodiversity of lionfish completed	Lionfish Impact assessment report circulated (Y1Q3)
	2.1.b.1.4 Determine changes in key indicator species	Updated assessment of lionfish impacts on native species	Assessment report (Y3Q3)
2.1 C) St Kitts and Nevis Pilot (See Annex 16.3)			
2.1c1 Management plan developed for the sustained control and management of the monkey ( <i>Chlorocebus aethiops</i> ) populations in protected areas	2.1.c.1 Conduct a critical review of control strategy employed locally, regionally	Practices for controlling Vervet monkeys documented.	Critical review of monkey control circulated (Y1Q2)
	2.1.c.2 Estimate Economic Impact of Vervet monkeys on agriculture, tourism and households in St. Kitts and Nevis	Economic impact of Vervet monkeys quantified	Impact assessment of Vervet monkeys circulated (Y2Q1)
	2.1.c.3 Validate capture techniques for green monkey under local conditions	Recommended capture techniques validated for St. Kitts	Report capture validation techniques circulated. (Y2Q3)
	2.1.c.4 Evaluate feasibility of cost recovery mechanism for sustainably managing the monkey population to minimize negative impacts	Cost recovery mechanisms for monkey control evaluated for sustainability post project.	Recommendations for sustainably managing the monkey population circulated. (Y2Q4)
	2.1.c.5 Management Plan for Vervet Monkey control programme in St. Kitts produced and circulated.	Vervet monkey management plan developed	Management plan circulated (Y3Q1)
<b>Component 3: Regional Biosecurity</b>			
<b>Outcome 3.1 Increased collaboration among Caribbean states to tackle IAS</b>			
<b>3.1: Regional cooperation</b>			
3.1.1 Regional strategy for prevention and	3.1.1.1 Review Current Biosecurity procedures and process at ports of entry	Biosecurity protocols; infrastructure and human capacity at ports of entry assessed	Biosecurity assessment review of ports of entry circulated. (Y1Q2)



OUTPUTS	ACTIVITIES	DELIVERABLES	BENCHMARKS
surveillance at ports of entry (i.e. customs) developed and Regional IAS Working Group established	3.1.1.2 Build Human Capacity for adopting International Best Practices at Ports of Entry	Training programme implemented to strengthen human capacity	Training report circulated (Y1Q3)
	3.1.1.3 Establish Regional IAS Working group	Regional IAS working group set up for OECS	Minutes of meetings circulated. (Y1Q2)
	3.1.1.4 The Regional Invasive Alien Species Strategy and Action Plan is reviewed and updated with focus on air and seaports surveillance	Regional IAS strategy and action plan updated	Strategy circulated (Y1Q4)
	3.1.1.5 Updated strategy and action plan presented to national and regional policy makers for adoption and implementation	Updated strategy and action plan submitted to OECS Commission and CARICOM	Acknowledgements on behalf of OECS commission and CARICOM (Y2Q1)
	3.1.1.6 identify existing networking opportunities for IAS coordination and joint efforts	Regional stakeholders working on IAS updated	Updated stakeholder directory circulated (Y1Q3)
	3.1.1.7 Published annual calendar of activities	Calendar of meetings, and training opportunities compiled	Calendar circulated (Y3Q4)
	3.1.1.8 Identify common IAS and available funds and develop joint work programme for execution	Prioritized list of IAS developed and national and regional sources of funds developed	Prioritized IAS list circulated (Y2Q1)
3.1.2 Database established for interceptions at ports	3.1.2.1 Critical review of ports of entry in 4 countries	Review of ports of entry completed	Review circulated (Y1Q3)
	3.1.2.2 Integrate the review with national reviews countries in component one and ensure interoperability among the seven participating countries.	Integration of regional and national reviews of ports of entry	Review integrated with national reviews (Y2Q1)
3.1.3 A Strategic Plan for the Regional Financing System for shared IAS developed	3.1.3.1 Evaluate potential financing activities and sources of income	Revenue collection opportunities for IAS assessed	Assessment of revenue collection for tackling common IAS circulated
	3.1.3.2: Produce financial plan and establish collection and mobilization mechanisms	Implementation plan for collecting revenues completed.	Implementation plan circulated. (Y2Q1)
	3.1.3.3: Plan endorsed by stakeholders submitted to national authorities for implementation.	Implementation plan endorsed by stakeholders	Plan with stakeholders' endorsement sent to policy makers. (Y2Q2)
<b>Outcome 3.2 Enhanced regional IAS management through early warning system, response measures and capacity building</b>			
<b>3.2 Enhanced regional management of IAS</b>			
3.2.1 Regional technical capacity developed to conduct risk assessment and measure economic impact of IAS	3.2.1.1 Enhance capacity to conduct IAS risk assessment	Training programme executed by trained trainers at the national level	Report of training (Y1Q3)
	3.2.1.2 Build capacity to measure economic impact of IAS	Training programme executed by trained trainers at the national level	Report of training (Y1Q3)
	3.2.1.3 At least one impact assessment conducted per country	Economic impact of at least one IAS completed per country.	IAS economic impact assessment report circulated. (Y2Q3)
	3.2.1.4 Produce and circulate report containing impact assessments for IAS	Technical bulletin containing at least 7 economic assessment reports compiled and edited.	Technical bulletin printed and circulated. (Y1Q4)
3.2.2 CIAS.NET strengthened as a learning network for IAS	3.2.2.1 Transfer all training materials into online training modules	Training materials integrated into online modules	Online training modules updated (Y1Q3)
	3.2.2.2 Update and strengthen the CIASNET.ORG as a platform for disseminating information on IAS in the Caribbean	Website update and possibly migrated to a more sustainable information provider	CIASNET.ORG updated (Y1Q2)
	3.2.2.3 Update database of IAS experts	Update IAS experts database on CIASNET.ORG	Updated directory available online (Y1Q3)
	3.1.2.4 Develop Resource Manual for all open sources of data on IAS and conduct training on open sources of data for IAS	Manual for use of open sources of data compiled	User manual circulated (Y2Q1)



OUTPUTS	ACTIVITIES	DELIVERABLES	BENCHMARKS
	3.2.2.5 Sensitize stakeholders on the need to disseminate national information on IAS via open online resources for IAS.	Data generated by the project shared with open access sources	National data posted on open access IAS information hubs (Y3Q3)
3.2.3 Regional App or ID IAS risk cards for prioritized species that can affect important biodiversity, agriculture, and human health developed for ports of entry	3.2.3.1 Design and produce IAS Identification guide for Barbados and OECS countries	Analysis of IAS stakeholders information needs completed	Report on IAS information needs circulated (Y1Q3)
	3.2.3.2 Prioritize IAS by country and ecosystem	Prioritize list of IAS by country and ecosystem compiled	Prioritize list of IAS circulated (Y1Q3)
	3.2.3.3 Identify and agree IAS for inclusion in the guide	List of species to be included in the IAS completed	List of species circulated (Y1Q4)
	3.2.3.4 Produce and publish guide in both electronic and print format.	App developed contain list of prioritized species in the first version	App available for download and use by stakeholders. (Y3Q1)

## Appendix 7: Costed M&E plan

M&E activity	Responsible Parties	Approx. Budget from GEF (US\$)	Budget co-finance	Time Frame
Inception Workshop	Project Management Unit (PMU) UN Environment	21,000	15,000	Within 2 months of project start-up
Inception Report (translation cost) publications and reporting)	PMU		5,000	1 month after project inception meeting
-Measurement of project -baseline data collection *all indicators will be measured by the appointed project team that will consist of regional project coordinator, CABI experts/support team and the national project focal points. The overall responsibility of the measurement of indicators will be with the project coordinator. Comp 1 indicators will in addition be measured with support from countries' representatives, Comp 2 indicators will be measured with support of the pilot coordinators, and Component 3 indicators will be measured with support from CABI, the CBD CARICOM, etc.	<input type="checkbox"/> Regional Project Coordinator <input type="checkbox"/> PMU/ Project team	30,000	50,000	Outcome indicators: start, mid and end of Project Progress/perform. Indicators: Within 1 month of the end of reporting period i.e. on or before 31 January and 31 July (through progress reports)  Baseline data collection: within the 1st year.
Project Steering Committee (SC)	Regional Project Coordinator <input type="checkbox"/> PMU <input type="checkbox"/> UN Environment	43,000	50,000	At least once per year face to face and once a year virtually meetings
Reports of SC meetings	Regional Project Coordinator with inputs from partners		15,000	Same as above
Monitoring visits to field sites and areas where project is active (this will include pilot sites in 3 countries + meetings to support the development of activities under all the components)	Project Coordinator UN Environment	5,000	55,000	As needed and based on project progress and identified needs for support during implementation
Communication of M&E actions	CABI	1,000	20,000	Annually at SC meetings
Audit reports	CABI	60,000	25,000	annually
Mid Term Review	UN Environment TM/ UN Environment	45,000	30,000	At mid-point of project

	Evaluation Office PMU			
Terminal Evaluation	UN Environment TM/ UN Environment Evaluation Office PMU	60,000	50,000	At project end
<b>Total M&amp;E Plan Budget</b>		<b>265,000</b>	<b>315,000</b>	

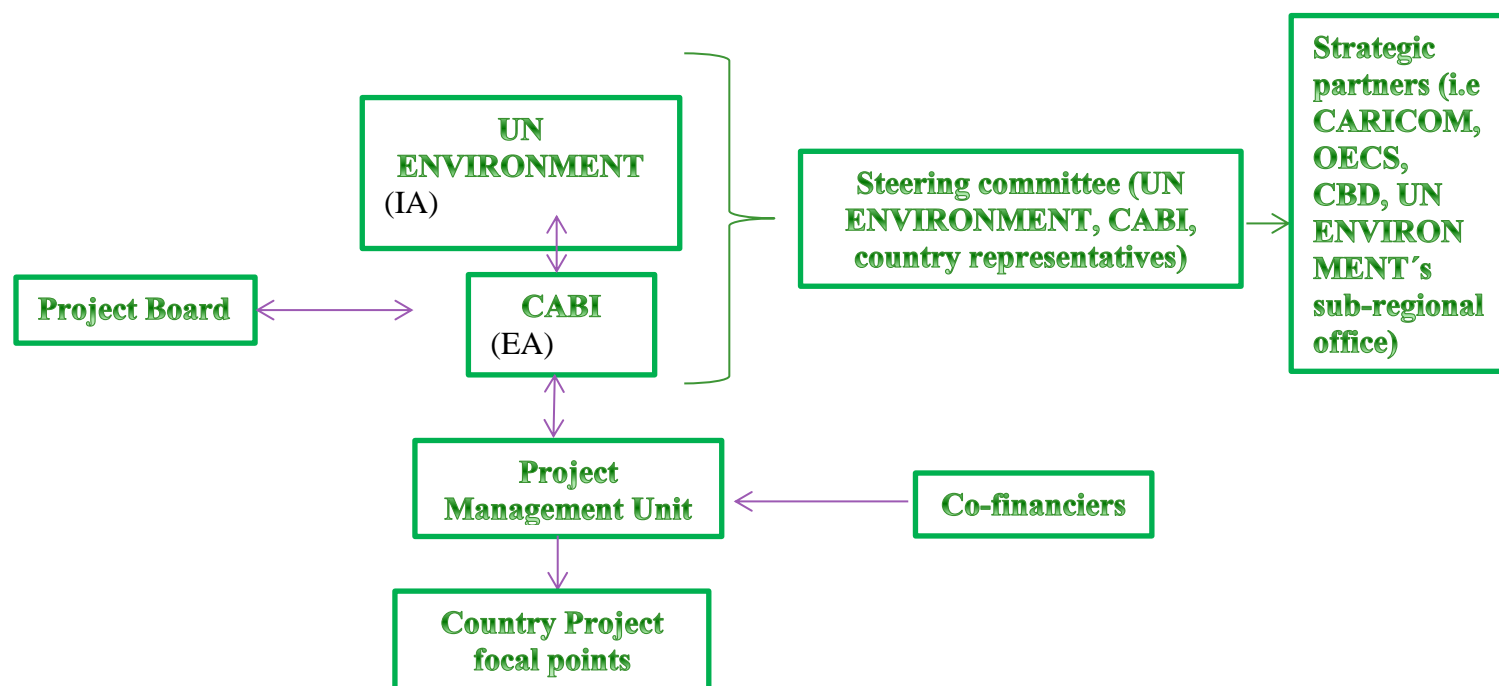
#### Appendix 8: Summary of reporting requirements and responsibilities

Reporting requirements	Due date	Format appended to legal instrument as	Responsible Party
Procurement plan (goods and services)	2 weeks before project inception meeting	N/A	Project Coordinator
Inception Report	1 month after project inception meeting	N/A	Project Coordinator
Expenditure report with appropriate notes	Quarterly on or before 30 April, 31 July, 31 October, 31 January	in Anubis system	Project Coordinator
Cash Advance request and details of anticipated disbursements (to be submitted in Anubis along with the expenditure reports)	Quarterly or When required	in Anubis system	Project Coordinator
Progress report	Half-yearly on or before 31 January, 31 July	Annex 8 (to be uploaded in Anubis)	Project Coordinator
Audited report for expenditures for year ending 31 December	Yearly on or before 30 June	N/A	Executing partner to contract firm
Inventory of non-expendable equipment	Yearly on or before 31 January	in Anubis system	Project Coordinator
Co-financing report (to be reported quarterly along with the GEF expenditure in the quarterly expenditure reports)	Yearly on or before 31 July	in Anubis system	Project Coordinator
Project implementation review (PIR) report	Yearly on or before 15 July	Annex 9	Project Coordinator, PSC
Minutes of steering committee meetings	Twice Yearly	N/A	Project Coordinator

Final report	2 months after project closure / technical completion	Annex 10	Project Coordinator
Final inventory of non-expendable equipment	2 months after project closure/ technical completion	in Anubis system	Project Coordinator
Equipment transfer letter	2 months after project closure/ technical completion	Annex 10	Project Coordinator
Final expenditure statement	3 months from project completion date	Annex 11	Project Coordinator
Mid-term evaluation (manual & Reports, baseline)	Midway through project	N/A	TM or EOU
Final audited report for expenditures of project	6 months from project completion date	N/A	Executing partner to contract firm
Independent terminal evaluation report (manual & Reports, baseline)	at the end of project or 6 months from project completion date	Appendix 9 to Annex 1	TM

## Appendix 9: Decision-making flowchart and organisational chart

This project will be operated under the supervision of UN Environment as Implementing Agency (IA), and CABI as Executing Agency (EA) with guidance and inputs from the Project Steering Committee (PSC) and strategic partners, as depicted in the project's governance structure below.



Project organization arrangements.

### Roles and responsibilities of each institution:

#### UN Environment's Ecosystem Division - Implementing Agency-IA

- Provide consistent and regular Project oversight to ensure the achievement of Project objectives
- Liaise between the Project and the GEF Secretariat,
- Ensure that both GEF and UN Environment policy requirements and standards are applied to and are met (reporting obligations, technical, fiduciary, M&E)
- Ensure timely disbursement/sub-allotment of funds to the EA, based on the agreed legal documents
- Approve budget revision, certify fund availability and transfer funds
- Organize mid- and end-term evaluations
- Provide technical support and assessment of the execution of the Project
- Provide guidance if requested to main TORs/MOUs and subcontracts issued by the Project
- Follow-up with EA for progress, equipment, financial and audit reports
- Certify project operational completion
- Member of the IPSC

### **CABI – CAB International- Executing Agency-EA:**

CABI will assign from its staff a Regional Project Coordinator (RPC) to perform the following functions on its behalf:

- Oversee Project execution in accordance with the project results framework and budget, the agreed work plan and reporting tasks.
- Support the Project Management Unit (PMU) in coordinating project activities at national and local levels.
- Provide technical expertise through its personnel and networks.
- Ensure technical quality of products, outputs and deliverables, including reports to UN Environment.
- Provide guidance and coordination to the PMU and national stakeholders in Antigua and Barbuda; Barbados; Grenada; Dominican; St. Lucia; St Kitts and Nevis and St. Vincent.
- Facilitate access to sites and locations.
- Support logistical issues, e.g. through organization of meetings and provision of relevant facilities.
- Support the PMU in regular Project reporting, incl. progress, financial and audit reporting to IA.
- Chair in conjunction with countries, the project PSC

**The Project Management Unit:** (PMU) will be located at CABI – CCA, Trinidad and will consist of:

- The Regional Project Coordinator (RPC) –based in Trinidad and Tobago
- The Project Administrative Assistant (PAA) based in Trinidad and Tobago
- CABI Regional IAS Coordinator based in Kenya, Africa

### **PMU roles comprise:**

- Ensure Project execution, including all technical aspects
- Ensure Project governance and oversight of the financial resources from the GEF investment in collaboration with the third party who will manage the project funds locally
- Provide staff time and expertise in guiding and advancing the project. (at least one person half- time staff dedicated to the project and administrative support)
- Provide Project reporting according to the supervision plan
- Share all achievements and products of the project with all relevant stakeholders
- Ensure that consultants and project partner organizations deliver against their contracts and in time
- Organize the Steering Committee meetings and serve as its secretariat
- Overall management and implementation of the Project M&E framework to evaluate project performance
- Management of the flow of information from the field to the Project collaborators, and producing periodic monitoring reports
- Prepare and manage ToR, contracts and MoU with consultants and project partners using appropriate legal instruments. ToR and selection process will be done according with the project's work plan and budget. ToRs will be cleared by UN Environment as well.
- Do all payments related to the project as per request and coordination with the EA and the project work plan and approved budget.
- Provide data for the project expenditure reports as per UN Environment templates, and provide support to the project coordinator in the elaboration of periodic expenditure reports.
- Undertake procurement of goods and services for the project and keep an updated inventory as per UN ENVIRONMENT templates
- Ensure that consultants and project partner organizations deliver against their contracts and in time (in collaboration with PMU)
- Provide support to the Project M&E activities.

### **Project Steering Committee (PSC)**

- Its mission is to assess compliance with the objectives and results of the project, orienting toward sustainability thereof.
- In practical terms the PSC is responsible for ensuring that the project meets goals announced in the Project Result Framework by helping to balance conflicting priorities and resources. Conclusions and recommendations produced by the PSC will be taken into consideration by UN Environment and the PM to improve implementation strategies, annual work plans and resources allocation budget and, when necessary, to adjust the project's Result Framework. This committee will meet every six months, either physically or virtually.
- Overall coordination of the PSC will be the responsibility of CABI and will involve representatives of the participating countries and regional agencies where possible.
- The first meeting of the PSC will serve to define the specific details of the rules of procedure of the Committee.
- This will be reflected in a regulation or guideline that establishes criteria and procedures related to the internal functioning of the committee, including the definition of the rules under which group decision-making and actions to be carried out will be governed. This could include the following:
  - Formal designation of the main and alternate representatives of each Institution.
  - Approval of the functions and duties that the members of the Committee may have regarding the work to be done.
  - Consider active any session which has the presence of half plus one of the members or alternates.
  - The decisions will be made by consensus.
  - The detailed rules and procedures will be established in coordination with UN Environment at project start.

### **CABI Project Board**

- This is a group within CABI. This group is an essential part of the PRINCE II project management framework that CABI employs in managing projects. It will provide support in resolving both technical and administrative issues that cannot be resolved at the level of the PMU.

### **Country focal points**

- Countries will appoint a project focal point, who will represent each country on the project steering committee. The focal point will also be the person responsible for supervising and ensuring delivery of project activities at a national level. Consultants and project staff in the countries will report to the project focal point.

### **Co-financing entities**

- Assist in the implementation of the project according to its thematic areas and products and activities identified in the PRODOC.

### **Project Headquarters**

- The project headquarters will be located at CABI CCA, Office in Trinidad.

## Appendix 10: Terms of Reference

### Regional Project Coordinator (RPC)

1. Title of Position: Regional Project Coordinator (RPC)  
(Project Manager)
2. Position Location: CABI Caribbean and Central America
3. Reports to: CABI and ISC
4. Date of TOR: 01 March 2018 – 28 February 2021
5. Supervises: Country Project Focal Points (three)  
Project Accountant/Administrator
6. Major Functions:
  - The RPC's task is to provide leadership and coordination in the implementation of the regional and four national components of the project.
  - He/she will have overall responsibility for the direction of the project, detailed work planning, financial management and the timely delivery of outputs including reports, as well as regional project activities
7. *Context and Tasks:*

The RPC acts as Project Manager and heads the Project Management Unit (PMU) at CABI.

The Project Manager will assume the following responsibilities (duties):

#### Administrative

- Working in close collaboration with UN Environment to ensure project management meeting GEF and UN Environment standards. This includes:
  - Ensure that essential steps in the implementation of the FSP are undertaken in a technically sound, timely and transparent fashion.
  - Operational management of the project according to the project document and the procedures in the official UN Environment Operational Guidelines.
  - Organising and managing project activities according to the work plan in order to produce the outputs in a timely manner; updating and regular reviewing of the project work plan
  - Reporting to UN Environment, through CABI on a regular (quarterly) basis: submission of the semi-annual progress reports to the UN Environment - GEF Task Manager, draft Final Project Report and any other required reports
  - Reviewing biannual progress and quarterly financial reports and provide input to the annual PIR reports (with UN Environment)
  - Ensuring that reports prepared by project personnel under the supervision of the RPC are prepared as required.
  - Managing the regional M&E system for regional and national components of the FSP, including the risk mitigation plan inclusive of M&E missions
  - Drafting the terms of reference of Country Project Focal Points and initiating national contracts
  - Revising budgets and allocations to ensure FSP output delivery within budget
  - Assisting countries and CABI in attracting further co-financing from international, regional and national sources to finance both regional and national project components of the FSP as these evolve.
  - Providing policy guidance to the project
  - Oversee public relations of the project



- To act a secretary to the Steering Committee (SC):
  - Inform SC members at regular basis, prepare meeting agenda's and minutes;
  - Report to UN Environment and the SC any irregularities in project execution, misuse of funds or procedures, or problems in project execution at a timely basis;
  - Coordinating and participating in meetings (virtual and/or personal) of the SC where FSP management, activities, and expected outputs are be discussed

#### Technical

- Working in close collaboration with Country Focal Points and representatives including:
  - Providing oversight and technical backstopping to national partners during FSP
  - Reviewing terms of reference and selection of sub-contractors, consultants and conduct procedures for initiating sub-contracts
  - Assisting the countries and partners in developing linkages with other related projects
  - Sourcing relevant expertise from regional / international subject matter specialists and manage their inputs and deliverables according to the work plan and UN Environment guidelines, in order to produce regional deliverables in a timely manner and within budget
- Participate in the preparation of publications that may result from the project
- Participate in external scientific meetings (conferences, seminars, workshops, and electronic networks) as required
- Organise Regional Training Workshops and assist in the delivery of some of the training on the management of IAS
- Coordinate and supervise all regional consultants including ensuring quality of deliveries

#### *8. Deliverables:*

The RPC will be responsible for delivering the following outputs:

- Regional and national project staff recruited (year 1)
- SC and PMU established
- Ensure efficient functioning of the PMU
- Supervise national operations (component 1 and 2)
- Project activities implemented efficiently and on schedule
- One SC meeting convened each year, agenda agreed and minutes prepared
- Annual work plan and budget approved by SC and UN Environment/GEF
- All financial and technical reports, according to specifications in the project document, submitted on schedule and approved
- Timely transfers of GEF funds
- Terms of reference produced for consultants and technical experts
- Inaugural, mid-term and project completion workshops convened
- Mid-term report submitted to UN Environment/GEF
- M&E Plan finalized and agreed with UN Environment, and implemented in cooperation with NEAs
- Project objectives met
- Effective public relations

#### 9. *Contract duration and nature*

The contract covers duration of one (1) year, renewable up to the end of the project which covers a period of three (3) years, with a probation period of 6 months, subject to good performance.

#### 10. *Qualifications, Experience and Qualities Required*

- Postgraduate degree, preferably Ph.D., in a technical field related to agriculture and/or the environmental sciences or a related field
- 10 years professional experience with at least 3 years spent in international multi- or bilateral cooperation
- Understanding of IAS and their impacts, including field management options, as well as national frameworks needed to contain the spread of IAS in countries.
- Project management experience, including technical and financial reporting, of internationally-funded projects with regional scope
- Proven successful project implementation in Caribbean in the fields of agriculture, environment, biodiversity conservation or related fields
- Excellent communications skills and ability to work as part of, as well as lead, a multi-disciplinary and multi-cultural team.
- Excellent command of spoken and written English
- Ability to work with senior government officials, research institutes, NGOs, and local communities, etc.
- Excellent organizational and time management skills
- Excellent computer skills
- Capacity to mobilize resources
- Experience in participatory approach
- Self-motivated personality
- Willingness to travel frequently, sometimes under difficult conditions

### **National Project Focal Points (NPFP)**

1. *Title of Position:* National Project Focal Point (Team Manager)
2. *Position Location:* Antigua and Barbuda, Barbados and St. Kitts and Nevis
3. *Reports to:* International Project Coordinator (Project Manager)  
& NEA (through the National Project Directors)
4. *Date of TOR:* 01 March 2018 – 28 February 2021
5. *Supervises:* National Subject Matter Specialists (consultants, sub-  
Contractors, pilot Site Committees, NCU administrative staff)

6. *Major Functions:*

- All countries will appoint a NPFP, who will be a national IAS expert. The NPFP will be responsible for all project activities within their respective country.
- The NPFP supervise the work of the national project support staff, national consultants and/or Task Teams, maintain communication with the SC, provide technical guidance during project implementation and will ensure that budget and administrative procedures are consistent with CABI rules and regulations.

7. *Context and Tasks*

The NPFP acts as Team Manager. The NPFP will normally be housed at the National Executing Agency (NEA) and be responsible for:

- The operational management of the FSP within country, which includes planning, initiating and managing national project activities according to the project document and the procedures in the official UN Environment Operational Guidelines.
- Identification, hiring and supervision of national subject matter specialists and facilitators as required to efficiently carrying out the tasks in a timely manner.
- Acting as central liaison point for IA and EA officials, i.e. UN Environment and CABI liaison officers, which includes co-organization and hosting of, as well as participation in meetings and teleconferences scheduled by the IPC and active participation in and contribution to SC meetings
- Acting as the technical focal point for national stakeholders; broaden national stakeholder base where relevant, e.g. by organizing national stakeholder consultations and facilitating national stakeholder meetings during which pilot projects will be reviewed
- Identification of additional national co-finance as the FSP develops
- Be responsible for proper implementation of the national Project M&E activities such as field surveys and reporting to CABI
- Timely preparation and submission of reports

8. *Deliverables*

- NSC established; regular meeting held and documented
- Terms of references and work plans for national Consultants and Sub-contractors prepared, agreed and monitored
- Technical and financial reports as well as other inputs that may be required for regional coordination by the RPC provided in timely fashion
- Pilot experiences submitted to RPC for inclusion in Best Practice Guidelines (year 3)
- National Invasive Species Strategy and Action Plan produced and submitted to authorities for formal approval (year 3)
- Cost-recovery mechanisms produced and endorsed by stakeholders
- Risk analysis procedures produced and submitted to relevant stakeholders for endorsement
- National training programs developed
- National Communications Strategy produced and implemented

9. *Qualifications and Experience Required:*

- University degree or equivalent qualification in the environmental sciences or related field
- At least 5 years professional working experience
- Experience with managing projects of this scope.
- Experience with conservation programs, agriculture development or related environmental fields, including insights in the specifics of IAS management
- Team player who possesses excellent organisational and communications skills
- Solid working knowledge of English
- Computer literacy; familiarity with MS Office

### Subject Matter Specialists

1.     *Title of Position:*                   Subject Matter Specialists  
  (Consultants of various disciplines)
2.     *Position Location:*               EA, NEA or near pilot site in country
3.     *Reports to:*                        NPC and RPC
4.     *Date of TOR:*                     Variable
5.     *Major Functions:*

The role is to assist the NPFP in the implementation of FSP activities. The NPFP, in coordination with the RPC, will prepare the terms of reference based on the individual needs of specific pilot projects on individual countries. The RPC, in coordination with the SC, will develop terms of references for regional expert inputs. Currently foreseeable roles include (but are not limited to):

- Accountant/Administrator
- Consultants on policy development
- Communications specialists/experts
- IAS training experts
- Conservation biologist/ecologists
- IAS Risk Experts

**Appendix 11: Co-financing commitment letters from project partners** (separate file)

**Appendix 12: Endorsement letters of GEF National Focal Points** (same as PIF)

### Appendix 13: Draft procurement plan

UN ENVIRONMENT Budget Line		List of Goods and Services Required	Budget	Year*	Brief description of anticipated procurement process**
1100	Personnel Component				
1101	Regional Project Coordinator	1 full time project coordinator	231,978	1 - 3	A professional from the CABI CCA will assume as Regional Project Coordinator.
1102	Project Staff				
	National Project Coordinator Antigua and Barbuda	1 part-time project coordinator	36,000	1 – 3	The National Implementing organisation will select the most suitable candidate. Depending upon qualification, experience, etc., with support from the PMU.
	National Project Coordinator Barbados	1 part-time project coordinator	36,000	1 - 3	The National Implementing organisation will select the most suitable candidate. Depending upon qualification, experience, etc., with support from the PMU.
	National Project Coordinator St. Kitts and Nevis	1 part-time project coordinator	36,000	1 - 3	The National Implementing organisation will select the most suitable candidate. Depending upon qualification, experience, etc., with support from the PMU.
1120	Administrative staff				
	Logistic Support (LS)	1 part time administrative assistant will be employed for of project operation, meetings, logistic and activities coordination and management Cost and 1 accounting assistant	83,032	1 - 3	Administrative and finance assistant.
1200	Consultants				
1201	International Consultants				
	Consultancy No.1	Development of a Regional Communication Strategy	25,000	1	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.2	Updating of the Regional IAS Strategy	18,000	1	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.3	Develop a “Training of Trainers” programme on measuring the economic impact of IAS. Provide on line support for participants to measure the economic impact of IAS on each island.	50,000	2 - 3	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.4	Bioclimatic modeling	40,000	2 - 3	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.

	Consultancy No.5	Determining a financial model for sustainably collecting funds for funding the management and control of common IAS problems	50,000	2 - 3	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.6	Monitoring and evaluation of biodiversity	20,000	3	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.7	Assessing the risk of IAS introduction via key pathways	25,000	1	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.8	Regional App and IAS identification guides 8	90,000	1 - 3	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.9	Building Capacity to undertake restoration following the management of IAS	60,000	3	CVs of 2 or 3 to experts or team will be reviewed by the PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
1202	National Consultants				
	<b>ANTIGUA AND BARBUDA</b>				
	Consultancy No.1	Development of national IAS strategy and action plan, Antigua and Barbuda	28,667	1 - 2	CVs of 2 or 3 to experts or team will be reviewed by a PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.2	Updating of IAS Legislation and protocol for Antigua and Barbuda	55,000	2 – 3	CVs of 2 or 3 to experts or team will be reviewed by a PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.3	Risk assessment of priority pathways	70,000	1 - 2	CVs of 2 or 3 to experts or team will be reviewed by a PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	<b>BARBADOS</b>				
	Consultancy No.5	Development of national IAS strategy and action plan, Barbados	28,667	1 - 2	CVs of 2 or 3 to experts or team will be reviewed by a PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	Consultancy No.6	Updating of IAS Legislation and protocol for Barbados	55,000	2 - 3	CVs of 2 or 3 to experts or team will be reviewed by a PMU. Depending upon qualification, experience,



					geographical distribution, etc., the consultant will be selected.
	Consultancy No.7	Risk assessment of priority pathways	70,000	1 - 2	CVs of 2 or 3 to experts or team will be reviewed by a PMU. Depending upon qualification, experience, geographical distribution, etc., the consultant will be selected.
	<b>ST. KITTS AND NEVIS</b>				
	Consultancy No.8	Development of national IAS strategy and action plan, St. Kitts and Nevis.	28,667	1 - 2	
	Consultancy No.9	Updating of IAS Legislation and protocol for St. Kitts and Nevis	55,000	2 - 3	
	Consultancy No.10	Risk assessment of Priority Pathways	70,000	1 - 2	
2300	Sub Contracts to Private Firms				
2301	Sub Contract to NGOs/private firms (for pilot site activities)				
	Pilot No.1	<u>Antigua and Barbuda</u> : Eradication of Invasive mammals in three offshore islands in Antigua and Barbuda and the implementation of a biosecurity plan for 14 offshore islands	253,098	1 - 3	Based on terms of reference, the costs associated in the implementation of the pilot sites include staffing, materials or other operational expenses. These costs will be controlled by the PMU, choosing the best options between price and quality, or the best proposal will be selected by the panel.
	Pilot No.2	<u>Barbados</u> : Increased stability of populations of endemic reptiles: Barbados leaf-toed gecko) and the Barbados threadsnake and hawksbill turtle nesting population, and indicator coral reef fish species at high biodiversity reef sites.	570,536	1 - 3	Based on terms of reference, the costs associated in the implementation of the pilot sites include staffing, materials or other operational expenses. These costs will be controlled by the PMU, choosing the best options between price and quality, or the best proposal will be selected by the panel.
	Pilot No.3	Validating best control practices for managing Vervet population towards the development of a sustainable control strategy	185,000	1 - 3	Based on terms of reference, the costs associated in the implementation of the pilot sites include staffing, materials or other operational expenses. These costs will be controlled by the PMU, choosing the best options between price and quality, or the best proposal will be selected by the panel.
4200	Non-expendable equipment				
4201	Non laboratory purchase				
	Non-expendable equipment	3 incinerators	39,999	1	CABI's procurement rules will apply in procuring. Procured internationally and shipped from the supplier directly to the three countries.
<b>GRAND TOTAL</b>			<b>2,310,644</b>		

Appendix 14: Checklist for Environmental and Social Issues  
UN ENVIRONMENT Environmental, Social and Economic Review Note (ESERN)

### I. Project Overview

Identification	<i>Insert Project ID# from Programme Framework Table</i>
Project Title	<i>Project preparation proposal for: Preventing the COSTS of IAS in Barbados and the OECS Countries.</i>
Managing Division	
Type/Location	<i>Regional; National</i>
Region	<i>Caribbean</i>
List Countries	<i>Antigua and Barbuda; Barbados; Dominic; Grenada; St. Kitts and Nevis; St. Lucia; and St. Vincent.</i>
Project Description	<i>Management of IAS: focus on preventing future IAS invasions by focusing on the high risk pathways while managing IAS in key ecosystems that are threatening native biodiversity.</i>
Estimated duration of project:	<i>36 months</i>
Estimated cost of the project :	<i>GEF Funding: 3,747,945 US dollars; co-finance 6,627,412 US dollars</i>

### II. Environmental Social and Economic Screening Determination

A. Summary of the Safeguard Risks Triggered			
Safeguard Standard Triggered by the Project	Impact of Risk <sup>3</sup> (1-5)	Probability of Risk (1-5)	Significance of Risk (L, M, H)
SS 1: Biodiversity, natural habitat and Sustainable Management of Living Resources	3	2	M
SS 2: Resource Efficiency, Pollution Prevention and Management of Chemicals and Wastes	2	1	L
SS 3: Safety of Dams	1	1	L
SS 4: Involuntary resettlement	1	1	L

<sup>3</sup> Refer to UN ENVIRONMENT Environment, Social and Economic Sustainability (ESES): Implementation Guidance Note to assign values to the Impact of Risk and the Probability of Risk to determine the overall significance of Risk (Low, Moderate or High).

SS 5: Indigenous peoples	1	1	L
SS 6: Labor and working conditions	1	1	L
SS 7: Cultural Heritage	1	1	L
SS 8: Gender equity	1	1	L
SS 9: Economic Sustainability	3	3	M
Additional Safeguard questions for projects seeking GCF-funding (Section IV)			

**B. ESE Screening Decision<sup>4</sup>** (Refer to the UN ENVIRONMENT ESES Framework (Chapter 2) and the UN ENVIRONMENT's ESES Guidelines.)

Low risk ☒ x      Moderate ☐ k      High ☐ risk      Additional information required ☐

**C. Development of ESE Review Note and Screening Decision:**

Prepared by: \_\_\_\_\_ Name: Naitram Ramnanan Date: \_July 24 2017\_\_\_\_\_

Safeguard Advisor: \_\_\_\_\_ Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Manager: \_\_\_\_\_ Name: \_Arne Witt\_\_\_\_\_ Date: \_\_\_\_\_

**D. Recommended further action from the Safeguard Advisor:** I agree that the project is likely to be in the moderate safeguard risk category since it is dealing with sensitive biodiversity dynamics in the ecosystem and economic uncertainty related to it. Science-based approach using the latest understanding and local traditional knowledge should be applied. The project stated that "UN Environment's Social and Environmental safeguards tool will be used to assess the possible impacts of the project on the participating countries, their communities, and environment." As the project manager already identified the safeguard risks, assessment should have been done during the project development phase. I would encourage the safeguard impact assessment is carried out for SS 1 and SS 9, among others, as early as possible.

The para 217 stated that the project has no negative impacts through the project intervention. While the intention is to bring environmental and social benefits, the project approach may involve inconvenient preconditions or bring unintended and indirect negative consequences. That is why we need precautionary approach throughout. I would suggest that the paragraph is modified.

<sup>4</sup> **Low risk:** Negative impacts negligible: no further study or impact management required.

**Moderate risk:** Potential negative impacts, but less significant; few if any impacts irreversible; impact amenable to management using standard mitigation measures; limited environmental or social analysis may be required to develop a ESEMP. Straightforward application of good practice may be sufficient without additional study.

**High risk:** Potential for significant negative impacts, possibly irreversible, ESEA including a full impact assessment may be required, followed by an effective safeguard management plan.

**Biodiversity aspect (SS1) :** The project identified some challenges such as “large border to land mass; difficult topography; large numbers of tourist arrivals; relatively high volume of trade; insufficient technical capacity and poor coordination among stakeholders”. Such issues within the rich bio-diverse environment are likely to bring some concerns over the SS1.

**Pesticides (SS2):** The project stated that integrated pest management programmes are likely to be applied to control the PHMB and agricultural pest and diseases. Control of invasive plants in Barbados requires use of chemical pesticides. Training on how to handle pesticides should be included in the activities of the project.

**Gender (SS 8):**

- Statements like “taking a gender perspective on invasive species can improve understanding of the impacts, increase the effectiveness of invasive species prevention and management and contribute to social equality”; “reducing invasive species would more immediately impact women”; “tourism will be negatively affected by IAS and one gender more than the others” are not well substantiated. Such statements look vague and should be re-written in a more concrete and solid manner if they are to be taken seriously.

- The project plans “to collect and disaggregate the gender in its reporting and ensure where possible that project implementation is gender sensitive.” General understanding on gender needs, perspectives, and engagements and so on should be analysed before collecting data. Such initial background research will help you gather meaningful and useful sex disaggregated data. Data can only be useful as long as one knows clearly on what, why and how to collect and use them.

**Economic Sustainability (SS 9):** IAS are likely to affect important economic sectors, such as agriculture (both crops and livestock); fisheries; forestry; and tourism. There is lack of information on the impact of IAS on biodiversity and the economies of these countries. The project also mentioned that the Green Vervet Monkey is considered to be tourist attraction. IAS are often and continuously introduced by some who consider them profitable. IAS related penalties haven’t been effective to curve the IAS introduction. As it may be for profits for minority number of people while majority of community may suffer, economic justice and equity should be factored in the project approach for the long-term sustainability of the project outcomes.

Also, it is not clear if tourism would be negatively affected if biodiversity is lost. Prices, vicinity to North America, resort facilities, kind of activities and services provided may also affect tourism. Without any data, this point will be difficult to argue. Therefore, the project may confront some resistance based on economic winners and losers. Careful analysis of diverse stakeholders and their needs and roles need to be mapped out for effective project execution

### III. ESES Principle and Safeguard checklist

(Section III and IV should be retained in UN ENVIRONMENT)

<b>Precautionary Approach</b>
The project will take precautionary measures even if some cause and effect relationships are not fully established scientifically and there is risk of causing harm to the people or to the environment.
<b>Human Rights Principle</b>
The project will make an effort to include any potentially affected stakeholders, in particular vulnerable and marginalized groups; from the decision making process that may affect them.
The project will respond to any significant concerns or disputes raised during the stakeholder engagement process.
The project will make an effort to avoid inequitable or discriminatory negative impacts on the quality of and access to resources or basic services, on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups. <sup>5</sup>

Screening checklist	Y/N/ Maybe	Comment
<b>Safeguard Standard 1: Biodiversity, natural habitat and Sustainable Management of Living Resources</b>		
Will the proposed project support directly or indirectly any activities that significantly convert or degrade biodiversity and habitat including modified habitat, natural habitat and critical natural habitat?	N	
Will the proposed project likely convert or degrade habitats that are legally protected?	N	

<sup>5</sup> 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.

Will the proposed project likely convert or degrade habitats that are officially proposed for protection? (e.g.; National Park, Nature Conservancy, Indigenous Community Conserved Area, (ICCA); etc.)	N	
Will the proposed project likely convert or degrade habitats that are identified by authoritative sources for their high conservation and biodiversity value?	N	
Will the proposed project likely convert or degrade habitats that are recognized-including by authoritative sources and /or the national and local government entity, as protected and conserved by traditional local communities?	N	
Will the proposed project approach possibly not be legally permitted or inconsistent with any officially recognized management plans for the area?	N	
Will the proposed project activities result in soils deterioration and land degradation?	N	
Will the proposed project interventions cause any changes to the quality or quantity of water in rivers, ponds, lakes or other wetlands?	N	
Will the proposed project possibly introduce or utilize any invasive alien species of flora and fauna, whether accidental or intentional?	N	All the contrary the project will support countries in establishing mechanisms to manage and control IAS
<b>Safeguard Standard 2: Resource Efficiency, Pollution Prevention and Management of Chemicals and Wastes</b>		
Will the proposed project likely result in the significant release of pollutants to air, water or soil?	N	
Will the proposed project likely consume or cause significant consumption of water, energy or other resources through its own footprint or through the boundary of influence of the activity?	N	
Will the proposed project likely cause significant generation of Green House Gas (GHG) emissions during and/or after the project?	N	

Will the proposed project likely generate wastes, including hazardous waste that cannot be reused, recycled or disposed in an <u>environmentally sound and safe manner</u> ?	N	
Will the proposed project use, cause the use of, or manage the use of, storage and disposal of hazardous chemicals, including pesticides?	N	
Will the proposed project involve the manufacturing, trade, release and/or use of hazardous materials subject to international action bans or phase-outs, such as DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Convention on Persistent Organic Pollutants or the Montreal Protocol?	N	
Will the proposed project require the procurement of chemical pesticides that is not a component of integrated pest management (IPM) <sup>6</sup> or integrated vector management (IVM) <sup>7</sup> approaches?	Maybe	For the control of invasive plants in Barbados
Will the proposed project require inclusion of chemical pesticides that are included in IPM or IVM but high in human toxicity?	N	
Will the proposed project have difficulty in abiding to FAO's International Code of Conduct <sup>8</sup> in terms of handling, storage, application and disposal of pesticides?	N	
Will the proposed project potentially expose the public to hazardous materials and substances and pose potentially serious risk to human health and the environment?	N	
<b>Safeguard Standard 3: Safety of Dams</b>		
Will the proposed project involve constructing a new dam(s)?	N	
Will the proposed project involve rehabilitating an existing dam(s)?	N	
Will the proposed project activities involve dam safety operations?	N	

<sup>6</sup> "Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms

<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/en/>

<sup>7</sup> "IVM is a rational decision-making process for the optimal use of resources for vector control. The approach seeks to improve the efficacy, cost-effectiveness, ecological soundness and sustainability of disease-vector control. The ultimate goal is to prevent the transmission of vector-borne diseases such as malaria, dengue, Japanese encephalitis, leishmaniasis, schistosomiasis and Chagas disease." ([http://www.who.int/neglected\\_diseases/vector\\_ecology/ivm\\_concept/en/](http://www.who.int/neglected_diseases/vector_ecology/ivm_concept/en/))

<sup>8</sup> Find more information from [http://www.fao.org/fileadmin/templates/agphome/documents/Pests\\_Pesticides/Code/CODE\\_2014Sep\\_ENG.pdf](http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/CODE_2014Sep_ENG.pdf)

<b>Safeguard Standard 4: Involuntary resettlement</b>		
Will the proposed project likely involve full or partial physical displacement or relocation of people?	N	
Will the proposed project involve involuntary restrictions on land use that deny a community the use of resources to which they have traditional or recognizable use rights?	N	
Will the proposed project likely cause restrictions on access to land or use of resources that are sources of livelihood?	N	But may improve access by control of Invasive animals.
Will the proposed project likely cause or involve temporary/permanent loss of land?	N	
Will the proposed project likely cause or involve economic displacements affecting their crops, businesses, income generation sources and assets?	N	
Will the proposed project likely cause or involve forced eviction?	N	
Will the proposed project likely affect land tenure arrangements, including communal and/or customary/traditional land tenure patterns negatively?	N	
<b>Safeguard Standard 5: Indigenous peoples<sup>9</sup></b>		
Will indigenous peoples be present in the proposed project area or area of influence?	N	
Will the proposed project be located on lands and territories claimed by indigenous peoples?	N	
Will the proposed project likely affect livelihoods of indigenous peoples negatively through affecting the rights, lands and territories claimed by them?	N	
Will the proposed project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	N	
Will the project negatively affect the development priorities of indigenous peoples defined by them?	N	
Will the project potentially affect the traditional livelihoods, physical and cultural survival of indigenous peoples?	N	

<sup>9</sup> Refer to the Toolkit for the application of the UN ENVIRONMENT Indigenous Peoples Policy Guidance for further information.



Will the project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	N	
<b>Safeguard Standard 6: Labor and working conditions</b>		
Will the proposed project involve the use of forced labor and child labor?	N	
Will the proposed project cause the increase of local or regional un-employment?	N	
<b>Safeguard Standard 7: Cultural Heritage</b>		
Will the proposed project potentially have negative impact on objects with historical, cultural, artistic, traditional or religious values and archeological sites that are internationally recognized or legally protected?	N	
Will the proposed project rely on or profit from tangible cultural heritage (e.g., tourism)?	N	
Will the proposed project involve land clearing or excavation with the possibility of encountering previously undetected tangible cultural heritage?	N	
Will the proposed project involve in land clearing or excavation?	N	
<b>Safeguard Standard 8: Gender equity</b>		
Will the proposed project likely have inequitable negative impacts on gender equality and/or the situation of women and girls?	N	
Will the proposed project potentially discriminate against women or other groups based on gender, especially regarding participation in the design and implementation or access to opportunities and benefits?	N	
Will the proposed project have impacts that could negatively affect women's and men'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?	N	
<b>Safeguard Standard 9: Economic Sustainability</b>		
Will the proposed project likely bring immediate or short-term net gain to the local communities or countries at the risk of generating long-term economic burden (e.g., agriculture for food vs. biofuel; mangrove vs. commercial shrimp farm in terms of fishing, forest products and protection, etc.)?	N	
Will the proposed project likely bring unequal economic benefits to a limited subset of the target group?	N	

#### IV. Additional Safeguard Questions for Projects seeking GCF-funding

<b>Community Health, Safety, and Security</b>			
Will there be potential risks and negative impacts to the health and safety of the Affected Communities during the project life-cycle?			
Will the proposed project involve design, construction, operation and decommissioning of the structural elements such as new buildings or structures?			
Will the proposed project involve constructing new buildings or structures that will be accessed by public?			
Will the proposed project possibly cause direct or indirect health-related risks and impacts to the Affected Communities due to the diminution or degradation of natural resources, and ecosystem services?			
Will the proposed project activities potentially cause community exposure to health issues such as water-born, water-based, water-related, vector-borne diseases, and communicable diseases?			
In case of an emergency event, will the project team, including partners, have the capacity to respond together with relevant local and national authorities?			
Will the proposed project need to retain workers to provide security to safeguard its personnel and property?			
<b>Labor and Supply Chain</b>			
Will UN ENVIRONMENT or the implementing/executing partner(s) involve suppliers of goods and services who may have high risk of significant safety issues related to their own workers?			

## **Appendix 15: Tracking Tools** (separate file)

## Appendix 16.1: Antigua and Barbuda Pilot Projects

### Country: Antigua & Barbuda

**Pilot Project 1:** Strengthening biosecurity on Redonda and other high priority offshore islands

**Species targeted:** *Rattus rattus* (black rat), *Herpestes javanicus* (small Asian mongoose), *Casuarina equisetifolia* (casuarina, Australian pine)

Table 1: Key Species found within the Target Islands (Conservation priority)

Status	Species	How affected by targeted Species
Critically Endangered (IUCN)	<i>Alsophis antiguae</i> (Antiguan racer)	Predation (mongoose, rats), depletion of lizard prey (mongoose, rats)
	<i>Pholidoscelis atrata</i> (Redonda ground lizard)	Predation (rats)
	<i>Anolis nubilus</i> (Redonda tree lizard)	Predation (rats)
	<i>Sphaerodactylus</i> sp. nov. (Redonda pygmy gecko)	Predation (rats)
	<i>Eretmochelys imbricata</i> (hawksbill turtle)	Predation on eggs and hatchlings (mongoose, rats)
Vulnerable (IUCN)	<i>Dendrocygna arborea</i> (West Indian Whistling-Duck)	Predation on eggs (rats)
	<i>Patagioenas leucocephala</i> (White-crowned pigeon)	Predation on eggs (rats)
Globally Significant and Regionally Important Bird Species	<i>Sula dactylatra</i> (Masked Booby)	Predation on eggs and young (rats)
	<i>Sula sula</i> (Red-footed booby)	Predation on eggs and young (rats)
	<i>Sula leucogaster</i> (Brown Booby)	Predation on eggs and young (rats)
	<i>Fregata magnificens</i> (Magnificent Frigate Birds)	Predation on eggs and young (rats)
	<i>Phaethon aethereus</i> (Red-billed tropicbird)	Predation on eggs and young (rats)
	<i>Onychoprion fuscatus</i> (Sooty Tern)	Predation on eggs and young (rats)

**Pilot (Target island) sites:** Redonda, Green Island, Smith Island, and Maiden Island (West).



The once-forested island of Redonda in 2016 (Jeremy Holden, FFI-RRP)



Great Bird Island, Galley Islands and Rabbit Island, rat-free since the 1990s (J. Daltry FFI-OICP)

### **Synopsis:**

At the heart of the Lesser Antilles, Antigua & Barbuda has long been a major hub for trade. With the movements of people and cargo, invasive alien species have spread throughout this nation and, from here, to other countries across the Eastern Caribbean. Among the most invasive and damaging of these species are black and brown rats, Asian mongooses, feral goats, and a variety of exotic plants including casuarina, neem and fever grass. Its extensive coastal waters have not been spared, with rapacious lionfish having invaded during the past decade and Broadleaf Seagrass which was first discovered off Grenada in 2002.

The primary goal of this pilot project is to advance the conservation of four islands and islets that support many of Antigua & Barbuda's most endangered wildlife. The target islands range from Green Island— one of the more attractive and popular offshore islands for tourism and recreation— to Redonda— the country's most rugged and least accessible island. Together, these islands represent two Important Bird Areas, two Key Biodiversity Areas and at least one Alliance for Zero Extinction site. They support some of the most important seabird colonies in the Caribbean and encompass most of the ranges of at least nine nationally endemic terrestrial reptile species (five of them Critically

Endangered, including the iconic Antiguan racer snake and Redonda ground lizard), the globally threatened West Indian whistling duck, nationally endemic invertebrates, rare and regionally endemic plants, and the foraging and nesting grounds of three globally threatened sea turtle species.

Considerable progress has already been made on many of these islands to eliminate invasive alien rats, mongooses, goats and certain plants, but preventing incursions is a chronic challenge, especially in light of the rising numbers of visitors and boat traffic. The pilot will therefore not only eradicate IAS from at least three important islands (Green Island, Smith Island and Maiden West Island) but leave in place more effective and robust biosecurity (Protection of biological resources from foreign or invasive species) protocols and capacity to prevent future (re)invasions by species that threaten native biodiversity on Redonda and the aforementioned islands.

In particular, note must be made of the Redonda Restoration Programme (RRP) which has been undertaken by Fauna & Flora International (FFI) in conjunction with the Environmental Awareness Group (EAG) and the Department of Environment (DoE). The implementation phase began in October 2016, and to date has been successful in the eradication of rats (estimated population 6,000) and the removal of feral goats (estimated population 65).

### **Background:**

Antigua & Barbuda has over 30 uninhabited offshore islands of global biodiversity importance. Of the four islands targeted by this project, three (Green Island, Maiden Island West and Smith Island) are within a few miles of the coast of Antigua, with the exception of Redonda, which is located 35 miles South-West of Antigua. They are combined into the same proposed pilot project because they are threatened by the same suite of invasive species, and the same organizations and individuals are involved in tackling IAS and conserving their endangered biodiversity. Since 1995, Antiguan organizations and their international partners have seen much success in restoring 15 offshore islands around Antigua by eradicating rats and other harmful invasive alien mammals (see Table 2 below). This has resulted in an exponential increase in birdlife and other fauna and flora, which has in turn led to most of this area becoming formally protected as part of the North East Marine Management Area (NEMMA). The only pilot islands that are not yet formally Protected Areas are Maiden West (a small privately owned island off Antigua's West coast) and Redonda. These islands, if protected, would not become Protected Areas under the NEMMA, but instead be most likely designated under the Environmental Protection and Management Act 2015 or other relevant legal instrument (one example being the Protected Area System Plan for Antigua and Barbuda, which is currently being developed under a separate GEF-6 project: *The Path to 2020*).

Table 2: List of 16 of Antigua and Barbuda's offshore islands that have been subject to IAS eradications, re-invasions and/or are work sites targeted under this project (also bolded). Without exception, all the IAS work on these islands was implemented by staff from the organizations involved in the present project (EAG, FFI, and Government of Antigua & Barbuda).

Offshore Island	Year IAS Eradicated	Re-invaded by IAS mammals?	Eradication of IAS planned in this project	Area (hectares)
Great Bird	1995 (rats), 2004 (neem trees), 2008 (chickens)	No	No	8.40
Galley Major	1995 (rats)	No	No	0.59
Galley Minor	1995 (rats)	No	No	0.17
Rabbit Island	1998 (rats)	No	No	2.14
Redhead	1998 (rats)	No	No	0.91
Lobster	1998 (rats)	No	No	0.40
Lobster Extension	1998 (rats)	No	No	0.06

<b>Maiden (West)</b>	<b>1998 (rats)</b>	<b>Yes - c. 2015 (rats)</b>	<b>Yes</b>	<b>1.00</b>
Maiden	1999 (rats)	Yes - 2001 (rats)	No	8.33
<b>Green</b>	<b>2001 (rats)</b>	<b>Yes - 2016 (rats)</b>	<b>Yes</b>	<b>45.19</b>
York	2007 (rats), 2009 (goats)	No	No	6.99
Pelican	2014 (rats, mongooses)	Yes - 2016 (rats)	No (unless additional funding secured)	13.36
Guardhouse	2014 (rats)	No	No	1.22
Codrington	2014 (rats and mongooses)	No	No	4.50
Redonda	2017 (rats and goats)	No	No	66.68
<b>Smith</b>	<b>N/A</b>	<b>N/A (rats still present)</b>	<b>Yes</b>	<b>1.22</b>

### Offshore islands of Antigua

Islands within and NEMMA and the outlying Maiden Island (West) are forested, low-lying limestone islands that hug Antigua's coastline. They form the Offshore Islands Important Bird Area (AG006) and a Key Biodiversity Area, spread across 9,021 hectares of islands and sea. Redonda is also designated an Important Bird Area (AG001), it is the most severely degraded of all the islands and has been identified as a high priority island within the region in need of restoration.

Terrestrial species of particular note here include:

- Antigua racer (Critically Endangered, but has increased from 50 to over 1,100 since 1995 thanks to the removal of rats and mongooses)
- Antigua ground lizard (*Pholidoscelis griswoldi*) (Near Threatened)
- Antigua spotted tree lizard (*Anolis leachii*)
- Antigua pygmy gecko (*Sphaerodactylus elegantulus*)
- Caribbean brown pelican *Pelecanus occidentalis occidentalis* (Regionally Endangered, but increasing in the project area)
- Least Tern (*Sternula antillarum*) (Regionally Vulnerable)
- West Indian whistling duck (Globally Vulnerable—Antigua & Barbuda contains the world's second largest population, with dozens of pairs on the offshore islands)
- White-crowned pigeon (Globally Near-threatened—Now common on offshore islands)

The islands also have important nesting beaches for sea turtles, especially the hawksbill turtle (Critically Endangered). They support a number of regionally and globally threatened vegetation types, including Leeward Islands Dry Forests (WWF Ecoregion NT0220: Critical/ Endangered), Leeward Islands Xeric Shrub (NT1310: Vulnerable), Lesser Antilles Mangroves (NT1416: Critical/ Endangered).

Even the smallest vegetated islands around Antigua have been invaded by rats, and many of them have also been colonised by mongooses, goats, neem trees, fire ants and other harmful aliens. The Offshore Islands Conservation Programme—a joint initiative of the Government of Antigua & Barbuda, Environmental Awareness Group, Fauna & Flora International and Durrell Wildlife Conservation Trust—has successfully removed rats and other invasive mammals from 15 islands to date (see Table 2), and has established a network of permanent bait stations to help detect and prevent incursions by rodents. While the biosecurity system has successfully halted several known incursions by rats (e.g. to Great Bird Island, 1998; York Island, 2015), it has not been 100% effective.

There is a need to strengthen the biosecurity systems that protect these globally important islands. Since Green Island and Maiden Island have been reinvaded by black rats, putatively carried on by tourist or fishing boats. This is why the pilot project is so timely and important: to strengthen the biosecurity systems that protect these important Key Biodiversity Areas.

## Redonda

Redonda is a rugged volcanic island that rises almost 300 meters above the sea, with a planar area of 58 hectares and a surface area of more than 65 hectares. It forms the epicentre of an Important Bird Area (AG001) and Key Biodiversity Area that extends to 760 hectares. Although a dependency of Antigua since 1967, Redonda is closer to Montserrat (23 km, 14 miles) and Nevis (32 km, 20 miles). The national land use plan of Antigua & Barbuda, approved in 2011, proposed the island of Redonda should become a new Environmental Protection Area to conserve birds and other wildlife, but this protected area is yet to be officially designated.

Redonda supports its own endemic fauna, including at least three endemic reptile species, all of which have been evaluated by the IUCN Snakes and Lizards Red-listing Authority as Critically Endangered due to invasive alien mammals. These are the Redonda ground lizard, Redonda tree lizard, and an undescribed species of pygmy gecko (*Sphaerodactylus* sp. nov). Historical paintings clearly show the island covered by dry woodland and swarming with birds before it was mined for its seabird guano. After the outbreak of World War 1, when the mining community abandoned the island, it continued to be deforested and desertified by the combined impacts of black rats and feral goats. So severe has been its vegetation loss, that even the goats have been subjected to starvation. The sediment and rocks falling from the islands eroded slopes have negatively impacted the surrounding reefs. Monitoring of seabirds, reptiles and plants confirmed an ongoing decline in the abundance and diversity of native species. A number of species have already gone extinct, including an endemic subspecies of burrowing owl.

In 2017, an urgent operation to eradicate the rats and remove the goats was conducted by the Government of Antigua & Barbuda and the EAG with human resources and technical support from FFI, WMIL and Caribbean Helicopters Ltd (the only company able to provide transport to Redonda). This work appears to have been successful, but further surveys are scheduled to verify no mammals remain. The island can be safely accessed only by air, and fortunately the helicopter company is very supportive of this work and willing to cooperate in preventing the introduction of invasive alien species by offering reduced airfare rates for restoration activities on the island. It is especially imperative to prevent the introduction of invasive plants before the native species have been able to reclaim the denuded island. The only known casuarina tree on Redonda was killed in 2017 to prevent this toxic Australian species from reproducing, but there remains a risk of pigeons and bats bringing the seeds of this and other common exotic plants from other nearby islands. This has been seen on other offshore islands around Antigua (e.g. the spread of neem seeds to Great Bird Island and Green Island via bird droppings). A biosecurity plan is under development by the Redonda Restoration Programme (RRP) but will need to be reviewed and enhanced as part of the pilot project to ensure the fuller and lasting recovery of this unique island ecosystem.

Redonda supports many rare and unique animals and plants of both national and global importance. The island has been internationally designated as an Important Bird Area (IBA) due to its globally significant breeding colonies of seabirds. It is one of the largest Booby nesting sites in the region, with three species (Brown, Masked and Red-Footed) calling Redonda their home. Also found on the island are populations of Magnificent Frigatebirds, Peregrine Falcons, and Red-Billed Tropicbirds.

Deep waters around Redonda form important feeding grounds for pelagic fish, including tuna and sharks. The shallow waters support marine ecosystems inclusive of coral reefs and seagrass beds, which are foraging grounds for the endangered Green (*Chelonia mydas*), critically endangered Hawksbill (*Eretmochelys imbricata*) sea turtles and Caribbean Queen Conch (*Strombus gigas*).

Following the rat eradication and feral goat relocation by the RRP, immediate changes have become apparent on Redonda. Due to predation by the rats, landbirds previously found the island unfavourable. Since April 2017, landbird sightings have included species such as Zenaida Doves (*Zenaida aurita*), Banana quits (*Coereba flaveola*), Barn Swallows (*Hirunda rustica*), Caribbean Elaenia (*Elaeni martinica*) and Pearly Eyed Thrasher (*Margarops fuscatus*). For seabirds, recent acoustic records of Audubon's Shearwater (*Puffinus lherminieri*) are a good sign of the island's recovery, as more birds make Redonda their home.



The pilot project will be conducted in collaboration with the local NGO Environmental Awareness Group (EAG), the international NGOs Fauna & Flora International (FFI), Durrell Wildlife Conservation Trust (Durrell), various private companies (e.g. Wildlife Management International Ltd [WMIL], Caribbean Helicopters Ltd and local tour operators), and the following government agencies: Department of Environment, Fisheries Division, Department of Agriculture (notably including the Forestry Unit and the Plant Protection Unit), Ministry of Education and National Parks Authority.

## **Baseline Data**

### **FAUNA:**

#### ***Redonda:***

##### *Invasives:*

A conservative estimate from 2014 of at least 5,500 black rats, around 65 feral goats, and 1 casuarina tree. Current population of black rats and feral goats as of May 2017: 0

##### *Native:*

Baseline surveys in 2014 recorded

- Peregrines (1 pair)
- Zenaida doves (3 pairs)
- Brown Boobies ( $\geq 774$  pairs)
- Masked Boobies ( $\geq 164$  pairs)
- Red-footed Boobies ( $> 150$  pairs)
- Magnificent Frigate-birds ( $\geq 119$  pairs)

Plus an unquantified number of Red-billed Tropicbirds, Brown Noddies, Bridled Terns and Audubon's Shearwaters. No other bird species present.

Lizard densities were:

- *Pholidoscelis atrata* 147/ha
- *Anolis nubilus* 771/ha
- (no counts were done on other reptile species of the Redonda Pygmy Gecko (*Sphaerodactylus* sp. and *Hemidactylus* sp.).

#### ***Offshore Islands (Green Island, Smith Island, Maiden Island West)***

##### *Invasives:*

No estimates of population sizes, but OICP monitors presence/ absence. As of end 2016:

- Black rats present on Green Island, Pelican Island, Smith Island and Maiden Island (West).
- Black rats absent from the rest of the islands (York Island, Great Bird Island, Galley islands, Rabbit Island, Redhead Island, Lobster Island, Codrington Island, Guardhouse island).

##### *Native:*

Baseline counts of seabirds and selected land birds on all the offshore islands combined in 2010 and 2011 were:

- Laughing gulls (2,274 pairs)
- Brown noddies (412 pairs)
- Brown pelicans (29 pairs)
- Bridled terns (283 pairs)
- Least terns (10 pairs)
- Roseate terns (68 pairs)
- Royal tern (8 pairs)
- Sooty terns (566 pairs)
- Red-billed tropicbirds (65 pairs)
- West Indian whistling duck (13 pairs)
- White crowned pigeons (86 pairs).

Baseline lizard densities for selected islands in 2011 were:

- *Anolis wattsi* (Green Island 3,779/ha; 91/ha; Smith Island no data; Maiden Island (West) 1,193/ha)
- *Anolis leachi* (Green Island 44/ha; Smith Island no data; Maiden Island (West) 178/ha)
- *Pholidoscelis griswoldi* (Green Island 111/ha; Smith Island no data; Maiden Island (West) zero)

In 2016, the population of Antiguan racers totaled 1,100 individuals on Green, Great Bird, York and Rabbit Island.

## FLORA:

Vegetation Surveys in 2012 by Lindsay, Thomas and Cooper provided the following information:

### *Invasives*

- *Scaevola sericea* (Green Island)
- *Leucaena leucocephala* (Green Island)
- *Cleome viscosa* (Redonda)

### *Natives*

- *Agave karrato* (all islands)
- *Argusia gnaphalodes* (Green Island)
- *Scaevola plumieri* (Green Island)
- *Strumpfia maritima* (Green Island)

Vegetation Survey in 2011 by Pratt and Thomas on Redonda provided the following information:

### *Native*

- *Phlebodium aureum*
- *Pityrogramma chrysophylla*
- *Agave cf. karatto synmontserratensis*
- *Tillandsia recurvate*
- *Cyperus spp.*
- *Ageratum conyzoides*
- *Wedelia cf. calycina*
- *Tournefortia cf. volubilis*
- *Melocactus intortus*
- *Opuntia dillenii*
- *Opuntia cf. triacantha*
- *Ficus citrifolia*

### *Invasives*

- *Cleome gynandra*
- *Cleome viscosa*
- *Casuarina equisetifolia*
- *Boerhavia coccinea*
- *Argemone mexicana*.

Further surveys will be conducted throughout the pilot project to evaluate the impacts of invasive alien species and their removal on native biodiversity, to monitor the efficacy of the biosecurity programme, and to identify other invasive alien species and/or issues that need to be addressed in future work programs.

## Current Situation

At the onset of the project, invasive rats will be eradicated from three priority offshore islands using a tried-and-tested methodology that has been successfully used to eradicate black rat populations from 15 islands (Great Bird, York, Rabbit, Redhead, Galley Major, Galley Minor, Lobster, Codrington, Lobster Extension, Guardhouse, Green, Pelican, Maiden (West), Maiden and Redonda which

represents 202 hectares) around Antigua, with the most recent being the island of Redonda. However, there have been re-invasions on Green, Pelican, Maiden and Maiden West islands. It has been found over the years that these high traffic areas need more frequent monitoring for signs of invasive species. The target islands will be Green Island, Smith and Maiden (West), totaling 47 hectares. The eradication of rats from Pelican island will be dependent on the availability of funds after successful eradications and biosecurity measures on the four target islands. In addition, all of the other islands named in this proposal were cleared of rats and, when present, other invasive mammals between 1995 and 2017, thus providing a remarkably valuable time series to show how native Caribbean biodiversity responds to the removal of these pressures.

Existing biosecurity protocols to detect and prevent IAS introductions will be reviewed and expanded at the start of the project, to address not only incursions by rats but other harmful alien taxa. Local government and NGO staff and volunteers (~20 Individuals) will be trained and equipped to implement the upgraded biosecurity system to prevent incursions on Redonda and the other priority offshore islands. Standardised monitoring of birds, reptiles, plants and invertebrates on the four target islands will clearly demonstrate the impacts of removing IAS. Additionally, awareness campaigns for stakeholders (tour operators, educational institutions, community organizations, campers, etc.) will be utilized to increase the appreciation and recognition of local wildlife/species and IAS, and measures available to prevent further IAS incursions. The pilot project will also advance the protection of Redonda, and incorporate the new biosecurity system into its long-term management aims, staffing structure and budget.

### **Priority Species for Management:**

#### ***Rattus rattus* (black rat, ship rat)**

Black rats first appeared in the Caribbean in the mid-17<sup>th</sup> century and spread to every vegetated island around Antigua & Barbuda, including Redonda. They have been successfully removed from most of the offshore islands, but are easily capable of reinvading, spread by boats and potentially swimming up to one kilometre between islands. The Global Invasive Species Database reports their impact as follows:

*A native of the Indian sub-continent, the ship rat (Rattus rattus) has now spread throughout the world. It is widespread in forest and woodlands as well as being able to live in and around buildings.... The ship rat has directly caused or contributed to the extinction of many species of wildlife including birds, small mammals, reptiles, invertebrates, and plants, especially on islands. Ship rats are omnivorous and capable of eating a wide range of plant and animal foods.... The ship rat is most frequently identified with catastrophic declines of birds on islands... Both R. rattus and R. norvegicus transmit the plague bacterium Yersinia pestis via fleas in certain areas of the world.*

The species is known to be a carrier of multiple diseases and pathogens, many of which are severe health hazards for humans. The persistence of typhus in the Caribbean is attributed to local rat populations. Brown rats are also present in Antigua & Barbuda, but although they are better swimmers, they appear to be less successful than black rats at colonising offshore islands. In any case, methods to eradicate and control black rats are often effective for both species.

#### ***Herpestes javanicus* (small Asian mongoose, small Indian mongoose)**

Mongoosees were deliberately introduced to Antigua and, many other Caribbean islands, in the late 19<sup>th</sup> century in an effort to curb the populations of invasive rats that were damaging sugarcane plantations. Mongoosees have not invaded Barbuda (where their import is prohibited), but have colonised some of the larger offshore islands, likely with human assistance. The Global Invasive Species Database reports their impact as follows:

*Mongoosees are diurnal generalist carnivores that thrive in human-altered habitats. Predation by mongoose has had severe impacts on native biodiversity leading to the decline and extirpation of native mammals, birds, reptiles, and amphibians... The small Indian mongoose has had a major impact on native species in the areas where it has been introduced. Mongoosees have also been implicated in the decline of many other bird, reptile and mammal species. Mongoosees also eat invertebrates but the impact of this predation on invertebrate populations has not been studied. In addition, mongoosees are carriers of human and animal diseases, including rabies and human Leptospira bacterium.*

The mongoose is blamed for the extirpation of the Critically Endangered Antiguan racer, which now lives only on mongoose-free offshore islands. Mongooses also prey heavily on the eggs and young of the Critically Endangered hawksbill turtles.

### ***Casuarina equisetifolia* (Casuarina, Australian pine)**

Native to tropical Asia and Oceania, casuarina trees are quite widespread in Antigua & Barbuda, and have been recorded on Redonda (where a single known adult tree was removed in 2017). The Global Invasive Species Database reports their impact as follows:

*Casuarina equisetifolia is a fast-growing plant which produces heavy shade and a thick blanket of leaves and fruits beneath it, reducing habitat value. Its dense monoculture thickets displace native dune and beach plant species. Once established, C. equisetifolia alters light, temperature, soil chemistry and hydrology of the habitats it invades... C. equisetifolia displaces native beach vegetation that provide critical wildlife habitat for threatened and endangered plant and animal species. C. equisetifolia forms dense stands and destroys reptile breeding sites in the Everglades National Park... C. equisetifolia can exhaust the moisture in the soil and lower the water table of the area... C. equisetifolia can facilitate beach erosion by displacing deep-rooted vegetation. Unlike native vegetation C. equisetifolia has a shallow root system and tends to uproot and topple during high winds, posing a significant hazard... C. equisetifolia produces allelopathic compounds that inhibit growth of other plants... The genus Casuarina poses a problem to humans as its pollen is a source of respiratory irritation and allergies.*

The seeds of this tree are dispersed by birds, water and wind. Even one young tree can produce thousands of seeds, and seeds in the seed bank can remain fertile for up to one year.

### **Methodology:**

#### ***Eradication of invasive mammals from three priority offshore islands using best eradication strategies***

##### *Rattus rattus* (black rat, ship rat) Eradication Plan

Written Operational Plans for eradicating rats will be peer-reviewed and finalised for the target islands: Green, Smith and Maiden West islands. The operations will ideally be carried out during the height of the dry season (January through May), when rats have fewer natural foods available, but the precise timing will be discussed with the landowners in advance.

This project will use Klerat, a waxy grain-based bait containing the anticoagulant brodifacoum and the bittering agent Bitrex. This formulation has been successfully used to eradicate rats from more than 20 Caribbean islands to date. While highly effective against rats, it is completely harmless to plants and invertebrates and unpalatable to the native vertebrates in the project sites. It can therefore be used with negligible risk, but warning signs must be posted to advise visitors to keep their pets away and not to tamper with the bait. Any risk of secondary poisoning will be removed by collecting any rat carcasses above ground (although most rats will die underground). To distribute the bait to all parts of each island, the project team will likely use a combination of bait stations distributed at 30-40 metre intervals (the recommended maximum distance for *Rattus rattus* eradications, taking into account each rat typically travels more than 50 metres to forage) and hand-broadcasting. Aerial baiting was an additional method successfully used on Redonda. The feasibility will be explored for some of this project's islands targeted for eradication. Bait uptake will be monitored daily and bait replenished for at least five weeks or until no rat sign is detected. Once bait has been deployed for at least two weeks, the field team will deploy a range of monitoring tools, including tracking plates, camera traps, hair traps and non-toxic scented wax and soap, to detect whether and where any rodents remain.

Approximately 12 months after the operation, another full island-wide survey will be conducted to verify no rats remain (it being accepted best practice to wait at least one year before declaring an island to be rat-free; or two years in the case of temperate environments). Ongoing surveillance for any rodents on the treated islands will also be a key part of the biosecurity system (below). The rat eradication operations will be conducted by 6–12 persons, including those who will be responsible for long term biosecurity (below).

### *Herpestes javanicus* (small Asian mongoose, small Indian mongoose) Eradication Plan

In addition to a peer-reviewed rat eradication plan, a mongoose eradication plan will also be written up, peer-reviewed by invasive species specialists and finalised. Mongoose eradications will likely be carried out during the grid-cutting phase of the restoration operation and before any baiting for rats is undertaken. This is best to be done during the dry season (January through May).

During this phase, Doc 250 predator traps will be loaded in live traps (Tomohawk and/or Havahart traps approximately 60 cm x 20 cm x 20 cm.) on the grid-lines being cut across the islands. Doc 250 predator traps have been identified by the New Zealand National Animal Welfare Advisory Committee as the most humane means of euthanizing animals such as these.

Due to the size of the three target islands, if 20 traps are set every day, it is quite likely that at least 80% of the mongooses will be caught within the first week (Daltry, J.C. Bell, E.A., Lawrence, S.N. & Havery, S.J. (2014)) The aim is to eradicate the entire population of mongoose on the target islands (where applicable – The target islands may not have mongooses present). Monitoring for mongooses, which will be conducted to determine the need for deploying traps, can employ several different methods including the use of tracking plates (these are inked plates within a tunnel which show up the prints of any animal that walks through the tunnel) to show mongoose footprints, night vision motion cameras, and other material such as scented wax. Trapping should continue for at least 3 weeks and until no further sign of mongoose is evident.

All volunteers should be briefed on the setting and handling of the traps. Traps should be laid in pairs back to back and in shady areas. At least 4 persons should be tasked with checking traps on the larger Green Island, and two persons for the smaller Smith and Maiden Islands. All trap locations should be marked with flagging tape and GPS location should be recorded.

Traps should be checked every morning and evening with all euthanized mongooses carefully retrieved for subsequent disposal. Used traps should be reloaded and re-baited. Bait can be small pieces of sardine or sausage.

Any mongoose found dead outside of the trap should be necropsied to determine cause of death. Volunteers should be mindful to promptly remove any non-target species found in the traps upon inspection.

It is worth emphasizing that the traps must be laid with extreme care as mongooses who avoid being euthanized by a trap they have visited will be extremely difficult to capture in the future.

In tandem with the 1-year verification for the absence of rats, this island-wide survey will also verify the absence of mongooses. Ongoing surveillance for any rodents on the treated islands will also be a key part of the biosecurity system.

It is expected that the mongoose eradication will be implemented by the same persons who will go on to implement the rat eradication phase of the project.

### ***Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands***

Current biosecurity systems for the target islands focus mainly on rodents, and will be reviewed and expanded through a hands-on workshop for all personnel involved in biosecurity activities and key stakeholders (e.g. landowners and tour operators). The biosecurity system must take account of the major IAS that pose a risk to the islands (including the target species named earlier) and their pathways, and address prevention as well as rapid detection and elimination of new incursions. For rodents, a clear immediate priority is to increase the number of permanent bait stations on the islands, ensure they are maintained at the optimum height and kept well stocked with rodenticide.

Currently, much of the biosecurity work on Antigua's offshore islands relies on only two volunteers who check some of the islands during the weekends. This project will ensure more persons will become involved in order to help monitor and safeguard more islands, and to address alien plants and animals other than rats (for the purposes of comparison, Saint Lucia has only five very small offshore islands but has five biosecurity personnel, each spending several days a month monitoring the islands and removing any invasive vertebrates, invertebrates and plants). The task of

implementing the upgraded biosecurity system is expected to be shared among at least six governmental and NGO personnel, each devoting two or three days a month to surveillance, removing IAS, and/or educating local users why and how to avoid spreading IAS. The project also proposes to appoint at least one full time Island Biosecurity Officer to coordinate this work and study more fully the IAS pathways. Additionally, the government agencies already have within their work programme IAS surveillance which may be expanded to having officers assigned to this task.

To train more persons, the Biosecurity Officer and other invited experts will develop and deliver a training course on IAS detection and prevention, and leave in place the supporting materials for this to be delivered to more persons in the future. Training will include identification of both native and non-native species, appropriate techniques for dealing with incursions (including safe use of chainsaws and herbicides, where necessary), and where required will seek additional help with identification and eradication.

***Undertake biodiversity monitoring programmes on Redonda and other priority islands to evaluate the impact of IAS eradications on native biodiversity***

This pilot project will benefit from the fact that considerable existing baseline data exist for seabirds, land birds, reptiles and certain other taxa on most of the target islands. The methods that were used for previous surveys will be replicated where possible, to allow comparison with these baseline data. Established methods include standardised surveys of birds (land bird point counts, seabird whole colony counts), lizards (transects, point counts), invertebrates (pitfall traps, malaise traps) and plants/vegetation cover (quadrats, fixed point photos). On Redonda, soil composition (using soil test kit) and microclimate (using data loggers) will also be monitored, as this island was the most severely damaged by invasive mammals. Additional monitoring methods may be devised (e.g. for snails) but must be relatively rapid and affordable for trained local personnel to replicate in the future.

For plants, namely *Casuarina equisetifolia* (casuarina, Australian pine), biosecurity teams will be taught identification methods for these species, and will remove any specimens observed when conducting grid assessments.

Teaching clear and consistent data recording during eradications, wildlife and biosecurity monitoring will be a key component of training personnel. Data from the monitoring programme will be managed and analysed using Access databases and georeferenced data will also be uploaded to the Department of Environment's database, EIMAS. The data obtained during the pilot project will be compared with the previous baseline data from the same islands to measure changes since rats and other aliens were eradicated. At least once a year, the findings should be analysed, presented and discussed with the entire field team and other interested stakeholders; to keep them motivated to continue monitoring and to help resolve any problems with the methodologies.

***Completion of steps for designating Redonda as a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua & Barbuda, including drafting the protected area management plan***

While most of the offshore islands of Antigua are protected by law as part of the North East Marine Management Area, Redonda is not. To help consolidate the IAS measures established by this project and ensure the island's wildlife populations will be able to continue to recover in safety, the island should be formally protected. This component will include completing stakeholder consultations (paying particular attention to anyone with customary rights to fish around Redonda); preparing and submitting maps and technical proposal to Cabinet to designate the protected area; establishing the protected area management committee, and developing, using a participatory process, the first costed management plan.

The management plan should of course incorporate the biosecurity and biodiversity monitoring programme for Redonda, and show how these will be sustained over the long term as part of the protected area's human resources and budget. The management plan is also likely to identify and prescribe other actions to help restore the island's natural biodiversity and ecological processes, including the feasibility of biodiversity restoration activities.

## Project Activities

What interventions are proposed?	Who will be directly involved in implementation?	How will impact be assessed? How is pilot expected to bring about sustainable change?	How will lessons learnt be disseminated (nationally and beyond)
Eradication of invasive mammals (rats and mongoose) from three priority offshore islands using best eradication strategies	Environmental Awareness Group, Department of Environment, Forestry, local landowners, Boys Brigade, local/international volunteers, Fauna & Flora International	Data generated from biosecurity checks and biodiversity monitoring programme will assess the success rate of eradication intervention	Regional conservation conferences (e.g. Birds Caribbean), electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) and signage.
Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands	Government Agencies: Department of Environment, Forestry Unit, Fisheries Division, Ministry of Education, and Training Division. NGOs: Environmental Awareness Group, local/ international volunteers, Fauna & Flora International, Durrell Wildlife Conservation Trust, Wildlife Management International Ltd., and IUCN/SSC Invasive Species Specialist Group	Reliable data available from biosecurity monitoring will demonstrate effectiveness of the biosecurity protocols. Conduct before-and-after KAP surveys to evaluate impact of education on stakeholder knowledge and behaviour. Protocols incorporated into ongoing management plans and budgets for the islands.	National interagency meetings, regional conservation conferences (e.g. Birds Caribbean), electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) , and signage.
Undertake biodiversity monitoring programmes on Redonda and other priority islands to evaluate the impact of IAS eradications on native biodiversity	Government Agencies: Department of Environment, Forestry NGO's: Environmental Awareness Group, local/ international volunteers, Fauna & Flora International, University of the West Indies, Harvard University and other collaborating scientists.	Reliable data available from monitoring programme will aid decision process on potential follow up eradication measures and pathway management; reliable data will reflect the impact of IAS eradication as documented differences in flora and fauna (especially seabird breeding success, size of endangered reptile population) and provide basis for island management	National interagency meetings, regional conservation conferences (e.g. Birds Caribbean), electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental), and signage.

		plans. This monitoring programme will provide the means to measure the impact of intervention and determine if observed ecosystem changes are sustainable.	
Completion of steps for designating Redonda as a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua & Barbuda, including drafting the protected area management plan	Environmental Awareness Group, Department of Environment, Forestry Unit, Fisheries Division, Ministry of Legal Affairs, Development Control Authority, National Parks Authority, Fauna & Flora International	Data from biodiversity monitoring programme will support and inform the management of Redonda Environmental Protection Area. The protected area will be incorporated into the Protected Area Systems Plan and its sustainable financing mechanisms (which are currently being developed under other GEF-funded projects implemented by Department of Environment).	National interagency meetings, regional conservation conferences (e.g. Birds Caribbean), electronically, newspapers, posters, TV, workshops and radio programs, press conference, social media, websites (NGO, Governmental), and signage.



## Work Plan

OBJECTIVE	ACTIVITY	Year 1	Year 2	Year 3
<i>Eradication of invasive mammals from three priority offshore islands using best eradication strategies</i>				
Finalise the Operational Plans for eradicating rats from the target islands (Green Island, Smith Island and Maiden Island)	Complete peer-review of plans; Conduct final meetings with landowners and other stakeholders.	X		
Prepare island(s) for eradication operation and deploy bait	Recruit field team, establish field camp, organise transportation and equipment. Cut access tracks across island (at least 30 metres apart for <i>Rattus rattus</i> eradication), mark out baiting points, and deploy bait. Monitor bait uptake and replenish the bait as needed.	X		
Intensive monitoring to verify whether and where any rats remain	Deploy a wide range of detection tools (e.g. tracking plates, chocolate-scented wax, camera traps) to verify no rats remain before ending the operation.	X		
Conduct final check after 12 months to verify the operations were successful	Repeat the island-wide survey using a wide range of detection tools to confirm the island is rat-free		X	
<i>Review and implement improved biosecurity protocols to detect and prevent incursions by IAS on Redonda and other priority offshore islands</i>				
Review of existing biosecurity protocols and identify gaps and solutions	Workshop for persons involved in biosecurity activities and other stakeholders, with expert facilitator/ trainer. Examine alternative solutions for offshore islands with more serious biosecurity weaknesses (e.g. close to mainland, larger numbers of visitors)	X		
Build capacity of personnel involved in implementing the improved biosecurity protocols	Develop and conduct "training of trainers" course on IAS detection and prevention, with supporting materials, field exercises and expert advisers.	X		
	Appoint Island Biosecurity Officer to serve as lead coordinator for implementing improved protocols, working with wider team of government and NGO field technicians.		X	

Implement best-suited biosecurity protocols to priority islands, depending on needs basis	These actions are to be prescribed by the previous activities, but are expected to include, inter alia, More frequent surveillance of islands, Installation of additional permanent bait stations to detect and prevent incursions by rodents around the coastlines and at potential entry points, Pre-flight screening of visitors to and from Redonda; Concerted outreach and education for all island users on how and why to avoid spreading pests.	X	X	X
Raise awareness of importance of eradicating IAS and how and why to prevent the spread of IAS on priority offshore islands	Utilization of media platforms, local newspaper, radio, etc. to promote information stressing the importance of protected areas, IAS eradication and biosecurity protocols. Use of local and international agency websites to promote the methods used and biodiversity recovery (see below).	X	X	X
<i>Undertake biodiversity monitoring programmes on Redonda and other priority islands to evaluate the impact of IAS eradications on native biodiversity</i>				
Finalize monitoring methods and ensure local personnel have capacity and tools to monitor biodiversity on priority islands	Consult and train local agency staff in monitoring methods, using existing methods where possible (to ensure comparability with baseline data since 1990s) and procure essential equipment and reference guides. Conduct refresher training each year.	X	X	X
	Recruit students/volunteers to assist with biodiversity monitoring.	X	X	X
Implement annual monitoring of native flora and fauna on the target islands	Apply agreed methods, including standardized surveys of birds (point counts, transects, seabird whole colony counts), lizards (transects, point counts), invertebrates (pitfall traps, malaise traps) and plants/vegetation cover (quadrats, fixed point photos). On Redonda, monitor changes in soil composition (using soil test kit) and microclimate (using data loggers).	X	X	X
Evaluate impact of invasive species control on native flora and fauna	Analyse the biodiversity data collected during the pilot project and previous baselines to evaluate correlations between changes in native species abundance and diversity and the removal of rats and other aliens. (Note that the project sites contain a time series of islands that have been rat-free for between 1 years and 23 years).	X	X	X

Present findings from biodiversity monitoring programme	At least once a year, field personnel present findings from the biodiversity monitoring to the field volunteers and other stakeholders	X	X	X
<i>Completion of steps for designating Redonda as a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua &amp; Barbuda, including drafting the protected area management plan</i>				
Complete stakeholder and inter-agency consultations to establish Redonda as a Protected Area (PA)	Complete meetings with local stakeholders (including neighboring states) to enlist support for protection and identify any persons with customary user rights that need to be taken into account.	X	X	
	Conduct meeting with implementing agencies to discuss options for declaring Redonda as a protected area under overarching Protected Area system plan (in development under separate GEF-6 project)	X	X	
Provide Cabinet with the necessary information to support the designation of the protected area	Prepare and submit maps and technical proposal to Cabinet to designate the protected area. This will include information on the area's biodiversity, archaeology and stakeholders.		X	
Establish a functioning inter-agency committee to support the management of the protected area	Establish the protected area management committee, with representatives from the relevant government agencies and NGOs, to meet at least quarterly to oversee the management of the protected area and help identify additional resources for its conservation		X	X
Produce the protected area management plan, incorporating IAS management requirements.	Using a participatory process, develop the first costed management plan for Redonda. This will incorporate the biodiversity monitoring and biosecurity systems developed under other components of this project to ensure they become part of the daily operations and budget of the protected area.			X

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## Appendix 16.2 Barbados Pilot Projects

Pilot Project 1: Establishment of a bio-secure site(s) for threatened native reptiles (Barbados leaf toed gecko) at a suitable location.

Species targeted: *Herpestes javanicus* (Indian Mongoose), *Rattus rattus*, *Rattus norvegicus* (black and brown rat), *Hemidactylus mabouia* (house gecko)

Pilot site: South East cliff of St. Philip

### Conservation priority:

Protection of the endemic, critically endangered Barbados leaf toed gecko (*Phyllodactylus pulcher*) is highly important for its survival. Creating a bio-secure site would ensure that having a population of the native gecko in an environment protected from invasive species would provide a safeguard against its extinction. A site that excludes invasive predators would provide us with data on the reproductive rates and rate of natural population growth in the absence of invasive predators. This will indirectly measure the impact of IAS on this native species.

### Synopsis:

- The native Barbados leaf-toed gecko is under threat from predators especially the Indian mongoose (*Herpestes javanicus*) and the black rat (*Rattus rattus*), and others such as the house gecko (*Hemidactylus mabouia*), the brown rat (*Rattus norvegicus*) the cane toad (*Rhinella marina*), the domestic cat (*Felis catus*) and perhaps centipedes (*Scolopendra spp.*). This is evidenced by the high rate of autotomy seen in the native gecko. Anthropogenic pressures such as increased development and expansion in coastal areas due to tourism are causing habitat loss. Furthermore, having built and lit structures close to the coastal cliffs are also opening the way for house geckoes into *Phyllodactylus* habitats. These geckos have been known to displace native geckos in other locations and compete with them. The main goal of this pilot project is to create a bio-secure site to ensure the survival of the native species and possibly increase their population.
- Baseline studies will be undertaken to assess the abundance and distribution of the native species and identify possible locations to create the bio-secure site(s). The best security or protection methods will be devised for the targeted IAS. Monitoring of the IAS and the native gecko will take place before and after the bio-secure site is implemented. Training of personnel from various stakeholder groups will be conducted to secure the long-term protection of the native gecko.

### Background:

Barbados is approximately 431 km<sup>2</sup> in size and is the most easterly of the Caribbean islands. It has no offshore islands that provide optimal habitat and that can be maintained free of invasive species that are thought to negatively affect the endemic Barbados leaf-toed gecko (*Phyllodactylus pulcher*). This is a nocturnal species known to inhabit limestone cliff habitats on the north, east and southeast windward coasts of the island. They are the only species of this genus in the Lesser Antilles. It was not sighted for 30 years, and assumed extinct, until a small population of *P. pulcher* was reported on Culpepper Island off the east coast of Barbados in 2011 (Williams et al., 2015). As a Critically Endangered species, it is of utmost importance to protect the species and its habitats.

After surveys were completed in 2014, the population was estimated through extrapolation to be approximately 12 000 individuals. However, this estimate was based on mark-recapture in only a few locations and needs to be expanded to improve confidence in it. *Phyllodactylus* usually lays one egg into rock crevices and cracks and preys upon invertebrates including spiders, cockroaches, crickets and termites (Williams et al., 2015).

In 2016, the gecko gained a status of Critically Endangered on International Union on Conservation of Nature's (IUCN) Red List. This means that it has very high risk of extinction in the wild and is the highest risk category assigned by the IUCN Red List for wild species (IUCN, 2017). The threats to the native species include predation, mainly from introduced rats and the Indian mongoose, among others. This was evident through the high incidence of tail loss reported in individuals during the study. They are also affected from

displacement by the house gecko (*Hemidactylus mabouia*) which is a direct competitor for habitat and prey (Williams et al., 2015). Lastly, the native species is affected by habitat loss through the expansion of tourism by developing new coastal resorts on cliff sides (Williams et al, 2016).

#### Priority Species for Management:

*Rattus rattus* (black rat) and *Rattus norvegicus* (brown rat)

Black and brown rats first appeared in the Caribbean in the mid-17th century and have spread into all habitats. The Global Invasive Species Database reports their impact as follows:

*A native of the Indian sub-continent, the ship rat (Rattus rattus) has now spread throughout the world. It is widespread in forest and woodlands as well as being able to live in and around buildings.... The ship rat has directly caused or contributed to the extinction of many species of wildlife including birds, small mammals, reptiles, invertebrates, and plants, especially on islands. Black and brown rats are omnivorous and capable of eating a wide range of plant and animal foods.... The black rat is most frequently identified with catastrophic declines of birds on island while the brown rat is known for the restricting the regeneration of plants and small animals... Both R. rattus and R. norvegicus transmit the plague bacterium Yersinia pestis via fleas in certain areas of the world.*

The species are known to be carriers of multiple diseases and pathogens, many of which are severe health hazards for humans. The persistence of typhus in the Caribbean is attributed to local rat populations. In any case, methods to eradicate and control black and brown rats are often effective for both species.

Source: Global Invasive Species Database (2017). Downloaded from <http://www.iucngisd.org/gisd/search.php> on 06-07-2017.

*Herpestes javanicus* (small Asian mongoose, small Indian mongoose)

Mongoose were deliberately introduced to Barbados and many other Caribbean islands, in the late 19th century in an effort to curb the populations of invasive rats that were damaging sugarcane plantations. The Global Invasive Species Database reports their impact as follows:

*Mongoose are diurnal generalist carnivores that thrive in human-altered habitats. Predation by mongoose has had severe impacts on native biodiversity leading to the decline and extirpation of native mammals, birds, reptiles, and amphibians... The small Indian mongoose has had a major impact on native species in the areas where it has been introduced. Mongooses have also been implicated in the decline of many other bird, reptile and mammal species. Mongooses also eat invertebrates but the impact of this predation on invertebrate populations has not been studied. In addition, mongooses are carriers of human and animal diseases, including rabies and human Leptospira bacterium.*

Mongoose also prey heavily on the eggs and young of the Critically Endangered Hawksbill turtles.

Source: Global Invasive Species Database (2017). Downloaded from <http://www.iucngisd.org/gisd/search.php> on 06-07-2017.

#### Methodology:

##### Baseline studies:

1. A study done in 2012-2014 recommended that a further *in-situ* study of *Phyllodactylus* be carried out to further refine the island-wide distribution (i.e. presence in gullies in the interior of the island that emerge onto the south-east coast sites where it is currently found).
2. The optimal location to create a bio-secure site in natural habitat and the optimal size will need to be determined. An assessment of the impact of the Indian mongoose and the black and brown rats on the native gecko will be achieved through investigating gecko abundance and distribution before and after the predators are excluded from the bio-secure site.

3. An additional/alternative option is to consider a bio-secure caged artificially-created habitat at the University of the West Indies (UWI). This would more easily allow exclusion of mammalian predators and the house gecko. Preliminary studies of the microhabitat, stocking density and dietary requirements of the gecko will be necessary.

##### Control methods:

After the baseline studies are completed and the option of a bio-secure site in natural habitat is determined, a control programme will be implemented for the invasive alien species. The rat and mongoose control plans, will be submitted for review by invasive species specialists before being finalised.

#### *Control Plan for the Rattus spp.*

With respect to control of the introduced rats (*Rattus spp.*), the project will use poison that contains the active ingredient Brodifacoum or Bromfenacoum – often sold under the brand name Klerat, Havoc or Talon. The ideal form is in blue, waxy blocks because reptiles and birds will not touch it. It is weather-proof and will not change in texture with water and therefore can be used year-round. It will be placed in plastic bait stations which allow the rat to climb inside and eat the bait. There is no current population estimate of rats but it is known that they are widespread throughout the island. It is harmful to mammals if eaten in large enough quantities and signage will be used to inform persons in surrounding areas. Vitamin K is the antidote to the poison if swallowed. The bait stations will be placed around the bio-secure site. After the rats have died, their carcasses will be removed. Bait uptake will be monitored daily and bait replenished for at least five weeks or until no rat sign is detected. Once bait has been deployed for at least two weeks, the field team will deploy a range of monitoring tools, including tracking plates, to detect whether and where any rodents remain.

#### *Control of the Indian mongoose (Herpestes javanicus)*

Mongoose control will likely be carried out before any baiting for rats is undertaken. This is best done during the dry season (January through May). During this phase, Doc 250 predator traps (or equivalent) will be loaded in live traps (Tomohawk and/or Havahart traps approximately 60 cm x 20 cm x 20 cm.). Doc 250 predator traps have been identified by the New Zealand National Animal Welfare Advisory Committee as the most humane means of euthanising animals such as these.

The aim is to eradicate the entire population of mongoose on the target site. Monitoring for mongooses, which will be conducted to determine the need for deploying traps, can employ several different methods including the use of tracking plates (these are inked plates within a tunnel which show up the prints of any animal that walks through the tunnel) to show mongoose footprints. Trapping should continue for at least three (3) weeks and until no further sign of mongoose is evident.

All volunteers should be briefed on the setting and handling of the traps. Traps should be laid in pairs back to back and in shady areas. At least 2 persons should be tasked with checking traps at the pilot site. All trap locations should be marked with flagging tape and GPS location should be recorded. Traps should be checked every morning and evening with all euthanised mongooses carefully retrieved for subsequent disposal. Used traps should be reloaded and re-baited with a small piece of meat. Any mongoose found dead outside of the trap should be necropsied to determine cause of death. Volunteers should be mindful to promptly record and remove any non-target species found in the traps upon inspection. The traps must be laid with extreme care as mongooses who avoid being euthanised by a trap they have visited will be extremely difficult to capture in the future. In tandem with the 1-year verification for the absence of rats, this beach-wide survey will also verify the absence of mongooses. Ongoing surveillance for any rodents on the treated pilot site will also be a key part of the biosecurity system. It is expected that the mongoose control will be implemented by the same persons who will go on to implement the rat control phase of the project.

There has been no systematic control programme for invasive species negatively impacting the native gecko. However, rat trapping was conducted on Culpepper Island in 2012-2014, and persons have received training in baiting and monitoring of traps.

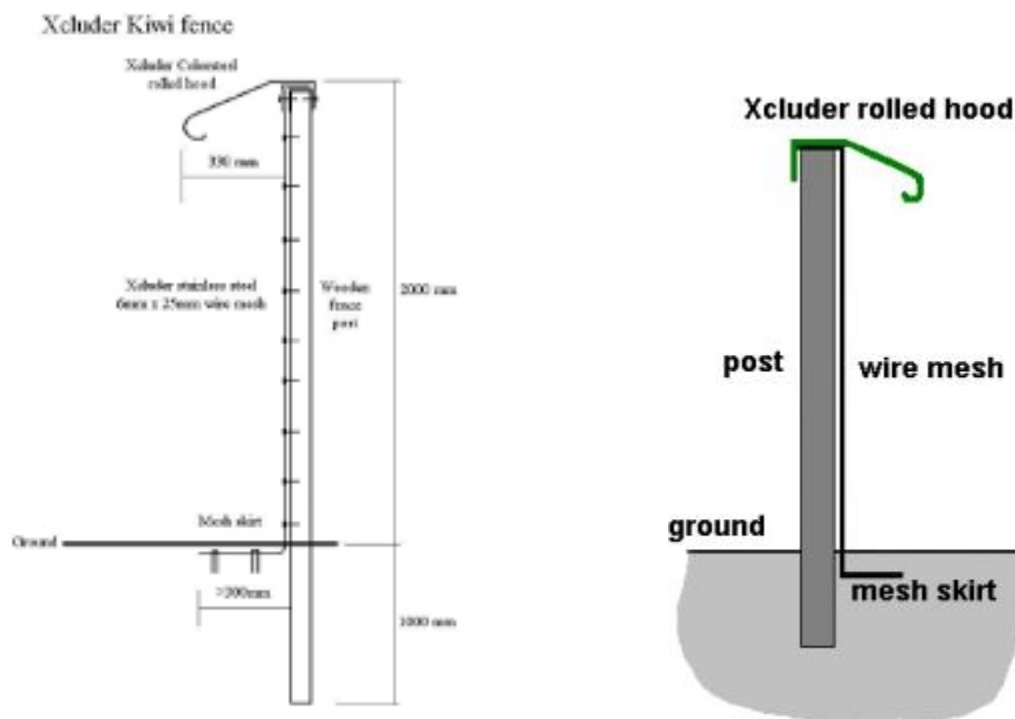
Removal of house geckos can be conducted by hand during night surveys. If the bio-secure site is also to exclude the house gecko, this will require an experimental approach as we are unaware of any bio-secure site in natural habitat that has done this successfully. This is one advantage of having a caged area at UWI, as there may be a greater chance of also excluding the house gecko.

#### *Monitoring:*

After control, monitoring will need to be conducted continuously to ensure that the predators are excluded. There will be ongoing surveillance of the plot to monitor the abundance and distribution of the native gecko. There will also be a post-control survey in the final year to verify the effectiveness of the control programme.

*Adaptive management plan:*

The predator exclusion fence will be implemented. Most studies have shown that the biodiversity within the fenced area had increased significantly. The fence is often used in the absence of a suitable uninhabited island. The *in situ* site chosen should be a hotspot for the native gecko. This predator exclusion fence will be 300 ha in size and will be made with 360 grade stainless steel mesh attached to wooden posts in the design of the Xcluder Predator Exclusion Fence. The base fence will be 1.8-2 metres high with a 300-500 mm wide horizontal mesh skirt facing in the direction of the predator. It will also extend 50-100 mm underground to exclude burrowing animals. A rolled hood extending 250-300 mm horizontally towards the outside of the fence will prevent climbing animals from getting over the fence (See Figure 1). The fence can keep out predators as small as mice. There will be double entry gates to ensure secure entry (Bell, 2014).



*Figure 1: Xcluder Predator Exclusion Fence cross-section*

The additional/alternative option would be a bio-secure caged artificially-created habitat at UWI. This would allow exclusion of mammalian predators and the house gecko. Preliminary studies of the microhabitat, stocking density and dietary requirements of the gecko will be necessary to determine the suitability of the artificial habitat.



## Project Activities

What interventions are proposed?	Who will be directly involved in implementation?	How will impact be assessed? How is pilot expected to bring about sustainable change?	How will lessons learnt be disseminated (nationally and beyond)
Creation of a fenced bio-secure site in natural habitat and/or bio-secure caged artificially-created habitat at UWI	Environment Division Department of Biological and Chemical Sciences, UWI	By assessing the number, distribution and level of autotomy of native geckos inside and outside of the bio-secure area	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) and signage.
Removal of mongoose and rats and on-going maintenance of a bio-secure area	Environmental Health Department, Department of Biological and Chemical Sciences, UWI	By assessing the number, distribution and level of autotomy before and after invasive mammal removal	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) and signage.

## Project Work plan

[illegible]

	mongooses and rats.												
	Set bait stations and traps around bio-secure sites for predators and monitor them.												
Evaluation of predator control	Evaluate the efficacy of the bio-secure site(s) after control.												

*Project Budget (in USD)*

Pilot Project 1: Establishment of a bio-secure site(s) for threatened native reptiles (Barbados leaf toed gecko) at a suitable location.	Year		
	1	2	3
Hire Consultant to complete baseline survey of gecko population and monitor annual population increases at the secure site	6000		2000
Predator exclusion fence materials (300ha in area at \$400/m)	462086		
Construction of fence (10 man days)	2000		
Fence maintenance (continuous)		1000	1000
Assessment of the predator population in the pilot site (21 days)	1000		
Tracking tunnels (2), pads and ink	300		
Traps for mongoose (\$100 x 5), bait stations (\$25 x 10) and bait for rats (\$150 x 5)	500	1000	300
Hire consultant to eradicate and monitor mongooses and rats daily (1 year)	1000	1000	
Assessment of the eradication programme			2000
Sub-total	730800	3000	5300
Total			<b>48,1186</b>

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Pilot Project 2: Development and implementation of a long-term monitoring programme on effective control of invasive plant species in gully ecosystems.

Species targeted: *Triphasia trifolia* (Sweet Lime), *Sansevieria hyacinthoides* (Mother-in-Law's Tongue), *Ptychosperma macarthurii* (Macarthur Palm), *Leucaena leucocephala* (River Tamarind)

Pilot site: Jack-in-the-Box Gully



Figure 2: Jack-in-the-Box Gully

Conservation priority: Protection of native flora and fauna in the gully/gullies.

## Synopsis:

The gully ecosystem is forested valleys in Barbados and the native understory shrubs seem to be displaced by invasive alien species, mainly of the *Rubiaceae* and *Myrtaceae* families (Carrington et al., 2003). In the Gully Ecosystem Management Study, done in 2003, the most abundant exotic and invasive plant species were the *Triphasia trifolia* (Sweet Lime) found in 15.5% of all gully segments, *Sansevieria hyacinthoides* (Mother-in-Law's Tongue) found in 13.3% of all gully segments, and *Ptychosperma macarthurii* (Macarthur Palm) found in 1.3% of all gully segments. The *Leucaena leucocephala* (River Tamarind) is another invasive species in which was found most frequently 52.1% on average. However, it is a very aggressive species which has a high rate of reproduction, it produces many seeds rapidly and frequently, highly abundant, adaptable, and relatively viable and its effect must be assessed. These four (4) species would be the focus of the pilot study ().

There is also a native shrub *Phyllanthus andersonii* found in moist forests such as gullies where the invasive alien species such as Sweet Lime and Mother-in-Law's Tongue may threaten. The endemic Macaw Palm (*Aiphanes minima*) to the Lesser Antilles may also be under threat through competition with the Macarthur Palm. They both exist in the scattered lower canopy below the main closed tree canopy of gullies. With a recent preliminary conservation study it was not considered to be threatened (Carrington et al., 2017).

Pilot plots will be created which contains all species of invasives mentioned and the percentage cover of each species will be determined. The relative impact the species has on its native competitor will also

be assessed. A control programme will then be implemented in order to control the invasive species. Monitoring and evaluation of the effectiveness of the control programme will also be implemented.

#### Background:

Gullies form an extensive network of drainage channels in Barbados formed from the erosion of limestone which comprises 5% of the total land area. Most gullies are found in St. Peter, St. James, St. Andrew and St. Thomas. These gullies contain much of the forested areas left in Barbados after colonialism. They are used locally for ecotourism, recreationally for hikes, slows storm water from reaching the coast, for bioprospecting and pathways between communities. Additionally, in the environmental context, they are important as a habitat and food source for flora and fauna, and provide oxygen. The gullies are under threat from unsustainable garbage disposal, overgrazing via agriculture, quarrying, urbanisation and deforestation (Carrington et al, 2003).

The wooded gullies account for 348 km of land area Barbados with four (4) categories: closed forest, open forest, scattered trees and thicket. They are home to around 200 native and naturalised flowering plant species with two (2) endemic species. Introduced species of plants represent 20% of these plants and can displace native plants through competition for resources and therefore reduce the population (Carrington et al, 2003).

#### Priority Species for Management:

- *Triphasia trifolia* (Sweet Lime)
- *Sansevieria hyacinthoides* (Mother-in-Law's Tongue)
- *Ptychosperma macarthurii* (Macarthur Palm)
- *Leucaena leucocephala* (River Tamarind)

#### Methodology:

##### *Baseline surveys:*

Barbados currently does not possess baseline data and therefore there is an urgent need to gather this data to assess the current state of gullies as it relates to the presence of alien invasive species and their impacts on native flowering plant species. This information can be compared to the findings of the Gully Ecosystem Management Study done in 2003. In the case of the introduced Macarthur palm and the native Macaw palm, their relationship should be assessed and monitored. Invasive alien plant species of gullies may play host to various fauna, which may also have an impact on local species. An analysis of the fauna found on IAS should be investigated as a minor study.

Forty (40) replicate plots with 10 for each species; 5 controlled and 5 treated plots of 100 m<sup>2</sup> should be established *in-situ* in the gully which contains all four species. Some will use either of the control strategies (chemical and physical) and the others left intact as a form of control. These will be assessed to gauge the impact of IASs on the native species. The abundance of invasive alien species will be measured by percentage cover, would be measured at the inception of the pilot and at 3-month intervals following removal of IASs.

##### *Control methods:*

After the baseline studies are completed and the impacts of the IASs are determined, a control programme could be developed and implemented. Control could be by chemical (judicious use of a systemic herbicide) and or mechanical (uprooting the plants completely) means in the pilot plots. After the pilot, a recommended procedure for removal could be established and implemented in one gully system.

With respect to the Macarthur Palm, uprooting would be difficult for large plants and as an alternative, cutting off the trunk at the base with a chain saw might be considered. As this is a clumping rather than solitary palm this may be ineffective. The extensive rhizome system of Mother-in-Law's Tongue may present a challenge to effectively uproot, while the prickly nature of Sweet Lime would also make uprooting difficult.

##### *Monitoring:*

The pilot plots will be monitored for return of the IAS over a two-year period to judge effectiveness. The percentage cover of the native plants with the IAS with which it competes would also be monitored.

##### *Adaptive management plan:*

For each invasive species the competition between them and the native plants (% cover) would also be monitored.

### Project Activities

What interventions are proposed?	Who will be directly involved in implementation?	How will impact be assessed? How is pilot expected to bring about sustainable change?	How will lessons learnt be disseminated (nationally and beyond)
Baseline studies on the invasive species and native plant population	National Conservation Commission, Plant Pathology Department, Biological Studies Department	Assessing the abundance and distribution of the invasive species in the pilot projects.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) and signage.
Control of the target species	Ministry of Agriculture, Food and Fisheries, Soil Conservation	After the control of the plants, the impact will be assessed after a year.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental), and signage.
Assess the effectiveness of the control programme put in place.	Environmental Health Department	Compare abundance and distribution of the IASs before and after control programme to determine if the programme worked.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, radio programs, social media, websites (NGO, Governmental),

## Project Work plan

[illegible]

*Project Budget (in USD)*

Pilot Project 1: Development and implementation of a long-term monitoring programme on effective control of invasive	Year		
	1	2	3
Baseline study on the abundance of IAS	6000		
Establish pilot plots - hire consultant to construct plots	3000		
Eradication of IAS in some plots (chemicals, machinery and labour)	4000		
Monitor plots - Man days = 1 year	2500	2500	
Assessment of the eradication programme			3000
Sub-total	15500	2500	3000
Total			<b>21000</b>

References:

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doi:10.1007/s12229-017-9182-5



Pilot Project 3: Mongoose control at a selected sea turtle nesting beach.

Species targeted: *Herpestes javanicus* (Indian Mongoose),  
Pilot site: Bath Beach



Figure 3: Bath Beach Source: Pinterest

Conservation priority: Protection of the native fauna, especially the Hawksbill turtle (*Eretmochelys imbricata*) from predation by introduced mammalian species such as the Indian mongoose is essential to its survival.

*Eretmochelys imbricata* (Hawksbill Turtle): IUCN status critically endangered (IUCN Red List, 2017)

Synopsis:

In the 2016 nesting season, there were 713 individual females nesting in Barbados and a total of 3822 nests. The Hawksbill turtle is under threat from predation of eggs and hatchlings by the introduced Indian mongoose (*Herpestes javanicus*) at several beaches. The Hawksbill turtle is one of three species of turtle which nests on Barbados' beaches annually. They are Critically Endangered according to IUCN's Red List and this is the most threatened category before extinction (IUCN, 2017).

Mammalian predation threatens continued nesting of hawksbills at Bath. About 17 – 21 % of the eggs on Bath beach, the proposed pilot site, are subject to predation annually. The population structure of the nesting population at Bath has been determined to differ from that nesting on the west and south coasts (Browne et al, 2010).

The pilot project may be conducted in collaboration with the Barbados Sea Turtle Project (UWI), the Ministry of Health, and the National Conservation Commission. A baseline inventory of nests impacted by the IAS is available for several years courtesy of the Barbados Sea Turtle Project's monitoring programme. With respect to control, the sensitivity of local stakeholders towards certain methods will need to be taken into account. After implementation, the effectiveness of the control programme will be monitored and the impact of successful control will be assessed against the baseline data. Mongoose are attracted by food remains left by beach users and stored in bins and skips. Prompt garbage removal will need to form part of the management plan to keep mongoose numbers down after initial control.

Background:

Bath beach is located on the windward coast of Barbados in the parish of St. John. It has beach facilities and is a picnic spot for recreational users and supports a small reef fishery. Of 551 hawksbill nests recorded at Bath from 1999-2005 (approx. 79 per year), 149 (27.0%) were predated by mongooses during the 60-day incubation period, with annual predation rates ranging from 17.9 % to 38.9%

(Leighton, 2009). There were 67 hawksbill nests recorded in 2015 (unpub. data). Predation rates were lower at Bath than in previous years (approx. 10%), which may have been at least partly due to the amount of *Sargassum* that was on Bath beach in 2015. This may have deterred mongoose predation. Bath is interesting, both because it has a lot of hawksbill nesting for an east coast beach and because the genetic population structure of the females that nest there differs from the west and south coast females (Browne et al 2010).

The Hawksbill turtle nests on the coasts of Barbados during the period of mid-May to mid-October. The eggs and hatchlings are threatened by predation from mongooses in some beach locations.

Mongooses are known to be captured in baited traps and euthanized by at least two local householders at hawksbill turtle nesting beaches on an informal and opportunistic basis. Data on mongoose predation at nesting beaches (# nests predated, egg mortality attributed to mongooses) are maintained by the Barbados Sea Turtle Project. The most recent data on mongoose abundance is from 2008 (Leighton et al 2008).

#### Priority Species for Management:

*Herpestes javanicus* (small Asian mongoose, small Indian mongoose)

Mongooses were deliberately introduced to Barbados and many other Caribbean islands, in the late 19th century in an effort to curb the populations of invasive rats that were damaging sugarcane plantations. The Global Invasive Species Database reports their impact as follows:

*Mongooses are diurnal generalist carnivores that thrive in human-altered habitats. Predation by mongoose has had severe impacts on native biodiversity leading to the decline and extirpation of native mammals, birds, reptiles, and amphibians... The small Indian mongoose has had a major impact on native species in the areas where it has been introduced. Mongooses have also been implicated in the decline of many other bird, reptile and mammal species. Mongooses also eat invertebrates but the impact of this predation on invertebrate populations has not been studied. In addition, mongooses are carriers of human and animal diseases, including rabies and human Leptospira bacterium.*

Mongooses also prey heavily on the eggs and young of the Critically Endangered Hawksbill turtles. Source: Global Invasive Species Database (2017). Downloaded from <http://www.iucngisd.org/gisd/search.php> on 06-07-2017.

#### Methodology:

##### *Baseline surveys:*

Data is compiled continuously by the Barbados Sea Turtle Project which would have information on the current rates and or incidences of nest predation. A baseline study will be conducted and needed for the invasive species at the pilot site(s) to determine the abundance and distribution of the species before control.

##### *Control of the Indian mongoose (Herpestes javanicus):*

The mongoose control will include capturing them in traps, specifically Doc 250 predator traps which will be loaded in live traps. A mongoose control plan will be written up, and peer-reviewed by invasive species specialists before finalisation. Doc 250 predator traps have been identified by the New Zealand National Animal Welfare Advisory Committee as the most humane means of euthanising animals such as these.

The aim is to eradicate the entire population of mongoose on the target site. Monitoring for mongooses, which will be conducted to determine the need for deploying traps, can employ several different methods including the use of tracking plates (these are inked plates within a tunnel which show up the prints of any animal that walks through the tunnel) and track pads on the sand to show mongoose footprints. Trapping should continue until no further sign of mongoose is evident.

All volunteers should be briefed on the setting and handling of the traps. Traps should be laid in pairs back to back and in shady areas. At least 2 persons should be tasked with checking traps at the pilot site. All trap locations should be marked with flagging tape and GPS location should be recorded. Traps should be checked every morning and evening with all euthanised mongooses carefully retrieved for subsequent disposal. Used traps should be reloaded and re-baited with a small piece of meat. Any mongoose found dead outside of the trap should be necropsied to determine cause of death. Volunteers should be mindful to promptly record and remove any non-target species found in the traps upon inspection. The traps must be laid with extreme care as mongooses who avoid being euthanised by a trap they have visited will be extremely difficult to capture in the future. Ongoing surveillance for mongooses on the treated pilot site will be conducted.



Consideration of better garbage storage and removal will be necessary at the pilot site, as the presence of garbage maintains the mongoose population in beach areas outside of the turtle nesting season. As the site is a popular recreational beach garbage will be present year round.

*Monitoring:*

The control methods must be monitored to ensure the successful reduction of the mongoose population and increase of the Hawksbill turtles' hatchling production. Removal of mongooses will also increase hatching success of local birds. Additionally, mongooses also eat kittens and there is a large feral cat population at least one nesting beach affected by mongoose. Care will need to be taken not to inadvertently increase the cat population, because they are also predators of turtle hatchlings and of birds.

*Project Activities*

<b>What interventions are proposed?</b>	<b>Who will be directly involved in implementation?</b>	<b>How will impact be assessed? How is pilot expected to bring about sustainable change?</b>	<b>How will lessons learnt be disseminated (nationally and beyond)</b>
Baseline study on the abundance of mongoose at Bath	Coastal Zone Management Unit, Environmental Health Department, National Conservation Commission, Barbados Sea Turtle Project (UWI)	Assessing the abundance and distribution of the invasive species before control will allow assessment of the impact of its removal.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) and signage.
Trapping mongooses at Bath every year	Environmental Health Department	Data generated from trappings will be used to assess the size of the mongoose population.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental), and signage.
Recording the predation on eggs and hatchlings from mongoose	Barbados Sea Turtle Project (UWI)	The number of eggs and hatchlings reported to have been subject to predation would indicate the impact before control. By comparing the data after control to that before control will allow assessment of the impact	

*Project Work plan*

Output	Output, Activities and Tasks	Project Year 1				Project Year 2				Project Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preliminary study	Baseline study on the abundance and distribution of the mongooses and rats.												
Monitor the turtle population	Continuous monitoring of the turtle population												
Control of rats and mongooses	Control and monitor mongooses and rats yearly												
Evaluation of control methods	Evaluate the efficacy of the control programme.												

*Project Budget (in USD)*

	Year		
	1	2	3
Monitor the turtle population (once weekly) - Barbados Sea Turtle Project	1500	1500	1500
Assessment of the predator population in the pilot site (21 days)	2000		
Assessment of the predator population in the pilot site (tracking tunnels (3), pads, ink and labour)	2500		
Traps for mongoose (\$100 x 10) and bait stations (\$25 x 10) and bait for rats (\$150 x 2/yr) and maintenance	1550	400	400
Hire consultant to control and monitor mongooses and rats (1 year)	3000	2000	
Assessment of the eradication programme			2000
Sub-total	10550	3900	3900
Total			<b>18350</b>

References

Browne, D.C., Horrocks, J.A., and F. A. Abreu-Grobois. (2010). Population subdivision in hawksbill turtles nesting on Barbados, West Indies, determined from mitochondrial DNA control region sequences. *Conservation Genetics* 11: 1541 – 1546.q

Leighton, P. (2009). Mongoose predation on sea turtle nests: Linking behavioural ecology and conservation. McGill University, Canada. Ph.D.

Leighton, P.A., J.A. Horrocks, B.H. Krueger, J.A. Beggs and D.L. Kramer. (2008). Predicting species interactions from edge responses: mongoose predation on hawksbill sea turtle nests in fragmented beach habitat. *Proc. Royal Society B-Biological Sciences* 275: 2465-2472.

Pilot Project 4: Lionfish assessment and management project at high biodiversity-value reef sites.  
Species targeted: Indo-Pacific Lionfish (*Pterois volitans*)  
Pilot Site: Pile Bay and Oistins Bay



**Figure 4: Pile Bay**

Conservation priority: Grazing fish such as the Parrotfish (*Scaridae spp.*) and Surgeonfish (*Acanthuridae spp.*) are highly impacted by predation.

#### Synopsis:

Barbados is a small island developing state which depends on tourism as the main economic activity. It has coral reefs which sustain coral reef fisheries and tourism in the country which need to be maintained.

The lionfish (*Pterois volitans*) is an invasive species which has been affecting the island since 2011. There was a project done called the Barbados Lionfish Project conducted by the Centre for Resource Management and Environmental Studies (CERMES) and the Department of Biological and Chemical Sciences of the University of the West Indies (UWI), in collaboration with government agencies including the Coastal Zone Management Unit (CZMU) and the Fisheries Division (FD) with funding from the Natural Heritage Department (NHD) of the Government of Barbados. The aim was to examine the abundance and composition of the reef fish population before the invasion of the lionfish and also to document the abundance and distribution of the lionfish during the invasion. The lionfish is a potential threat to both the economy and to the coral reef ecosystem. It can be a threat to human health with its venomous spines, it exhibits fast growth and maturation, has few native predators, a high level of appetite and a high reproductive rate. It could ultimately change the structure and composition of the coral reef ecosystem in a negative way by affecting the survival of native fish and invertebrate species. The Caribbean invasion began in 2004 with a sighting in The Bahamas that spread rapidly throughout the region. The first sighting for Barbados was in 2011. It is believed that the species was introduced to the Western Central Atlantic via multiple releases of aquarium fish (Oxenford and Valles, 2014).

This pilot study will assess the current abundance and distribution of the lionfish and native reef species, and compare the results with the 2011 'pre-invasion' study in an attempt to assess the impact of the lionfish on Barbados' coral reef ecosystem to date.

#### Background:

The coral reef ecosystem in Barbados is an important resource in relation to tourism, fisheries and the protection from coastal erosion. It is a fragile ecosystem in which small changes in its environmental conditions or species composition can offset the delicate balance and lead to degradation.

The lionfish was seen as a potential threat to the Caribbean in 2004 when it was sighted in The Bahamas. This invasive species has quick adaptability, few native predators and parasites, a large appetite, fast growth, maturation and reproduction and low mortality rates. It is considered regionally as a potentially significant threat to ecology of coral reef ecosystems and therefore poses a significant threat to those countries like Barbados which are economically dependent upon healthy reefs. Lionfish is known to quickly overpopulate reefs and consume and displace native prey species. Native species composition can be severely disrupted through overconsumption by lionfish, which in turn may lead to an effect on reef fisheries and prevent the recovery of overexploited species. It could also throw off the ecosystem balance and food web of the entire reef ecosystem. The abundance of key herbivores such as the Parrotfish and the Surgeonfish which graze on the algae on coral reefs are likely to be reduced and this may lead to an overabundance of algae on the reefs. Outside of effects on tourism and fisheries, the lionfish also has venomous spines which can severely harm humans, even leading to death in some rare cases (Oxenford and Valles 2014). Both Pile Bay (West Coast) and Oistins Bay (South Coast) are important fishing communities in Barbados.

In order to initiate a response to the potential threat, the Barbados Lionfish Project was created in collaboration with the University of the West Indies and the Government of Barbados. This included

culling activities through lionfish derbies to raise awareness of the potential of the fish to support a viable fishery to hoteliers, fishers, chefs and the tourism industry. There were also training workshops on how to handle and prepare the lionfish and market development. The aim is to reduce the lionfish population to numbers which will not significantly impact recreational beach users and the functional integrity of the coral reef ecosystem. There was also a hotline for lionfish sightings in the early days of the invasion to track the spread around the coastline of Barbados. Local divers still carry out culling activities and a small scale fishery has developed.

However, the current abundance of the lionfish and the effectiveness of the management strategies put in place are unknown. It was further noted that the aquarium trade needed to be regulated in order to reduce or eliminate the introduction of other alien invasive marine species. These factors need to be assessed.

Priority species for management:

*Pterois volitans* (Indo-Pacific Red Lionfish)

Invasive lionfish are a concern to coastal managers due to their potential threat to fisheries resources, native fish communities and human health (Morris *et al.* 2008). The impacts can be seen summarized below:

- Ecosystem change: While few ecological studies have been conducted (but see Albins & Hixon 2008) it is clear that the lionfish's presence in the Caribbean is a worrying one. Lionfish are highly piscivorous and reduce the recruitment of juvenile fishes, which in turn disrupts marine ecosystem processes and reduces reef biodiversity (Albins and Hixon 2008; Morris *et al.* 2008).
- Reduction in native biodiversity: If their populations are allowed to continue growing unchecked, lionfish have the potential to severely reduce reef biodiversity, with the possible extinction of several species; although it is still too early to be definitive, anecdotal evidence from the Bahamas corroborates this premise (Dell 2009).
- Predation: Albins and Hixon (2008) showed that lionfish can drastically reduce recruitment of native fishes on small patch reefs in the Bahamas. They are potentially capable of decimating indigenous reef fish populations in the Caribbean due to their lack of natural predators and voracious appetite (Valdez Mascari & Aguiar 2009).
- Competition: Not only do lionfish consume large quantities of juvenile fish (such as grouper and yellow-tail snapper) but they also out-compete native species (such as scamp, gag, and yellow-mouth grouper) for food (Morris *et al.* 2008; Dell 2009).
- Economic/Livelihoods: In addition, by reducing populations of commercially important species such as grouper (Albins and Hixon 2008) they may as a consequence damage the economy of island communities which are dependent on such fishing industries.
- Human health: Lionfish are venomous with their spines containing apocrine-type venom glands (Morris *et al.* 2008). Lionfish venom has been found to cause cardiovascular, neuromuscular, and cytolytic effects ranging from mild reactions such as swelling to extreme pain and paralysis in upper and lower extremities (Kizer *et al.* 1985, in Morris *et al.* 2008). The toxin in lionfish venom contains acetylcholine and a neurotoxin that affects neuromuscular transmission (Cohen and Olek 1989, in Morris *et al.* 2008). Lionfish spines can prove dangerous to divers, snorkelers and aquarium enthusiasts (Morris *et al.* 2008; Schofield 2009). Stings are not fatal, but intensely painful and often requiring hospitalisation (Morris *et al.* 2008). Lionfish stings can be treated by heating the afflicted part in hot water (to 45° C) for 30 to 90 minutes and applying corticoids to the area (FishBase 2006); medical attention should be sought immediately (Cayman Islands Government Undated).

Source: Global Invasive Species Database (2017). Downloaded from <http://www.iucngisd.org/gisd/search.php> on 10-07-2017.  
Methodology

Underwater fish surveys

Repeat underwater surveys to assess current abundance and distribution of the lionfish and native reef fish species need to be carried out to compare to the previous baseline surveys done before the invasion of lionfish.

Repeat surveys of reef fisher catches (catch per unit effort) to assess impact of lionfish on fisher revenue.

Control methods

After the preliminary population assessment of the lionfish and native species, further education and awareness of the public, fishermen and divers will be carried out to share information on lionfish hotspots and focus culling and harvesting efforts on the most vulnerable reef areas.

Periodic intensive culls in the form of 'lionfish derbies' by the government and the private sector will be organised as well as regular culls in marine protected areas and vulnerable hotspots. Further promotion of the use of lionfish as a healthy food to encourage development of a viable lionfish fishery through the creation of niche markets will also be undertaken as a sustainable eradication method for this invasive species.

### Monitoring

Continuous monitoring of the lionfish population and native reef fish species must be done in order to assess the eradication impact on the ecosystem. Continuous education of the public must be done since lionfish are also a threat to humans if not handled carefully.

### Project Activities

<b>What interventions are proposed?</b>	<b>Who will be directly involved in implementation?</b>	<b>How will impact be assessed? How is pilot expected to bring about sustainable change?</b>	<b>How will lessons learnt be disseminated (nationally and beyond)</b>
Continuous culling of invasive lionfish from Barbados	Divers, Coastal Zone Management Unit, Centre for Resource Management and Environmental Studies, Fishers	A small fishery has been established from previous awareness activities and this is expected to keep the lionfish population in check. Dive operators will also be encouraged to offer lionfish culling dives. These activities will ensure sustainable eradication efforts	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental) and signage.
Repeat underwater fish surveys to determine abundance of lionfish and native species and assess impact of lionfish on the reef since the invasion. Repeat fisher catch per unit effort surveys to assess impact of lionfish on catch rates and fisher revenue.	Divers, Coastal Zone Management Unit, Centre for Resource Management and Environmental Studies, Fishers	Data generated from underwater surveys, supplemented by sightings from recreational divers will be used to assess the abundance and distribution of lionfish. Comparison with previous fish surveys will be used to examine the impact of lionfish on the native fauna.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental). International peer reviewed publication, regional scientific meeting.
Assess the effectiveness of the eradication programme put in place.	Coastal Zone Management Unit, Centre for Resource Management and Environmental Studies, biological Department of University of the West Indies	Conduct before-and-after KAP surveys to evaluate impact of education on stakeholder knowledge and behaviour.	National interagency meetings, regional conservation conferences, electronically, newspapers, posters, TV, workshops and radio programs, social media, websites (NGO, Governmental), and signage.

*Project Work plan*

Output	Output, Activities and Tasks	Project Year 1				Project Year 2				Project Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Control	Continuous culling of invasive lionfish from Barbados												
Baseline surveys	Repeat underwater fish surveys to determine abundance of lionfish and native species and assess impact of lionfish on the reef since the invasion.												
	Repeat fisher catch per unit effort surveys to assess impact of lionfish on catch rates and fisher revenue.												
Evaluation of control methods	Assess the effectiveness of the eradication programme put in place.												

*Project Budget (in USD)*

	Year		
	1	2	3
Assess native population of reef fish before and after eradication programme	10000		10000
Continuous assessment of the predator population in the pilot sites	2000	2000	2000
Lionfish culling (once a quarter)	1600	1600	1600
Educational and awareness of the public and stakeholders on the lionfish as a fisheries and safety procedures. Hire a consultant to organise workshops and educational materials, advertisements, etc.	5000	5000	5000
Assessment of the eradication programme			4000

Sub-total	18600	8600	22600
Total			<b>49800</b>

#### References

Oxenford, H.A., and H. Vallès 2014. The Lionfish Project. A research project to investigate the impact of invasive lionfishes on the ecological services of parrotfishes and other key herbivores in Barbados. Final Report. CERMES, UWI, Cave Hill, Barbados, 57pp.

### **Appendix 16.3: St. Kitts Pilot-Management Plan for Management of Vervet Monkey**

Targeted Species: *Chlorocebus aethiops sabaeus*, Vervet Monkey.

#### Synopsis

*Chlorocebus aethiops sabaeus*; green monkey. Typically, they have a yellow to greenish-brown coat with white undersides and white fur on their brows and cheeks. They have bluish skin on their abdomens while their faces, hands and feet are all black-skinned (Rowe 1996; Groves 2001). Vervets move quadrupedally and they are equally as comfortable on the ground as they are in the trees. They are semi-terrestrial and semi-arboreal, spending time feeding and traveling on the ground during the day and retreating to the trees to sleep at night. They have the characteristic cheek-pouches like other members of the superfamily Cercopithecoidea which allow them to forage and store food to be eaten later.

Vervets are generalists, as is obvious from their widespread range in Africa and the success of introduced populations. They are tolerant of a wide variety of habitats and can live in humid rainforests, semi-desert environments, or swamps from sea level to elevations up to 4500 m (14,764 ft.); their only limitation seems to be water availability and the presence of sleeping trees. Vervets are rarely found in the depths of dense forests, but rather utilize the edges of tropical rain forests, lowland evergreen forests and montane forests. They seem to prefer wooded rather than heavily forested areas, such as dry deciduous forest, scrub forests and gallery forests, which are composed of both trees and shrubs.

Vervets have the most omnivorous diet of all primates. They eat all of the types of food that any primate is known to eat including leaves, gum, seeds, nuts, grasses, fungi, fruit, berries, flowers, buds, shoots, invertebrates, bird eggs, birds, lizards, rodents, and other vertebrate prey. They have a strong preference for fruit and flowers, which are seasonal resources, and from month to month they vary their diet tremendously to cope with fluctuations in food availability.

On St. Kitts, where agricultural foods are readily available and in condensed areas such as on plantations, large numbers of animals can be supported in a much smaller space. Population densities range from 9 individuals per square kilometer (5.6 per square mile) at the Segera Ranch in Kenya to 255 individuals per square kilometer or 158 per square mile on St. Kitts, 28 times more dense as the population in Kenya. (Cawthon Lang K.A. 2006)

Vervets are among the most used primates in biomedical research because they are small, easily handled, non-endangered, evolutionarily closely related to humans, and easily bred in captivity, they are a popular species for use in biomedical primate research.

#### Background

The general accepted view is that the monkeys on both the islands of St. Kitts and Nevis arrived in the 1600s with the African slave trade, and that this is the Green Monkey (*Cercopithecus aethiops*), and that individuals were taken from the Gambia and Senegal in West Africa, these representing subspecies *Cercopithecus aethiops sabaeus*. However, there is no conclusive modern and updated study, including genetic analysis, to support this generally accepted view. For many years it fed on forest trees and cultivated sugar cane. With the demise of the sugar industry, loss of certain forest species to hurricanes and an increased population; these Primates have become a major pest to farmers and home owners.

Each year thousands of pounds of produce in the field are lost to monkeys and they are encroaching and advancing more and more into urban areas as well. There seems to be an over population and

there needs to be a balance between what the natural environs can sustain and the population density. The director of Agriculture MR. Melvin James notes that the monkey is a major pest to every crop grown on the island. Eating both above the ground parts as well as digging and eating roots and tubers.

#### Current Population and Impact on Biodiversity

No recent authoritative data on the population size is available and it was not practical to complete a detailed estimate of the current population with the resources available under the PPG. However, during February and May to June 2017, an Environmental Awareness Group (EAG) conducted a rapid ecological survey of three of the St. Kitts and Nevis' protect areas, namely, the Central Forest Reserve (St. Kitts), the Nevis Peak and Camps River Watershed Protected Area, and the Booby Island Marine Reserve (focus was on the terrestrial environment). The efforts included an assessment of the flora, fauna, geological, ecological, species, social, cultural, infrastructural, protected areas, limited economic and traffic issues in these national parks (Lindsay K. 2017).

During this survey, the team also made observations of the African Green Monkeys on both islands. Dr. Jennifer Daltry, herpetologist, international conservation biologist and restoration ecologist, and tropical invasive species expert, has made some very disquieting observations and arrived at some even more troubling conclusions about these voracious predators in a preliminary report to the Government of St. Kitts and Nevis about invasive species for the island. In it, Dr. Daltry concludes:

*"...non-native mammal signs and sightings and must infer these animals are placing an immense pressure on native species throughout St Kitts and Nevis. The monkeys in particular appear to have a far-reaching ecological impact, not only through directly feeding on huge quantities of plants and small animals, but there appears to be a positive correlation between the abundance of monkeys and black rats, which benefit from fruits and other foods dropped on the forest floor.*

- *Monkeys are responsible for high levels of damage to plants. The lack of bromeliads and orchids, as noted by the project botanists, may be largely due to the monkeys.*
- *Palm hearts, fruits and other foods were found to be very commonly dropped by monkeys on the forest floor and subsequently eaten by rats, which also appeared to occur at exceptionally high densities in the forests.*
- *Vervet (African Green) monkeys were the most widespread and frequently detected invasive mammal, recorded in 57% of the timed searches, followed by rats (51%), mongooses (50%), goats (42%) dogs (22%) and pigs (3%)."*

The St. Kitts-Nevis flora research team first noticed the unnatural absence of bromeliads, *Heliconia* spp., orchids, and other fleshy plant species from throughout and locations across both islands during the visit in February and May-June 2017. Kevel Lindsay, team leader, recounted that in the 1990s, he had visited the South East Peninsula (SEP) on St. Kitts, and found a hereto unreported species of orchid, *Lonopsis utricularioides*, which is a widespread species in the Caribbean, Central and South America, but rare in many places. He returned after many decades and went looking for it, but to date is unable to find it. Sadly, no evidence of this lost orchid was forthcoming, and the species may now be extirpated from the island.

In fact, during the February to June 2017 period, Mr. Lindsay found it quite peculiar that these dry habitats that are so suitable for orchids such as *Lonopsis*, are remarkably devoid of groups of plants such as native succulents and dry seasonal woodland species like *Bursera simaruba*, and several cactus species, including the Lesser Antillean tree cactus *Consolea*. This would not have been the only cactus that the monkeys affected. Even today, most of the islands' native cacti species remain relatively rare or absent in most locations, and this is due in part to the fact that monkeys will feed on these plants. Another species that the monkey may have affected is *Hylocereus undatus* subsp. *luteocarpus*, a scandent cactus plant that scrambles onto trees, rocks and ruins. While *H. trigonus* is recorded only for Nevis in The Federation, this may only be an artifact of post-monkey history. These results are preliminary but points to potential very high impact on biodiversity this will need to be further studied to rule out other causes.





**Photo 1. A very rare *Hylocereus undatus* subsp. *luteocarpus* cactus atop a sugar mill ruin, St. Kitts.**

Both species are quite rare on these islands, though they are relatively widespread and common on many of the nearby landmasses of the region. Photo 2 shows a lone colony on the north-western area of St. Kitts of *H. undatus* subsp. *luteocarpus*. Even in these photos, it is apparent that monkeys have been chewing on the succulent stems of the plants.

At one point, in the past, these species would have been quite attractive to monkeys—that is, given their water, mineral and sugar contents, and also to goats and donkeys. Some of these species likely disappeared from both islands early in the European colonisation, and after massive land clearing, monocultural agricultural practices, and ongoing land-clearing. Today, these islands are poorer for it.



**Photo 2. St. Kitts Bullfinch illustration.**

African Green Monkeys are responsible, or are likely responsible for several native species declines and disappearances, including the St. Kitts Bullfinch, a subspecies (some experts say even a species), photo 3 (specimen [https://commons.wikimedia.org/wiki/File:Naturalis Biodiversity Center - RMNH.AVES.110037 - Loxigilla portoricensis grandis Lawrence, 1881 - St. Christopher Bullfinch - specimen - ventral view.jpeg](https://commons.wikimedia.org/wiki/File:Naturalis_Biodiversity_Center_-_RMNH.AVES.110037_-_Loxigilla_portoricensis_grandis_Lawrence,_1881_-_St._Christopher_Bullfinch_-_specimen_-_ventral_view.jpeg)). Even today, monkeys are impacting plant groups such as bromeliads (photo 3); where they sit on top of the large plants, then rip them apart to access the energy-rich sugars (see bromeliad with smaller crown of leaves on the top).

The monkey also targets other birds, and preys on eggs, chicks and adults, and also eats native lizards, frogs and invertebrates.

Other plant species that the monkey targets include orchids, native palms, and *Heliconia* spp. Monkeys seek out the carbohydrates and other nutrients in moist forest and dry woodlands succulents. Due to many hundreds of years of their feeding, many of these plants are now disappearing or are now long gone.

While the tourism sector, and some locals, may find that monkeys form strong emotional and an attractive component of the natural landscape of the islands of The Federation, and thereby supporting the national economy, in the long-term, the decline of the forest and natural areas of the country will only ensure that the facets that form the most unique qualities of these islands will soon disappear, thereby undermining the whole of the St. Kitts and Nevis economic framework.

But the economy is not the only issue that is critical for controlling and managing the monkeys of St. Kitts and Nevis. We need to understand how these mammals are affecting mosquito-borne diseases such as dengue fever, Chikungunya and even malaria and yellow-fever.





2.3.3 Validate capture techniques for green monkey under local conditions

2.3.4 Evaluate feasibility of cost recovery mechanism for sustainably managing the monkey population to minimize negative impacts

2.3.4 Management Plan for Vervet Monkey control programme in St. Kitts produced and circulated.



## Budget

Activity	Budget (US\$)
2.3.1 Conduct a critical review of control strategy employed locally, regionally	5,000
2.3.2 Estimate Economic Impact of Vervet monkeys on agriculture, tourism and households in St. Kitts and Nevis	52,000
2.3.3 Validate capture techniques for green monkey under local conditions	90,000
2.3.4 Evaluate feasibility of cost recovery mechanism for sustainably managing the monkey population to minimize negative impacts	26,000
2.3.4 Management Plan for Vervet Monkey control programme in St. Kitts produced and circulated.	12,000
<b>Total</b>	<b>185,000</b>

## References

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2. Grober, J. P and Turner, T.R. 2010. A novel trap design for capture and sedation of Vervet monkeys. South African Journal of Wildlife Research 40(2) 163-168.
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## Appendix 17: List of Endemic Species in Barbados and the OECS

**Table 3: Number of native and endemic species Barbados and the OECS**

	Antigua and Barbuda	Barbados	Dominica	Grenada	St. Kitts & Nevis	St. Lucia	St. Vincent
Birds	1	1	2	2		5	2
Mammals						1	1
Reptiles	10	2	5	1		5	6
Amphibians			1	1			1
Plants	2		17	4	2?		
Marine Species							

**Table 4: Endemic Birds in Barbados and the OECS**

Scientific Name	Local Name	IUCN Status	Distributio n	Reference
<i>Angara cucullata</i>	Grenada Tanager	Least Concern	Gd, LA?	IUCN Red List
<i>Amazona guildingii</i>	St. Vincent Parrot	Vulnerable	STVG	IUCN Red List
<i>Amazona versicolor</i>	Saint Lucia Parrot	Vulnerable	STL	IUCN Red List
<i>Catharopeza bishop</i>	Whistling Warbler	Endangered	STVG	
Chondrohierax uncinatus murus)	Hook-billed Kite	Endangered	Gd	
<i>Icterus laudabilis</i>	St Lucia Oriole	Near Threatened	STL	IUCN Red List
<i>Leptotilla wellsi</i>	Grenada Dove	Critically endangered	Gd	
<i>Loxigilla barbadensis</i>	Barbados Bullfinch		Bar	
<i>Loxigilla noctis</i>	Lesser Antillian Bullfinch		LA	
<i>Margarops fuscus</i>	Scaly- breasted Thrasher		LA	
<i>Melanospiza richardsoni</i>	St Lucia Black Finch	Endangered	STL	IUCN Red List
<i>Myiarchus nugatory</i>	Grenada fly- catcher	Least concern	LA	
<i>Setophaga delicate</i>	St Lucia Warbler	Least Concern	STL	IUCN Red List

<i>Setophaga subita</i>	Barbuda Warbler	Near Threatened	A&B	IUCN Red List
<i>Tangara cucullata</i>	Grenada Tanager	Least Concern	Gd	IUCN Red List
<i>Tangara versicolor</i>	St Vincent Tanager	Least Concern	SVG	IUCN Red List

A&B: Antigua and Barbuda; Bar: Barbados; Dom: Dominica; Gd: Grenada; SKN: St. Kitts and Nevis; STL: St. Lucia; STVG: St. Vincent and the Grenadines. LA: Lesser Antilles

**Table 5: Endemic Mammals in Barbados and the OECS**

Scientific Name	Local Name	Status	Distribution	Reference
<i>Oligoryzomys victus</i>	St. Vincent Pygmy Rice Rat	Extinct	STGV	IUCN Red List
<i>Micronycteris buriri</i>	St. Vincent Big-eared Bat		STVG	
<i>Brachyphylla cavernarum</i> , <i>Monophyllus plethodon luciae</i>	The Antillean Fruit Bat, Insular Long-tongued Bat and Tree Bat		Lesser Antilles	Biophysical resource inventory of mammals 2009
<i>Sturnira lilium</i> Luciae	Little Yellow-shouldered Bat subspecies luciae		Stl	
	Tree bat subspecies luciae		STL SVG	
<i>Megalomys georginae</i>	Barbados Rat Rat	Extinct	BAR	Turvey et al (2012)
<i>Myotis nyctor</i>	Bat	Vulnerable	BAR and possibly Gd	Larsen et al. (2012)

A&B: Antigua and Barbuda; Bar: Barbados; Dom: Dominica; Gre: Grenada; SKN: St. Kitts and Nevis; STL: St. Lucia; STVG: St. Vincent and the Grenadines.

**Table 6: Endemic Reptiles in Barbados and the OECS**

Scientific Name	Local Name	IUCN Status	Distribution	Reference
<i>Alinea lanceolata</i>	Barbados Skink	Possibly extinct	Bar	IUCN Red list
<i>Amerotyphlops tasymicris</i>	Grenada Bank Blindsnake	Possibly extinct (Grenada)	Gre, SVG	IUCN Red List
<i>Anolis extremus</i>	Barbados anole		Bar and STL	
<i>Anolis griseus</i>	Saint Vincent Tree Anole		SVG	
<i>Anolis oculatus</i>	Dominica Anole	Least concern		

<i>Anolis trinitatus</i>	Saint Vincent Bush Anole		SVG	
<i>Chironius vincenti</i>	St. Vincent Black Snake	Critically endangered	SVG	IUCN Red List
<i>Cnemidophorus vanzoi</i>	St Lucia Whiptail,	Endangered	STL	IUCN Red List
<i>Corallus cookie</i>	Congo Snake; Cook's Tree Boa		SVG	
<i>Corallus grenadensis</i>	Grenadine Boa		SVG	
<i>Erythrolamprus melanotus</i>	Grenada Groundsnake			
<i>Erythrolamprus ornatus/ Liophis ornatus</i>	St Lucia Racer	Critically endangered	STL	IUCN Red List
<i>Erythrolamprus perfuscus</i>	Barbados racer	Extinct	Bar	
<i>Gonatodes daudini</i>	Grenadines Clawed Gecko	Critically Endangered	SVG	
<i>Tetracheilostoma carlae</i>	Barbados Thread Snake	Critically endangered	Bar	
<i>Phyllodactylus pulcher</i>	leaf toed gecko	Critically endangered	Bar	
<i>Sphaerodactylus elegantulus</i>	Antigua Least Gecko	Data Deficient	A&B	IUCN Red List
<i>Sphaerodactylus kirbyi</i>	Bequia Dwarf/Pygmy Gecko		SVG	
<i>Tetracheilostoma breuili</i>	St. Lucia Thread Snake	Vulnerable	STL	IUCN
<i>Bothrops caribbaeus</i>	Fer de lance	Vulnerable	STL	Biophysical resource inventory of reptiles and amphibians 2009
<i>Sphaerodactylus microlepis</i> (subspecies <i>microlepis</i> and <i>thomasi</i> )	Pygmy gecko	Vulnerable	STL	
<i>Iguana cf iguana</i>	St Lucia Iguana	Critically endangered	STL	Biophysical resource inventory of reptiles and amphibians 2009
<i>Gymnophthalmus pleii luetkeni</i> and <i>nesydriion</i> )	ST Lucia Anole/ Zandoli	Least Concern	STL	Biophysical resource inventory of reptiles and amphibians 2009

<i>Clelia errabunda</i>	<i>St Lucia Cribo</i>	Extinct	STL	
<b><i>Boa constrictor</i></b> (one subspecies <i>orophias</i> )	<i>St Lucia Boa constrictor</i>		STL	
<b><i>Anolis extremus</i></b>				

A&B: Antigua and Barbuda; Bar: Barbados; Dom: Dominica; Gd: Grenada; SKN: St. Kitts and Nevis; STL: St. Lucia; SVG: St. Vincent and the Grenadines.

**Table 7: Endemic Amphibians in Barbados and the OECS**

Scientific Name	Local Name	Status	Distribution	Reference
<i>Eleutherodactylus euphronides</i>	Grenada Whistling Frog		SVG	
<i>Pristimantis shrevei</i>	St. Vincent Whistling Frog	IUCN Endangered	SGV	
<i>Eleutherodactylus johnstonei</i>	Johnstone's Whistling Frog	Least Concern	STL	Biophysical resource inventory of reptiles and amphibians 2009

A&B: Antigua and Barbuda; Bar: Barbados; Dom: Dominica; Gre: Grenada; SKN: St. Kitts and Nevis; STL: St. Lucia; SVG: St. Vincent and the Grenadines.

**Table 8: Endemic Flora (Flowering Plants) of Barbados and the OECS**

Scientific Name	Local Name	Status	Distribution	Reference
<i>Acalypha elizabethae</i>			STL	
<i>Acalypha vincentina</i>			STVG	
<b><i>Agave barbadensis</i></b>			Bar?	<a href="http://Intreasures.com/barbados.html">http://Intreasures.com/barbados.html</a>
<i>Asplenium malcolm-smithii</i>			SKN	
<i>Begonia pensilis</i>			STVG	
<i>Begonia rotundifolia</i>			STVG	
<i>Bernardia laurentii</i>			STL	
<i>Besleria elongata</i>			STVG	
<i>Besleria petiolaris</i>			Dom	
Bois Kwaib			Dom	
<i>Calliandra guildingii</i>			STVG	
<i>Charianthus dominicensis</i>			Dom	
<i>Charianthus grenadensis</i>			Grd	
<i>Chromolaena impatiolaris</i>			Dom	
<i>Chromolaena macrodon</i>			Dom	



<i>Chrysochlamys caribaea</i>	Bwa Mang. Palitivyé Wouj.	STL	
<i>Clidemia vincentina</i>		STVG	
<i>Coccoloba boxii</i>		A&B	
<i>Columnea speciose</i>		STVG	
<i>Croton guildingii</i>		STVG	
<i>Cuphea crudiana</i> (extinct)		STL	
<i>Cyathea elliottii</i>		Grd	
<i>Daphnopsis macrocarpa</i>		STL	
<i>Epidendrum discoidale</i>		Dom	
<i>Epidendrum vincentinum</i>		STVG	<a href="http://Intreasures.com/barbados.html">http://Intreasures.com/barbados.html</a>
<i>Gonolobus iyanolensis</i>		STL	
<i>Gonolobus waitukubuliensis</i>		Dom	
<i>Gonolobus youroumaynensis</i>		STVG	
<i>Gustavia antillana</i>		STVG	
<i>Hoffmannia tubiflora</i>		STVG	
<i>Inga dominicensis</i>		Dom	
<i>Lindernia brucei</i>		STVG	
<i>Lobelia brigittalis</i>		STVG	
<i>Lobelia sancta-luciaae</i>		STL	
<i>Malouetia retroflexa</i>		STVG	
<i>Maytenus grenadensis</i>		Grd	
<i>Meliosma herbertii</i>		STVG	
<i>Metastelma barbadense</i>		Bar	
<i>Miconia ernstii</i>		Dom	Carrington (2007)
<i>Miconia luciana</i>		STL	
<i>Miconia mornicola</i>		Dom	
<i>Miconia secunda</i>		STL	
<i>Odontocarya smithiorum</i>		STVG	
<i>Pectis ericifolia</i>		A&B	
<i>Peperomia cuneate</i>		STVG	
<i>Peperomia vincentiana</i>		STVG	
<i>Phyllanthus andersonii</i>		Bar	Carrington (2007)
<i>Pitcairnia micotrinensis</i>		Dom	
<i>Pitcairnia sulphurea</i>		STVG	
<i>Psidium guildingianum</i>		STVG	
<i>Rhytidophyllum caribaeum</i>		Grd	

<i>Rondeletia americana</i>	STVG
<i>Rudgea vincentina</i>	STVG
<i>Sabinea carinalis</i>	Dom
<i>Selenicereus innesii</i>	STVG
<i>Solanum urens</i>	STVG
<i>Thelypteris muscicola</i>	SKN
<i>Tibouchina chironioides</i>	Dom
<i>Tibouchina cistoides</i>	STVG
<i>Tibouchina cistoides</i>	STVG
<i>Tillandsia megastachya</i>	STVG
<i>Trigynaea antillana</i>	STVG
<i>Verbesina howardiana</i>	Dom
<i>Vernonia</i> (or <i>Lepida ploa</i> ) <i>pallescens</i>	STVG

A&B: Antigua and Barbuda; Bar: Barbados; Dom: Dominica; Gre: Grenada; SKN: St. Kitts and Nevis; STL: St. Lucia; STVG: St. Vincent and the Grenadines

**Table 9: Endemic Flora (Ferns) of Barbados and the OECS**

Scientific Name	Local Name	Status	Distribution	Reference
<i>Acrostichum</i> (or <i>Elaphoglossum</i> ) <i>smithii</i>			STVG	
<i>Asplenium godmani</i>				
<i>Cyathea tenera</i>				
<i>Pteris longibrachiata</i>			STVG	

A&B: Antigua and Barbuda; Bar: Barbados; Dom: Dominica; Gre: Grenada; SKN: St. Kitts and Nevis; STL: St. Lucia; STVG: St. Vincent and the Grenadines

## Appendix 18: Responses to STAP and Council comments

### Preventing Costs of Invasive Alien Species (IAS) in Barbados and the OECS Countries Response to STAP and GEFSec Reviews

	STAP Review and Council Comments	Proponents' response
1	The baseline situation in each country participating has been well-summarized, but surprisingly this listing has not been subject to a gap (or needs) analysis or lessons learned that map against the proposed Components of the PIF.	<p>The project has gathered information during PPG that allowed the proponents to have a better understanding of the region's needs or existing gaps in relation to dealing with IAS. In this sense, the project has included information in section "2.3 Threats, root causes and barrier analysis" and under section "2.6 The baseline analysis and gaps", where a description of the regional baseline as well as individual countries' data has been included. All together this information presents a scenario of the main challenges faced by the participating countries, and what has been done or is ongoing in relation to IAS.</p> <p>The project builds substantially on previous and ongoing efforts and its approach and actions have been revised accordingly. For instance, in the case of St. Kitts and Nevis, one of the main needs identified during PPG was the problem the country is having with Vervet Monkeys. In this sense and to maximize the impact on the ground, the project has adapted to include a new pilot for St. Kitts where the issue of the Vervet Monkey will be supported with the drafting of a management plan and some testing on the ground. Likewise, during PPG, discussions with more stakeholders for the Antigua and Barbuda pilot resulted in a slightly modified pilot to eradicate rats on three islands: Green Island; Smith Island; and Maiden Island. In addition, a biosecurity plan will be developed and implemented for 14 offshore islands. Both of these changes were made in order to meet the main needs identified during PPG.</p> <p>What is evident in terms of needs analysis is sustainability of actions with respect to IAS. In this context, the proposed project will enhance the sub-region's capacity to build capacity post-project by training trainers who can train new staff; material will be made available online for NGOs and the private sector to build their capacity; and awareness raising on IAS and their impact will be done in a way that encourages behavioral changes (e.g. away from the tendency to move plant material into or among islands, or to smuggle species via the pet and aquaria trade).</p>
2	The PIF lacks focus, and does not provide clear guidance for the PPG phase, with the indicators given mostly not relating directly to the outcomes under which they are listed.	During the PPG phase, extensive discussions were held on the project design and proponents are confident that the revised logframe included in the project document gives a more clear perspective of the project (see annex 4 of the project document). The outcomes, indicators and outputs have been revised to ensure alignment.
3	The logic behind the project is potentially workable in terms of linking field activities to developing an enabling environment, but the sequencing and synergies between	A more comprehensive description of what the project will do and the interaction and relation between its various components has been added throughout Section 3 "Intervention strategy".

	STAP Review and Council Comments	Proponents' response
	these activities needs to be worked out far more carefully.	<p>The project is framed under the scenario of existing social and economic interaction within SIDS of the OECS, and their lack of national policies, awareness and capacity to effectively deal with IAS. The lack of regional cooperation is also a major impediment, especially with regard to the management of pathways and therefore, the failure of one SIDS to effectively manage IAS means that all other islands are at increased risk.</p> <p>Due to this “regional” characteristic of high trade and movement of people, tourism, etc. within the OECS countries, the issue of IAS prevention and management is of paramount importance. In this sense, the project has been designed in a way that it will create an enabling environment to support the management, control, and eradication of IAS in the region through national and regional interventions. The project was designed under the premise that regional understanding of the problem and barriers, as well as improved national capacities to better respond to the IAS problem, are key for success. In this sense, the project has been designed in a way such that it will foster a suitable environment for regional cooperation (component 3) where aspects that are of common importance for the participating countries will be discussed and tools will be produced for the use of the wider Caribbean region. In addition, the project will also foster an enabling environment for national improvement in the response to the IAS problem. This will be done through the development of national strategies to manage, control and eradicate IAS; in situ support (through component 2 pilots) to address particular IAS problems, which will generate important lessons and experiences that can be transferred to all the region; and through technical tools that will support the implementation of the national strategies.</p> <p>The project will therefore rely on a two tier approach to achieve its objective and will promote regional cooperation (in close collaboration with exiting regional organizations such as USDA Aphis; Caribbean Agricultural Health and Food Safety Agency; and the Caribbean Plant Health Directors' Forum) and knowledge management as the main elements for the development of more advanced and appropriate national measures.</p> <p>The intervention logic of the project builds on the assumption that lessons learned by the countries will be shared openly with their neighbors and that the lessons learned from that exchange will be eventually embraced by the various Caribbean states to improved their capacity to manage IAS.</p>
4	How do the AIS activities in Antigua and Barbados feed into components 1 and 3 of the project, and vice versa?	<p>As explained above, the project's intervention logic considers two tiers: national and regional interventions, mainly due to the nature of the SIDS and their social and economic pathways of interaction. In this sense, Component 3 activities will be the main umbrella under which the region as a whole will improve its capacities to deal with IAS. This will be achieved through a regional awareness strategy to improve the region's understanding of the IAS problem, production of tools that can be used by all countries (not only those participating in this project) such as the mobile app and the website, and establishing sub-regional coordinating mechanisms to enhance early detection and rapid response with emphasis at high priority pathway entry points, amongst others.</p>

	STAP Review and Council Comments	Proponents' response
		<p>Activities under Components 1 and 2 are of a national nature and are designed to support three countries that designated their STAR allocation to address IAS during this GEF cycle. The three countries will therefore be supported in improving their national capacities to deal with IAS through the development of national IAS strategies and technical tools to support their implementation such as guidelines and protocols and also through the implementation of national awareness raising campaigns. In this sense, some of the elements from the awareness campaign and activities of Component 3 will be used in these three countries for the implementation of their national awareness actions.</p> <p>The other four countries participating in the project will not receive financial support through this project for implementation of awareness raising campaigns, but will benefit from the materials that will be generated under Component 3, which they can use as soon as they become available.</p> <p>In summary, capacities created under all the components will add to improve the region's capacity to manage IAS. National interventions such as the pilots (in situ work) on Antigua and Barbuda, Barbados and St. Kitts will serve as an example for other countries in the region and will generate expertise and information that will be shared under Component 3. Likewise, activities under Component 3 will enable sharing of information and experiences and the use of regional tools that will also benefit the national interventions.</p>
5	Is the project sensible in spending 75%+ of the budget on the enabling environment and only 20% of field activities?	<p>The project proponents understand the need for sustainability post project, and that the best way to ensure this is achieved is to establish the appropriate legal and policy framework. In this context, it is justifiable to allocate more to the enabling environment since the tools and the capacity for addressing IAS will be available to the wider Caribbean and the scaling up opportunities is potentially great. The concept of a regional fund for common IAS even if is partially successful will yield significant returns in the capacity of the region to tackle IAS and wider environmental issues in particular. However, in response to country needs, funds for field activities under component 2 have been increased, and now constitute 32% of the project budget for Components 1-3 (with 68% going towards the enabling environment). This responds directly to the countries needs to improve the opportunities for work on the ground and also to the specific need of St Kitts and Nevis to address the problems related to the Vervet Monkeys.</p>
6	The incremental reasoning is not made, as the links between the many listed activities related to AIS in the Eastern Caribbean and how exactly this project builds on these is not convincing.	<p>This is addressed in detail in sections 2.6 and 3.7 of the PRODOC. In the absence of GEF support, the region will more than likely continue its reactive approach to IAS that impact the agriculture sector and animal and human health, given that in the prevailing economic circumstances the countries are unlikely to hire staff to proactively deal with IAS issues. Some may attempt to establish or update National Invasive Species Strategies to address the more frequent introduction of new IAS. St. Lucia with a strategy in place for 2011-2015 can move towards implementing it in a more coordinated way. Regional partners will continue to invest in the region in support to the eradication, management and control of IAS, however with the political changes in key donor countries in the region UK and the USA, the funding situation of the regional partners is becoming increasingly tight.</p>

	STAP Review and Council Comments	Proponents' response
		<p>The funds for the Caribbean Plant Health Directors Forum (CPHDF) from the USDA are assured for 2017 and 2018. Nonetheless these efforts are not likely to be enough to equip the region with the needed capacities to improve their ability to manage, control and eradicate IAS. GEF funds will complement these efforts and will leverage resources that will valorize impact on the ground, contributing to the safeguarding of local biodiversity.</p> <p>One critical issue in managing IAS in SIDS in absence of the GEF support is the possibility to undertake regional activities, share lessons and experiences and foster south - south cooperation. Regional and International workshops such as those organized by CBD and FAO will continue to provide a platform for this, but will have limited scope and impact than those sub regionally or nationally and allow a greater critical mass to attend.</p> <p>With the support of the GEF, actions will be undertaken that will make it possible to address the barriers to stemming the tide of IAS invading the Caribbean. The GEF support will offer a timely intervention to more precisely define the problem and recommend the best policies and management tools that will contribute to the sustainable management of the problem in the future.</p> <p>The key philosophy of the proposed project is to identify the IAS pathways with the highest risks for IAS introductions; develop national policies and action plans to reduce the threat from IAS to biodiversity and the national economies; enhance coordination within and between sectors; and build capacity to identify IAS risks and then manage them via early detection and rapid response. The project also will provide the various stakeholders with the tools to effectively achieve this in a sustained manner into the future, and in a participatory manner develop codes of conduct to govern the actions of private sector operators engaged in high risk pathways in order to reduce risks via "self-enforcement".</p>
7	Several improvements to the project design should be considered mainly to rationalize the many actions proposed into a more logical grouping based on related scientific and technical needs.	<p>The biggest impediments to IAS management are a lack of policy, awareness, capacity and implementation of best management practices. The project is consistent with accepted management principles of IAS management and control that advocates prevention, early detection and rapid response. This will be achieved through components one and three. Quantifying the risks associated with the high risk pathways and understanding the nature of the risk will give insights into the most cost effective manner to mitigate these risks. Specific targeted recommendations will be made in this regard. Then the policy framework will be strengthened through support to the legal departments to update legislation. There is a demand for this as the sub-region moves to implement free movement of goods and services. Simultaneously, the protocols and best practices created in participatory manner with key stakeholders will lead to better coordination within and between countries. The capacity will be enhanced to strengthen prevention through the creation of a critical mass of skilled persons to conduct risk analysis; improve surveillance and interceptions at ports of entry where all deliberate and the majority of unintended introductions are introduced. The project will demonstrate in tangible ways that control, management and eradication of IAS is possible in small island situations, and that benefits to native biodiversity, livelihoods and the general economy are real and measurable.</p>

	STAP Review and Council Comments	Proponents' response
8	Also 36 months is a very short time to achieve the very large catalogue of proposed outputs described, which is a substantive risk not addressed.	The issue of project duration was discussed during the PPG phase, and the proponents are confident that the project will be undertaken in this timeframe. The main strategies that have/will be employed to ensure timely implementation are to have ready by the time the project is approved: a detailed first year work plan and budgets; the inception workshop planned; and through the focal points, to have the national coordinators shortlisted. The project's strategy is to work in parallel. This means that while the countries will be leading activities under components 1 and 2, with the use of consultants to deliver the key outputs, CABI will be moving forward with activities under component 3 and the overall regional coordination. It should be noted that various pilots proposed require around a year of actual implementation time. In addition, activities that normally take a long time are already being advanced during the late stages of the PPG, for instance information for the legal instruments that need to be signed between CABI-UN ENVIRONMENT, and between CABI and the countries, is already being gathered and templates will be circulated and discussed in advance with the aim of having all the needed documentation ready by the time the project starts.
9	Component 1. The Critical Situational Analyses Identification proposed mentions the Threatened Island Database as an example of a key source this, however, only covers threats from vertebrate IAS. Therefore at PPG stage more information should be provided about other taxa and the sources of expertise used to compile CSAs and recommend priorities for action together with the peer review mechanism to be used.	The project proposes to use various resources to feed into the development of the CSAs. In addition to the Threatened Island Database, these include the Global IAS Data base; Fishbase; CABI's Invasive Species Compendium, and several regional sources such as the National Herbarium in Trinidad and the Smithsonian, which have compiled databases on plant species in the Caribbean, and <a href="http://www.caribherp.org">www.caribherp.org</a> , which gives information on reptiles of the Caribbean. In addition, under Output 1.4 the project will create awareness of the various open access data sources and will offer a step-by-step approach on accessing and using these tools, once permission from these sources is obtained to share their data. These CSAs will be peer reviewed by the National Coordinating Committee, the international steering committee and the strategic partners, including the CBD secretariat.
10	Component 1. There needs to be greater specificity about what it means by "IAS management framework and cross sectoral arrangements". The indicators do not clarify or measure this achievement, but refer to higher level (project goals). Also consider expertise from outside the region and lessons learnt from e.g. the Pacific Invasives Initiative: <a href="http://rce.pacificinvasivesinitiative.org/">http://rce.pacificinvasivesinitiative.org/</a>	<p>Indicators have been revised. In the particular case of component 1, improved scores on the GEF tracking tool will be used as an indicator, in particular issues covered by points 1 to 4 in the tracking tool.</p> <p>In addition, outputs such as "cross sectoral arrangements" have been captured now as part of the national IAS strategies, with the aim of simplifying the project design and also to make the argument of the strategy more clear in terms of what it will include. This also includes the participatory manner in which the project will be implemented involving the stakeholders in high risk pathways such as the pet and aquaria trade; horticulture; trade in used vehicles; and international passenger travel to develop codes of conduct for their respective industries. The project will work with the respective industry representative bodies to ensure these are developed and implemented and to also make inputs both into the national and regional strategies.</p> <p>The project will benefit from the documented experiences and lessons learnt from the various Pacific IAS projects. Where possible a Secretariat for the Pacific Region Environment Programme (SPREP) representative will be invited to share experiences and attend our regional IAS working group meetings virtually. UN ENVIRONMENT is also the</p>



	STAP Review and Council Comments	Proponents' response
		IA for another regional IAS project in Pacific and will facilitate the sharing of experiences and lessons learnt between both projects.
11	Component 1. Public awareness and capacity building campaigns are mentioned several times under section c) of this component but Component 3 B 'Capacity Building and Awareness' would appear to be a more appropriate home for these activities, linked to the web portal and apps discussed elsewhere.	<p>The project document includes now a description of what is expected from the various awareness activities. Activities under component 3 are meant to benefit all the countries, and will produce tools that could also be adapted for used independently by each of the countries to improve their capacities and understanding towards IAS during or beyond project life.</p> <p>Activities under component 1 will support the 3 countries (Antigua and Barbuda, Barbados and St Kitts) to use some of the tools generated under component 3 for the implementation of national awareness campaigns during project life. In addition, while under component 3 data such as awareness levels, most popular media etc. will be helpful in developing the regional approaches and products; the tools from component 3 will be further complemented with additional ones that these countries will develop under their national awareness campaigns.</p>
12	Component 2. The pilot actions suggested for Antigua and Barbados are especially welcomed; these are well summarized and structured but there are no references or evidence provided as to whether these types of interventions have succeeded or failed in the past. However, if adequately documented (including a literature search) the pilots should be a useful source of knowledge that at PPG stage needs to be integrated into the plans for KM described elsewhere in the PIF. The pilot actions would likely be more effective as demonstrators if regional participation from local scientists/practitioners could be designed into the pilots rather than simply disseminating the results.	<p>This is addressed in Annex 16 - Pilot projects for Antigua and Barbuda of the UN ENVIRONMENT Prodoc. Indeed over the past two decades Antigua and Barbuda has eradicated rats on at least 10 offshore islands with notable benefits to biodiversity, in particular sea bird populations. This project will share these experiences with the wider Caribbean and get the stakeholders in Antigua to train stakeholders in other islands to do the same. Regional meetings under Component 3, as well as the regional steering committee meetings will be used for this. In addition, the project will network with the CBD secretariat, and will ensure that the project experiences are shared on CBD events when possible.</p> <p>The possibility of having scientists or technical personnel from other countries visiting the pilot sites as a learning opportunity will be analyzed and discussed at inception meeting, once the date for pilots commencement will be set after the project's approval. Project resources are currently limited to cover this, but if countries could cover the travel expenses of some representatives, the project will assist in coordinating the visits and ensuring they are productive. In addition, after the first year the budget will be revised and if funds allow, then the project will include this activity.</p>
13	Component 3. This presents a comprehensive set of actions some of which are going to be very expensive and probably requiring trade-offs between them. For example the ambition to survey and map all of the IAS on all of the islands (all countries or just the islands of the pilots	Introduced vertebrates such as rats; mongooses; feral pigs; feral goats; cats; dogs; and donkeys are the main vertebrates that are having the biggest impact on endemic biodiversity in the target countries, and numerous studies have compiled significant information on these IAS and the threats they pose to native flora and fauna. However, information on the impacts of IAS flora is much less available; although studies have demonstrated links between invasive plants and increased frequency and severity of wild fires, there are relatively few studies on other impacts of IAS flora. Nevertheless, it is widely held that invasive plants have changed the ecology / ecosystem functions of environmentally sensitive areas in the target countries, for example by reducing suitable nesting habitats for native



	STAP Review and Council Comments	Proponents' response
	- not clear), is going to take considerable resources, and might be best undertaken using the CSA for species as well as pathways described in Component 1 to prioritize this work.	birds. For this reason, the project will carry out surveys only on invasive plants (see Component 3) in order to demonstrate the severity of the problem and to create awareness of the problem. However the project will not seek to reinvent the wheel. Before undertaking any surveys, the project will first consult with the Smithsonian Institute, the University of the West Indies, the Centre for Marine Environmental Sciences, and the National Herbarium of Trinidad and Tobago (CABI has existing relationships with all of these institutions) to assess their existing data on species distribution. Following that, rapid surveys will be carried out of suspected IAS flora that have not been covered in previous surveys and are believed to have significant impacts on native biodiversity.
14	Component 3. Is a suitable common mapping tool and database in place already, and if not what is proposed?	As outlined above many of this data already exists such as the CABI Invasive Species Compendium. This open source is now being updated so that all the distribution data will be automatically displayed on maps. This feature will be fully functional before the project is started therefore the project will ensure that the data for the Caribbean is updated and available freely. CABI will do rapid surveys for invasive plants and transects in sensitive areas to have more updated distribution data for invasive plants which have not been sufficiently highlighted in the past.
15	Component 3. Amongst the rest of the proposed actions in this Component the PIF is not clear on what amongst the actions are top priorities and the PIF describes several (at least 4) potential outputs as "efforts" rather than firm outputs to be committed to.	These have been addressed in the log frame and the outputs are now clearly identified.
16	Overall there are 19 outputs, which may be too many to allow the project to focus.	The number of outputs has been reduced to improve the project focus. Please see the new logframe and the table showing changes from the PIF in Section A of the CEO Endorsement Request. In addition, a better description of what is behind each of the outputs has been added to the description of the components on the alternative scenario.
17	A large number of very general outputs are listed, but with little technical description of exactly what they mean, or reference to where these have been done elsewhere and experience learned.	Please refer to the section of alternative scenario in the project document. The proponents have addressed this under that section improving the description of the outputs and technical description of what they will mean.
18	There are many un-defined terms " such as "critical situation analyses", "national invasive species strategies", "cross sectoral arrangements", "legal frameworks", "regulatory guidance and protocols", "awareness and capacity building programs", "procedures, codes of conduct and incentive systems", "national cost recovery financial mechanisms".	<p>The terminology used is aligned with the regional CBD workshop with key project executants, which took place at the PIF stage. Nonetheless, these terms are now clearer through the more detailed descriptions of project outputs and activities in the Alternative Scenario. In addition, a brief description of these concepts is provided below.</p> <ul style="list-style-type: none"> <li>• Critical situation analysis: this is a gap analysis of the current status of IAS management from the policy situation; human resource capacity; identification of the coordinating mechanisms; funding mechanisms as well as a list of the key invasive and potential IAS that can threaten biodiversity in a country.</li> <li>• National invasive species strategy: outlines the existing legal framework for action and provide guidelines and an action plan for preventing, early detection and rapid response; and management frameworks for IAS.</li> </ul>

	STAP Review and Council Comments	Proponents' response
		<ul style="list-style-type: none"> <li>• Cross sectoral arrangements: IAS affects multiple economic sectors and requires cross sector participation to effectively control them</li> <li>• Legal frameworks refer to the existing laws and regulations that allow the authorities to act to deal with IAS issues.</li> <li>• Regulatory guidance and protocols: refers to the procedures and practices that are in place to with a focus on the preventing new IAS introductions</li> <li>• Awareness and capacity building programs: set of actions designed to raise awareness and build human capacity to address IAS issues</li> <li>• Codes of conduct: guidelines and recommendations for stakeholders in the same business sector to abide by to minimize the introduction</li> <li>• Incentive systems: incentives for the general public to participate in IAS control eg bounty system</li> <li>• National cost recovery financial mechanisms: fees for a service or taxes for generating income for IAS management.</li> </ul>
19	<p>One area that can be substantially improved since the previous GEF project is online (live) knowledge management. The website developed during the MTIASIC project CIASNET.ORG, has been cited by the proponent as the preferred online tool, including for use as a data repository. STAP's review of this website indicates that the project has created a useful resource, but that the site's potential (currently limited to English only), for hosting or connecting to monitoring data, early warning information or acting as a clearing house for soliciting action at national or regional level, remains to be developed; the last update appears to be at least two years ago. The proponent should further detail how the long term sustainability of this KM platform may be funded and staffed and what incentives or obligations are being agreed between countries in the region to ensure that this proposed IAS clearing house is effective,</p>	<p>The CIASNET.ORG website has been of great help and a useful tool in raising awareness and providing information on IAS. Despite the non-updating the site, the monthly average of visits for 2017 are as follows:</p> <ol style="list-style-type: none"> <li>Unique visitors: 2,500</li> <li>Number of visits: 3,500</li> <li>Number of hits: 55,500</li> </ol> <p>The resources does not allow for multiple languages beyond making google translator on the site. This has however not prevented access by non-English speaking countries. Some attempts were made to get funding but the stakeholders were not comfortable with pesticide companies who were the main ones interested in advertising.</p> <p>During this project, the site will be made both, a repository of information on IAS in the Caribbean as well as a valuable resource of contact information on key stakeholders in the region, and it will facilitate linkages with other regions, for example the Pacific where both UN ENVIRONMENT and CABI work with other stakeholders to manage IAS.</p> <p>During project implementation, the current CIAS.NET will be updated to serve as a communication and coordinating hub both for the project as well as regional IAS issues in general. All of the training courses done under the project will be posted as e-learning modules on CIAS.NET so that the site will be used as an online open source to support national capacity building efforts to manage IAS. The site will contain materials specific to trainers to use for training others. Material will also be available to encourage new recruits engaged in IAS management to improve their skills while on the job. Reports from the database of IAS interceptions at airports and seaports will also be posted on the site. Participating counties will have country pages to highlight their national IAS lists, black lists of species to be kept out of the countries, and commodities and species that are free to be traded. The current skills database on the site</p>

	STAP Review and Council Comments	Proponents' response
	<p>including relevant indicators. STAP encourages proponents to use existing databases and information management tools wherever possible before building unique datasets, and consider appropriate interoperability standards. Within the KM section of the full proposal these aspects should be set out clearly and referenced within the body of the proposal.</p>	<p>will be updated to include IAS experts currently active in the participating countries as well as those whose capacity to manage IAS will be developed by the project. During project implementation the various baseline data for IAS in participating countries will be translated into distribution maps and made available on the site, which will address a significant gap in this type of information in the Caribbean.</p> <p>CABI and the project team will work with existing regional partners to ensure that this hub will continue to operate post-project. Lessons learned from the previous MTIASIC project and stakeholder inputs during project preparation indicate that this site should be managed by stakeholders in the region. However, should this prove to be unsustainable or if regional agencies such as the OECS Secretariat or CARAPHA are unwilling to continue to manage the site as a regional resource, the site will be migrated to a CABI-managed online resource such as the Invasive Species Compendium or a new resource to be developed as part of a Global Initiative on Invasive Species</p> <p>More information can be found under output 3.2.2 on the alternative scenario section.</p>
	<p><u>Germany:</u> Germany approves this PIF in the work program but asks that the following comments are taken into account: Suggestions for improvements to be made during the drafting of the final project proposal:<sup>[1]</sup><sub>[SEP]</sub></p> <ul style="list-style-type: none"> <li>• This project spans across several islands therefore mechanisms coordination and information sharing will be crucial for project success. Germany therefore suggests that the PIF should indicate areas of cooperation and information sharing among the islands, as well as sharing of resources, based on a pre- scheduled timeline.</li> </ul>	<p>The comment from Germany at the PIF stage has been addressed in Component 3: Regional Biosecurity of the project, and Appendix 5 in the Prodoc provides a timeline for implementing the activities under Component 3.</p> <p>Under Component 3, the following activities will be done in a collaborative manner using shared resources both from the GEF and from the co-financing pledged by project partners:</p> <ul style="list-style-type: none"> <li>• Regional strategy for prevention and surveillance at ports of entry (i.e. customs) developed</li> <li>• Regional IAS Working Group established:</li> <li>• Database established for interceptions at ports</li> <li>• A Strategic plan for the Regional Financing System for shared IAS developed</li> <li>• Regional technical capacity developed to conduct risk assessment and measure economic impact of IAS</li> <li>• <u>CIAS.NET</u> strengthened as a learning network for IAS</li> </ul> <p>Another key factor built into the project execution is the establishment of national steering committees as well as the international project steering committee. The latter will comprise representatives from the national committees and its key role is to ensure that there is collaboration and resource sharing among project executants.</p>

	STAP Review and Council Comments	Proponents' response
		<p>The Free Circulation of Goods in the OECS has been a critical component of the Revised Treaty of Basseterre, which heralds the deepening of the integration process among the Member States of the OECS and the creation of an Eastern Caribbean Economic Union (ECEU). One of the main features of the ECEU is the establishment of an OECS Customs Union, which facilitates the free circulation of goods. Although all the structures are not in place to make this provision fully operational, full implementation of the free circulation of goods is imminent. Although SPS measures will still be enforced, the freer movement of people and goods will likely to result in greater movement of IAS. The creation of the ECEU reflects the substantial political will in the region for the collaboration and sharing of resources to achieve the free movement of goods and services in the OECS; it also reflects the political will that exists to strengthen collaboration and resource sharing, which the project will assist the region to accomplish via capacity building and the development of information sharing and decision-making tools.</p>

## Appendix 19: Responses to GEFSEC comments



### GEF-6 GEF SECRETARIAT REVIEW FOR FULL-SIZED/MEDIUM-SIZED PROJECTS THE GEF/LDCF/SCCF TRUST FUND

GEF ID:	<b>9408</b>		
Country/Region:	<b>Regional (Antigua and Barbuda, Barbados, Dominica, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines)</b>		
Project Title:	<b>Preventing COSTS of Invasive Alien Species (IAS) in Barbados and the OECS Countries</b>		
GEF Agency:	<b>UN ENVIRONMENT</b>	GEF Agency Project ID:	
Type of Trust Fund:	<b>GEF Trust Fund</b>	GEF Focal Area (s):	<b>Biodiversity</b>
GEF-6 Focal Area/ LDCF/SCCF Objective (s):		<b>BD-2 Program 4;</b>	
Anticipated Financing PPG:	<b>\$133,333</b>	Project Grant:	<b>\$3,747,945</b>
Co-financing:	<b>\$5,040,000</b>	Total Project Cost:	<b>\$8,787,945</b>
PIF Approval:		Council Approval/Expected:	
CEO Endorsement/Approval		Expected Project Start Date:	
Program Manager:	<b>Sarah Wyatt</b>	Agency Contact Person:	<b>Kristin Mclaughlin</b>

### PIF Review

Review Criteria	Questions	Secretariat Comment	Agency Response
<b>Project Consistency</b>	1. Is the project aligned with the relevant GEF strategic objectives and results framework? <sup>10</sup>	April 6, 2016  Thank you for the revisions. During PPG, please make sure to articulate the ties/logic of working on agricultural pests with IAS that	During the stakeholder consultations a strong case was made by stakeholders in both Barbados and St. Kitts and Nevis for working with Vervet Monkey that is reported to be both a major pest to all crops grown as well as impacting native plants and

<sup>10</sup> For BD projects: has the project explicitly articulated which Aichi Target(s) the project will help achieve and are SMART indicators identified, that will be used to track the project's contribution toward achieving the Aichi Target(s)?

		threaten globally significant biodiversity.	birds (see section 3, output 2.1 of the Prodoc). Observations in St. Kitts suggests that in three national parks where the monkey population is active due to their feeding habits that drops a lot of food on the ground encourages high populations of black rats. Giant African snail and red palm mite were other examples of serious agricultural pests that were affecting native plants that can potentially lead to serious negative impact on biodiversity.
	2. Is the project consistent with the recipient country's national strategies and plans or reports and assessments under relevant conventions?		
<b>Project Design</b>	3. Does the PIF sufficiently indicate the drivers <sup>2</sup> of global environmental degradation, issues of sustainability, market transformation, scaling, and innovation?	<p>April 6, 2016</p> <p>Thank for you these changes. Sustainability of many of these activities will be critical to the long term success of these efforts beyond the period of GEF funding, please ensure financial sustainability during PPG.</p>	<p>Financial sustainability post project will benefit from several actions that will be implemented by the project these include:</p> <ol style="list-style-type: none"> <li>1. Incorporating the private sector and air and sea ports as far as possible during the project implementation in developing strategies, policies and action plans</li> <li>2. Targeting the private sector in all the awareness raising activities</li> <li>3. Examining and recommending a workable model for a designated fund to work on common IAS problems in the region. This will be done in close collaboration with regional organizations and the OECS commission sustained implementation post project</li> <li>4. Trainers will be trained to continue to build capacity post-project, supported by training manuals and teaching aids</li> <li>5. The project will work closely with the OECS secretariat that is currently implementing a regime of free movement of goods and services; in this context the risk assessment and surveillance protocols developed will be continued to be implemented post project</li> <li>6. Tools to be developed under the project such as the mobile</li> </ol>

			<p>app for the identification of IAS and identification manuals will assist with surveillance and increase interceptions at air and seaports, which will offer protection to economic sectors such as agriculture and tourism while protecting globally important biodiversity</p> <p>7. Management eradication of key IAS on 3 offshore islands and management plans for managing important IAS will also contribute to financial sustainability. See section 3.8 of the Prodoc.</p>
	4. Is the project designed with sound incremental reasoning?	<p>April 6, 2016</p> <p>No. The budget for component 3 seems excessive, particularly given co-finance and that it seems to largely be the work of consultants. Please revise or provide justification for this budget or enhance the activities listed.</p>	<p>The budget for component 3 has been reduced (see table B of the CEO Endorsement and Annex 1 of the Prodoc). Consultants are needed since there is capacity in these SIDS is limited to manage all of the issues for which the project may need expertise. However, all consultants that will be engaged will deliver training materials that will contribute to the regional capacity. Where feasible the capacity that exist in the region will be used in the undertaking these various consultancies. Also some of the consultancies are for developing concrete tools to aid in identification of IAS and improve surveillance at the ports of entry. The consultancies will also address significant information gaps as it relates to IAS in the participating countries. In addition, the creation and active work of the working groups that will be created by the project at national and regional level will add to the sustainability of the results and ensure that local expertise and personnel is not only involved, but up-to-date with the information.</p>
	5. Are the components in Table B sound and sufficiently clear and appropriate to achieve project objectives and the GEBs?	<p>April 6, 2016</p> <p>Thank you for the revisions. During PPG, special attention will need to be paid to ensuring the coherence and GEF-appropriateness of component 1 with activities such as “cost recovery mechanism” being fully fleshed out.</p>	<p>The seriousness of the loss of biodiversity warrants the setting up of a dedicated sustainable funding mechanism to combat IAS at the national level. Such a mechanism can also contribute to joint public private sector collaboration on IAS. The project will review successful models and provide costed models for adoption by countries. A range of possibilities will be explored such as: an import levy on all goods entering the country, especially those which pose a significant risk such as horticultural/ornamental plants and pets; fees for export</p>



		Through a GEF supported project, Cuba has had quite a bit of success in developing a national invasive species strategy and may be a good opportunity for learning and collaboration.	certification/clearance services, to be recovered from exporters of certain products and live animals; charges from transport, travel & tour operators, and agriculture & construction machinery owners, traders transporting livestock, agricultural products and related goods; a tourism levy similar to that imposed on visitors to Galapagos, a large percentage of which will be used for IAS management; fines for non-compliance with IAS management requirements and through general taxation; and levies on water usage (invasive woody and aquatic invasive species use copious amounts of water). The appropriateness of these for likely success in the OECS will be explored. Additional details on what the project is expecting to do on cost recovery can be found in the alternative scenario section of this document. The MTIASIC project did established contacts with the National authorities in Cuba. A meeting of the steering committee of the MTIASIC project was held there to learn first-hand of some of their approaches. The OECS region has strong ties with Cuba and these will be built on to continue the learning experiences with Cuba. Similar to what was done under the MITISAC, a Cuban representative will be invited to the inception workshop of this project to share their experiences.
	6. Are socio-economic aspects, including relevant gender elements, indigenous people, and CSOs considered?		
<b>Availability of Resources</b>	7. Is the proposed Grant (including the Agency fee) within the resources available from (mark all that apply):		
	• The STAR allocation?		
	• The focal area		



	allocation?		
	<ul style="list-style-type: none"> <li>The LDCF under the principle of equitable access</li> </ul>		
	<ul style="list-style-type: none"> <li>The SCCF (Adaptation or Technology Transfer)?</li> </ul>		
	<ul style="list-style-type: none"> <li>Focal area set-aside?</li> </ul>		
<b>Recommendations</b>	8. Is the PIF being recommended for clearance and PPG (if additional amount beyond the norm) justified?		
<b>Review Date</b>	Review		
	Additional Review (as necessary)		
	Additional Review (as necessary)		

## **Appendix 20: Theory of change (separate file)**