



UNITED NATIONS ENVIRONMENT PROGRAMME

Programme des Nations Unies pour l'environnement Programa de las Naciones Unidas para el Medio Ambiente
 Программа Организации Объединенных Наций по окружающей среде برنامج الأمم المتحدة للبيئة

联合国环境规划署



PROJECT DOCUMENT

SECTION 1: PROJECT IDENTIFICATION

1.1	Project title:	Mitigating the Threats of Invasive Alien Species in the Insular Caribbean	
1.2	Project number:	GFL/-2328-2740-4995 PMS: GF-1030-08-02	
1.3	Project type:	FSP	
1.4	Trust Fund:	GEF	
1.5	Strategic objectives:		
	GEF strategic long-term objective:	SO3	
	Strategic programme for GEF IV:	BD-SP 7: Invasive Species	
1.6	UNEP priority:	Ecosystem Management	
1.7	Geographical scope:	Regional (Caribbean): Bahamas, Dominican Republic, Jamaica, Saint Lucia, Trinidad & Tobago	
1.8	Mode of execution:	External	
1.9	Project executing organization:	CABI	
1.10	Duration of project:	48 months Commencing: April 2009 Completion: March 2013	
1.11	Cost of project	US\$	%
	Cost to the GEF Trust Fund	3,034,027	47.3
	Co-financing		
	Cash		
	The Bahamas	171,965	2.7
	Dominican Republic	321,000	5
	Jamaica	664,930	10.4
	Saint Lucia	270,000	4.2
	Trinidad & Tobago	406,288	6.3
	CABI	60,000	0.9
	<i>Sub-total</i>	1,894,183	29.5
	In-kind		
	The Bahamas	184,262	2.9
	Dominican Republic	300,100	4.7
	Jamaica	325,028	5.1

Saint Lucia	400,000	6.2
Trinidad & Tobago	155,794	2.4
CABI	120,000	1.9
<i>Sub-total</i>	1,485,184	23.2
Total	6,413,394	100

1.12 Project summary

Invasive Alien Species (IAS) are a major threat to the vulnerable marine, freshwater and terrestrial biodiversity of Caribbean islands and to the people depending on this biodiversity for their livelihoods. Caribbean states have recognised the need for a regional strategy and expressed strong interest in linking their national efforts in implementing Article 8 (h) of the CBD to mitigate the threats of IAS in the Caribbean; they are also contracting parties to several other international instruments addressing IAS threats. The proposed GEF project aims to broaden the approach to dealing with IAS, both by strengthening existing national measures and by fostering regional cooperation frameworks through which Caribbean-wide strategies can be developed. In parallel with participation in the development of national and regional strategies, each country will also address its own most pressing IAS problems through a total of twelve pilot projects, relating to prevention, early detection and rapid response, management and eradication of the most problematic IAS. In all the pilots there is a strong emphasis on capacity building among Government staff and other practitioners, as well as raising awareness of IAS issues among a wider stakeholder group including the general public. The pilots are designed so that their findings and lessons learned will be readily applicable to other sites, including other Caribbean states, enabling replication of the methodologies. Through this combination of synergistic approaches, the proposed project aims to provide the participating countries and others in the Caribbean region with the necessary tools and capacity to address existing and future biological invasions.

TABLE OF CONTENTS

SECTION 1: PROJECT IDENTIFICATION	1
ACRONYMS AND ABBREVIATIONS.....	4
SECTION 2: BACKGROUND AND SITUATION ANALYSIS (BASELINE COURSE OF ACTION)	8
2.1. Background and context	8
2.2. Global significance	9
2.3. Threats, root causes and barrier analysis.....	11
2.4. Institutional, sectoral and policy context	19
2.5. Stakeholder mapping and analysis.....	24
2.6. Baseline analysis and gaps	31
2.7. Linkages with other GEF and non-GEF interventions	39
SECTION 3: INTERVENTION STRATEGY (ALTERNATIVE)	40
3.1. Project rationale, policy conformity and expected global environmental benefits... 	40
3.2. Project goal and objective	43
3.3. Project components and expected results	43
3.4. Intervention logic and key assumptions.....	51
3.5. Risk analysis and risk management measures	53
3.6. Consistency with national priorities or plans.....	54
3.7. Incremental cost reasoning	55
3.8. Sustainability	57
3.9. Replication.....	59
3.10. Public awareness, communications and mainstreaming strategy	60
3.11. Environmental and social safeguards	61
SECTION 4: INSTITUTIONAL FRAMEWORK AND IMPLEMENTATION ARRANGEMENTS.....	62
SECTION 5: STAKEHOLDER PARTICIPATION	63
SECTION 6: MONITORING AND EVALUATION PLAN.....	64
SECTION 7: PROJECT FINANCING AND BUDGET	65
7.1. Overall project budget.....	65
7.2. Project co-financing	63
7.3. Project cost-effectiveness.....	68

ACRONYMS AND ABBREVIATIONS

AIWG	Alien Invasive Working Group, Jamaica
AOSIS	Alliance of Small Island States
BEST Commission	Bahamas Environment, Science and Technology Commission
BERC	Bahamas Environmental Research Center
BNT	Bahamas National Trust
BREEF	Bahamas Reef Environmental Foundation
BW	Ballast Water
CABI	Centre for Agricultural Bioscience International
CABI CLA	Centre for Agricultural Bioscience International - CABI Caribbean and Latin America, Trinidad & Tobago
CAHFSA	Caribbean Agricultural, Health and Food Safety Agency (CARICOM)
CAR/RCU	Caribbean Regional Coordinating Unit of UNEP, Jamaica
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CARINET	The Caribbean Taxonomic Network of BioNET-International
CARIPESTNET	Caribbean Pest Information Network
CBD	Convention on Biological Diversity
CCAM	Caribbean Coastal Area Management Foundation, Jamaica
CCCCC	Caribbean Community Climate Change Centre
CEP	Caribbean Environment Programme (UNEP)
CERMES	Centre for Resource Management and Environmental Studies (UWI, Barbados)
CFCS	Caribbean Food Crop Society
CHM	Clearing House Mechanism
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement, France
CISSIP	Caribbean Invasive Species Surveillance and Information Program (CISWG)
CISWG	Caribbean Invasive Species Working Group
CITES	Convention on the International Trade in Endangered Species of Wild Fauna and Flora
COP	Conferences of the Parties
COPE	Council of Presidents of the Environment, Trinidad & Tobago
COTED	Council for Trade and Economic Development (CARICOM)
CPACC	Planning for Adaptation to Climate Change Project
CPPC	Caribbean Plant Protection Commission (IPPC)
CPR	Cardio-pulmonary Resuscitation
CRISIS	Caribbean Regional Invasive Species Intervention Strategy (CISWG)
CSA	Critical Situation Analysis
DEPI	Division of Environmental Policy Implementation (UNEP)
DR-CAFTA	Dominican Republic – Central American Free Trade Agreement
EA	Executing Agency
EEZ	Exclusive Economic Zone
ELI	Environmental Law Institute, USA
EMA	Environmental Management Authority, Trinidad & Tobago
EMD	Environmental Management Division, Jamaica
EOU	Evaluation and Oversight Unit (UNEP)
EVI	Environmental Vulnerability Index
FAMU	Florida Agricultural and Mechanical University, USA

FAO	Food and Agriculture Organisation of the UN
FoProBiM	Fondation pour la Protection de la Biodiversité Marine, Haiti
FPR	Frosty Pod Rot
FSP	Full Size Project
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information Systems
GISIN	Global Invasive Species Information Network
GISD	Global Invasive Species Database
GISP	Global Invasive Species Programme
GLISPA	Global Island Partnership (CBD)
GPS	Geographic Positioning System
IA	Implementing Agency
IABIN-I3N	Inter-American Biodiversity Information Network – Invasives Information Network
IAS	Invasive Alien Species
IC	International Coordinator
ICAO	International Civil Aviation Organisation
IICA	Inter-American Institute for Cooperation on Agriculture
IMA	Institute of Marine Affairs, Trinidad & Tobago
IMO	International Maritime Organisation
IOJ	Institute of Jamaica
IPPC	International Plant Protection Convention
ISC	Invasive Species Compendium (CABI)
ISPM	International Standards for Phytosanitary Measures
ISSG	Invasive Species Specialist Group (IUCN)
IUCN	The World Conservation Union
IWCAM	Integrating Watershed and Coastal Area Management
IWS	International Workshop
JCDT	Jamaica Conservation and Development Trust
JCRMN	Jamaica Coral Reef Monitoring Network
JIRG	Jamaican Iguana Recovery Group
JIRCG	Jamaican Iguana Research and Conservation Group
JNCC	Joint Nature Conservation Committee, UK
LBS Protocol	Protocol Concerning Pollution from Land-Based Sources and Activities
LMOs	Living Modified Organisms
LPC	Lead Partnering Countries
MACC	Mainstreaming and Adaptation to Climate Change Project
MALFF	Ministry of Agriculture, Lands, Forestry and Fisheries, Saint Lucia
MALMR	Ministry of Agriculture, Land and Marine Resources, Trinidad & Tobago
M&E	Monitoring and Evaluation
MEA	Multilateral Environmental Agreement
MESI	Marine & Environmental Studies Institute (College of The Bahamas)
MIS	Marine Invasive Species
MISA	Marine Invasive Alien Species
MoA	Ministry of Agriculture, Jamaica
MSP	Medium Size Project
NASD	Nonindigenous Aquatic Species Database (USGS)
NBSAP	National Biodiversity Strategy and Action Plan
NC	National Coordinator
NEA	National Executing Agency

NEPA	National Environment Planning Agency, Jamaica
NEPAD	Environment Action Plan of the New Partnership for Africa
NGO	Non-Governmental Organisation
NISS	National Invasive Species Strategy
NPF	Nature Preservation Foundation, Jamaica
NPPO	National Plant Protection Organisations (IPPC)
NSC	National Steering Committee
OECS	Organisation of Eastern Caribbean States
OFP	Operational Focal Point
OT	Overseas Territory
PAHO	Pan-American Health Organisation
PBPA	Portland Bight Protected Area, Jamaica
PDF-A	Project Development Facility A
PHMB	Pink Hibiscus Mealybug
PIF	Project Identification Form
PIR	Project Implementation Review
PIU	Project Implementation Unit
PMU	Project Management Unit
PPG	Project Preparation Grant
PRINCE 2	Projects in Controlled Environment – 2
PSA	Public Service Announcements
PSC	Project Steering Committee
RAC/REMPEITC	Regional Activity Centre - Regional Marine Pollution Emergency, Information and Training Centre Caribbean, Curaçao
RADA	Rural Agriculture Development Authority, Jamaica
REEF	Reef Environmental Education Foundation, Florida, USA
RIAS	Regulatory Impact Assessment
RPM	Red Palm Mite
RREAP	Rapid Response / Emergency Activity Development
RPPO	Regional Plant Protection Organisation (IPPC)
RSP	Regional Seas Programme (UNEP)
SBSTTA	Subsidiary Body for Scientific, Technical and Technological Advice (CBD)
SEMARENA	Secretaria del Estado de Medio Ambiente y Recursos Naturales, Dominican Republic (Secretary of State for Environment and Natural Resources)
SIDS	Small Island Developing States
SCCs	Site Coordinating Committees
SLFD	Saint Lucia Forestry Department
SPAW	Specially Protected Areas and Wildlife
SPS	Sanitary and Phytosanitary
SRP	Species Recovery Plan
STENAPA	Saint Eustatius National Park
SUSTRUST	Trust for Sustainable Livelihoods, Trinidad & Tobago
TEU	Twenty-foot Equivalent Unit
TNC	The Nature Conservancy
TNC-DR	The Nature Conservancy(-Dominican Republic)
UDC	Urban Development Corporation, Jamaica
UF-IFAS	University of Florida – Institute for Food and Agricultural Sciences
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention of the Law of the Sea

UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNGCSIDS	United Nations Global Conference on the Sustainable Development of Small Island States
USA	United States of America
USAC-JSAC	University Sub-Aqua Club & Jamaica Sub Aqua Club
USDA-APHIS	United States Department of Agriculture – Animal and Plant Health Inspection Service
USGS	United States Geological Survey
UWI	University of the West Indies
WCR	Wider Caribbean Region
WHO	World Health Organisation
WTO	World Trade Organisation

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

2.1. Background and context

1. Invasive Alien Species (IAS) are a major threat to the vulnerable marine, freshwater and terrestrial biodiversity of Caribbean islands and to people depending on this biodiversity for their livelihoods. Caribbean states have recognised the need for a regional strategy and expressed strong interest in linking up their national efforts in implementing Article 8 (h) of the Convention on Biological Diversity (CBD) to mitigate the threats of IAS in the Caribbean. Countries in the Caribbean are also contracting parties to the *Convention on the Protection and Development of the Marine Environment of the Wider Caribbean* of 1983 and its *Protocols on Specially Protected Areas and Wildlife* (SPAW Protocol of 1990) and *Pollution from Land-Based Sources and Activities* (LBS Protocol) of 1999. Article 12 of the SPAW Protocol refers specifically to the control of alien species. Responding to this need, CABI, in collaboration with a wide range of partners, has developed a proposal titled “*Mitigating the Threats of Invasive Alien Species in the Insular Caribbean*” for funding by the Global Environment Facility (GEF) through the United Nations Environment Programme (UNEP).

2. In July 2006, the first funding cycle, Project Development Facility-A (PDF-A) was granted by GEF, supported by a noteworthy co-financing ratio of 1:6. Activities under PDF-A had the following six countries as focal points: the Bahamas, Cuba, Dominican Republic, Jamaica, Saint Lucia and Trinidad & Tobago. During the PDF-A phase the pilot countries began to define their current state of knowledge regarding IAS (databases, diverse taxonomic inventories, best practice, toolkits, etc). They also started to analyse how their existing national legislation and programmes, as well as their obligations under multilateral agreements and conventions, address the management of IAS. This work was continued and expanded during the second phase in the GEF project development cycle, the Project Preparation Grant (PPG), with a focus on identifying gaps, inconsistencies and conflicts in national policies and programmes in order to prioritise the actions needed.

3. The PDF-A phase was completed with an international workshop in January 2007. A final report has been prepared¹. Unfortunately Cuba withdrew its engagement after completing PDF-A, but will be kept informed about project advances.

4. In April 2008 the PPG was initiated. This phase will last until the middle of January 2009. The following activities, to be carried out during the PPG phase, were designed to provide essential information and data for the preparation of this Full Size Project (FSP) proposal, and to build up a knowledge base to identify and design a series of country-specific IAS pilot projects:

- ◆ Collate gaps in existing plans and policies as a baseline for a strategic review under the FSP
- ◆ Outline national and regional communication and capacity-building strategies for the FSP, with a view towards the development of a Caribbean-wide cooperation strategy under FSP
- ◆ Develop criteria and initiate baseline surveys for species and site selection for pilot projects, define pilot projects in each of the five countries, and provide initial technical inputs for tentative project design and activity costing at national level

¹ Lopez V, Krauss U, Seier M, Polar P, Murphy S (2007). *Mitigating the Threats of Invasive Alien Species in the Insular Caribbean*. Final Technical Report, Project Development Facility - A (PDF-A), GFL / 2328 - 2711 – 4937, GEF, UNEP, CABI Caribbean and Latin America, Trinidad & Tobago, pp. 95.

The present proposal for the FSP is the main output of the PPG phase. If approved by the GEF, the FSP will thus be the third and culminating phase of the GEF initiative. It is anticipated to start in the middle of 2009 and to last for four years.

2.2. Global significance

5. The Wider Caribbean Region (WCR, Figure 1) is defined in Article 2.1 of the Cartagena Convention as the "marine environment of the Gulf of Mexico, the Caribbean Sea and the areas of the Atlantic Ocean adjacent thereto, south of 30° north latitude and within 200 nautical miles of the Atlantic coasts of the United States of America (USA)". This geographic area extends from Florida (USA) in the north to French Guiana, on the North Coast of South America, in the south and east. The WCR comprises the 36 United Nations (UN) member states and territories that created the Caribbean Environment Programme (CEP). Several dependent territories are officially part of three European nations, with all the associated exchange of goods and persons: France, the Kingdom of the Netherlands, and the United Kingdom (UK).



Figure 1: Map of the Wider Caribbean Region with countries participating in project.

6. The Caribbean, designated as one of the world's biodiversity hotspots², spans 4.31 million km² of ocean and 0.26 million km² of land. It supports extremely diverse ecosystems (marine, freshwater and terrestrial) of global ecological and economic importance. In particular, the marine ecosystems surrounding the Caribbean islands comprise a major share of the region's globally important biodiversity. This was recently recognised by the UN, which designated the Caribbean

² <http://www.biodiversityhotspots.org/xp/Hotspots/caribbean/>

Sea as a Special Area in 2002. It borders the Mesoamerica hotspot³, and a number of nearshore and offshore islands in the Caribbean Sea are biologically important for their endemic species and as nesting areas for seabirds. There is a high level of marine endemism within both the Caribbean and Mesoamerica hotspots.

7. The marine diversity in the Caribbean includes about 60 species of corals and about 1,500 species of fish, nearly a quarter of which are endemic. Indeed, the greatest concentration of fish species in the Atlantic Ocean Basin occurs in the northern part of the hotspot in waters shared by The Bahamas, Cuba and the United States. The World Conservation Union (IUCN) expressed deep concerns about IAS threatening marine ecosystems at the 3rd World Conservation Congress in November 2004⁴: “Globally, preliminary findings of the Millennium Ecosystem Assessment confirmed IAS as one of the major drivers towards homogenisation of ecosystem biodiversity in marine environment. Invasions are less likely to be accurately recorded and monitored in marine, as opposed to terrestrial, environments.” The report concludes that “increased baseline and monitoring surveys, and more detailed and quantitative risk assessment methodologies were identified as key priorities.” Following that recommendation, the proposed project will collaborate closely with the Global Invasive Species Programme (GISP), GloBallast and the UNEP Regional Seas Programme (RSP). This process was initiated during PDF-A and yielded the first regional study of its kind⁵ which is expected to form the baseline against which future projects can be proposed as well as assessed.

8. The terrestrial and aquatic ecosystems of the Caribbean also boast exceptionally high levels of species endemism, as shown in Table 1. Jamaica has been ranked fifth among islands of the world in terms of endemic plants. The country also enjoys a high level of endemism for animal species, as 98.2% of the 514 indigenous species of land snails and all of the 22 indigenous species of amphibians are endemic to Jamaica.

Table 1: Species diversity and Endemism in the Insular Caribbean

Taxonomic Group	# Species	# Endemic Species	% Endemism
Plants	13,000	6,550	50
Mammals	89	41	46
Birds	604	163	27
Reptiles	502	469	93
Amphibians	170	170	100
Freshwater Fishes	161	65	40

9. The Caribbean Islands have 41 endemic mammal species, including two endemic rodent families: Solenodontidae and Capromyidae. The family Solenodontidae includes two surviving but endangered species, the Cuban solenodon (*Solenodon cubanus*), and Hispaniolan solenodon (*S. paradoxus*), which are rare giant shrews threatened both by human exploitation and by IAS, such as mongooses, feral cats, rats and dogs. The Capromyidae includes 20 species of rodents, known locally as hutias, which are prized for their meat and threatened by hunting, habitat loss and invasive species.

³ <http://www.biodiversityhotspots.org/xp/Hotspots/mesoamerica/>

⁴ IUCN 3rd World Conservation Congress, November 2004, *Marine Highlights*.
http://www.iucn.org/themes/marine/pdf/PostWCC_KeyMarineMsgs.pdf

⁵ Lopez V, Krauss U (2006) National and Regional Capacities and Experiences on Marine Invasive Species, Including Ballast Waters, Management Programmes in the Wider Caribbean Region – a Compilation of Current Information. UNEP-CAR/RCU, Jamaica. 105 pp.
<http://www.cep.unep.org/newsandevents/news/2006/final-cabi-unep-car-rcu-report.pdf>

10. Over 600 species of birds have been recorded in the Caribbean, 163 of which are endemic⁴. Of these regional endemics, 105 species are confined to single islands. More than 120 bird species migrate from their breeding grounds in North America to winter in the Caribbean. The Caribbean is the most important (and sometimes the exclusive) wintering ground for a number of North American species such as the declining Cape May warbler, Northern parula, black-throated blue warbler, palm warbler and prairie warbler. It is also the only wintering ground for globally threatened migrants such as Kirtland's warbler, Bicknell's thrush and (the possibly extinct) Bachman's warbler. In Trinidad & Tobago, 467 bird species have been recorded. These include six globally threatened species. Saint Lucia's avifauna totals 177 species, of which seven are endemic and seven are globally threatened.

11. The Insular Caribbean is also particularly rich in reptile diversity, with 502 species, of which 469 (93%) are endemic. The diversity includes several large evolutionary radiations of lizards, such as the anoles (*Anolis*; 154 species, 150 endemic) with their colourful dewlaps used in displays; dwarf geckos (*Sphaerodactylus*; 86 species, 82 endemic); and curly tails (*Leiocephalus*; 23 species, all endemic) that hold their tails in a coil as they run. This lizard fauna includes the smallest lizards in the world, *Sphaerodactylus ariasae* from the Dominican Republic and *S. parthenopion* from the U.S. Virgin Islands. Also included in the reptile fauna are nine species of rock iguana, all threatened, from the genus *Cyclura* including some that are over one metre long. The Jamaican iguana (*Cyclura collei*, CR) was thought to be extinct until a small population of about 200 individuals was rediscovered in 1990 in the Hellshire Hills of Jamaica. This species is the focus of one of the pilot projects in Jamaica.

2.3. Threats, root causes and barrier analysis

Increased pathway activities

12. The unique biodiversity of the insular Caribbean is under threat from IAS which are being introduced at an increasing rate through trade, transport, travel and tourism - the infamous "four Ts". The risk of such introductions, deliberate or accidental, is growing through the increase in international economic and cultural links in such diverse areas as agriculture, aquaculture, transport and trade (commodities and pets as well as accidental introductions in cargo and on wood packaging), tourism (e.g. ecotourism, yacht traffic) and industrial development (e.g. dragging oil rigs between Trinidad / the Orinoco Delta and the Gulf of Mexico).

13. Alien species introduced into the Caribbean are likely to become invasive in all the participating countries and the Caribbean as a whole. The Caribbean basin serves as a crossroads for international maritime trade, and this is increasing. For example, container throughput at the port of Kingston, Jamaica, increased from 339,000 Twenty-foot Equivalent Units (TEU) in 1994 to 1.065 million TEU in 2002⁶. The region's proximity to the Panama Canal and maritime trade routes between North and South America and the Eastern and Western hemispheres makes it an important location for facilitating trade. The ports of San Juan, Puerto Rico; Freeport, Bahamas; Kingston, Jamaica; Houston, Texas, Miami, Florida and Jacksonville, Florida in the United States; and Manzanillo and Coco Solo in Panama rank among the top 100 ports worldwide in terms of container traffic⁷. This volume of trade combined with the connectivity given through the marine environment exacerbates the vulnerability of the insular Caribbean to IAS from around the globe. Furthermore, at several ports the establishment of trans-shipment services has also led to an

⁶ McCalla R, Slack B & Comtois C. (2005). The Caribbean basin: adjusting to global trends in containerization. *Maritime Policy and Management* 32: 245-261.

⁷ Degerlund J (2007). *Containerisation International Yearbook 2007*. Informa UK Ltd., London.

increase in sea container traffic. The ports of Freeport, Bahamas; Río Haina, Dominican Republic; Kingston, Jamaica; and Port of Spain, Trinidad, are part of the Caribbean Trans-shipment Triangle. Trans-shipment activities are an important consideration in pest risk analysis as they result in much higher numbers of vessels and cargo containers entering certain ports compared to imports/exports alone, and thus a much higher risk of IAS introductions. The need for a region-wide response to trade-associated IAS was acknowledged by the Council for Trade and Economic Development (COTED) of the Caribbean Community (CARICOM) and the Caribbean Invasive Species Working Group (CISWG).

14. Tourism in the Caribbean is also on the increase. The insular Caribbean is a prime tourist destination, with visitors coming principally from Europe, the USA and other Caribbean destinations, often as part of multi-destination travel (“island hopping”) and/or as an unavoidable consequence of flight and ferry itineraries. A boost to regional tourism was provided by the 2007 cricket World Cup, and in 2008 stop-over arrivals throughout the Caribbean exhibited a 2.1% increase, a trend even more pronounced in the five project countries with a 3.6% increase. The number of cruise ship passengers increased by 6.9% throughout the Caribbean and by 6.2% in the four pilot countries for which 2008 statistics are available: the Bahamas, Dominican Republic, Jamaica and Saint Lucia⁸. Furthermore, since many airline and cruise ship passengers are multi-destination travelers, they are more likely to carry perilous types of locally made handicrafts (e.g. hats made from coconut leaves) that could harbour plant pests, such as the red palm mite (RPM), *Raoiella indica*⁹. This further illustrates the regional nature of the IAS threat, a fact recognised by numerous partner organisations as well as by partner countries during recent stakeholder consultations.

15. A recent pathway analysis conducted by the United States Department of Agriculture – Animal and Plant Health Inspection Service USDA-APHIS¹⁰ added mail as a novel high risk factor to the above mentioned well known pathways. The approach rate¹¹ of plant materials and associated pests was twice as high in private postal services, such as DHL, FedEx, and UPS, compared to those for public mail. The former are experiencing growth due to the increase in the parcel service market and on-line shopping.

16. Natural spread, whether mediated by wind, water, or inter-island movement of birds, insects, marine organisms and other animals, may play a significant role in the movement of exotic plants, through seeds as well as pests throughout the Caribbean, due to the proximity of adjacent islands and land masses. For example, the two western tips of Trinidad are only 11km from the coast of Venezuela and the island’s south coast faces the effluent of the Orinoco River. The Windward Islands are in the direct path of air currents, including storms and hurricanes that carry Saharan and Sahelian dust from Africa. Several rust fungi are believed to have crossed the Atlantic Ocean with the trade winds, e.g. coffee rust from Angola to Bahía and sugarcane rust from Africa to the West Indies¹². Swarms of African locusts reached the Windward Islands from the African Cape

⁸ Caribbean Tourism Organization. *Latest Statistics 2008*. 20 November 2008, <http://www.onecaribbean.org/content/files/nov20Lattab08.pdf>

⁹ Smith TR & Dixon WN (2008). 2007 Florida CAPS Red Palm Mite Survey 2nd Interim report: October 2006 – January 2008, Florida Cooperative Agricultural Pest Survey, Program Report No. 2007-02-RPM-02

¹⁰ Meissner H (2008) *Caribbean Pathway Analysis*. United States Department of Agriculture (USDA) in collaboration with the Caribbean Invasive Species Working Group (CISWG), Draft version for Comments, pp 251.

¹¹ The approach rate is defined as the percentage of randomly inspected sampling units that contained what the search was targeting (e.g. a contaminant).

¹² Nagarajan S & Singh DV (1990) Long-distance dispersion of rust pathogens. *Annual Review of Phytopathology* 28: 139-153.

Verde Islands in 1988, though they did not establish¹³. Prevailing winds in the Caribbean may carry IAS from the Windward Islands towards the northwest to the Leeward and Virgin Islands, the Greater Antilles, and to part of the Central and North American mainland. The Asian citrus canker bacterium, *Xanthomonas axonopodis* pv. *citri*¹⁴, and the whitefly-transmitted Bean Golden Mosaic Virus¹⁵ are believed to have spread through the Wider Caribbean in this manner.

Climate Change

17. Global climate change will create conditions suitable for the spread and invasion of new exotic organisms. Oceanic water currents are changing and cyclone activity is believed by many to have increased as a result. Hurricanes and other severe weather events in the Wider Caribbean that favour the spread of IAS have already increased notably in recent years. The United States Geological Survey (USGS)¹⁶ already fears that the invasive and presumably wind-dispersed scale *Dactylopius ceylonicus*, which was released on Nevis in 1979 to control an invasive cactus, may negatively affect the south-western U.S. because of new dissemination patterns altered by climate change.

18. One expression of climate change is an intensification of severe storms. Increase hurricane activity has eroded coastal areas on Bermuda, an effect compounded by the presence of *Casuarina equisetifolia*, a fast growing, shallow rooted and often invasive tree that tends to topple in strong winds taking pieces of the soft costal soil and limestone with it¹⁷.

19. Changes in weather patterns and increasing temperatures may also enable species to expand their current ranges as has been anticipated in the case of disease-carrying mosquitoes. Recent changes in the distribution of several species of tropical fish, and the green algae *Caulerpa webbiana* in the waters around the Azores have been attributed to warming of these waters¹⁷.

20. Increased atmospheric carbon dioxide levels and carbon dioxide enrichment in aquatic ecosystems are also thought to contribute to the invasiveness of certain terrestrial and aquatic species. A positive interaction of increased carbon dioxide and temperature was observed for the invasive aquatic plant dioecious hydrilla (*Hydrilla verticillata*) which showed maximum growth response to increased carbon dioxide levels at elevated water temperatures¹⁸.

¹³ Richardson CH & Nemeth DJ (1991). Hurricane-borne African Locusts (*Schistocerca gregaria*) on the Windward Islands. *GeoJournal* 23: 349-357.

¹⁴ Gottwald TR, Graham JH & Schubert TS (1997). An epidemiological analysis of the spread of citrus canker in urban Miami, Florida, and synergistic interaction with the Asian citrus leafminer. *Fruits* 52: 371-378.

¹⁵ Blair M, Bassett MJ, Abouzid AM, Hiebert E, Polston JE, McMillan RT, Graves W & Lamberts M (1995). Occurrence of Bean Golden Mosaic Virus in Florida. *Plant Disease* 79:529-533.

¹⁶ USGS (2006) *Invasive Species and Climate Change*. http://pubs.usgs.gov/of/2006/1153/pdf/of06-1153_508.pdf

¹⁷ Petit J. & Prudent G. 2008. Climate Change and Biodiversity in the European Union Overseas Entities. IUCN, Brussels, 178 pp., http://www.reunion2008.eu/pdf/en/42.10_LOW_FINAL_book_EN.pdf

¹⁸ U.S. Environmental Protection Agency (EPA). (2008) Effects of climate change for aquatic invasive species and implications for management and research. National Center for Environmental Assessment, Washington, DC; EPA/600/R-08/014. http://www.elistore.org/Data/products/d18_04.pdf

21. High altitude forests are the best preserved areas on many tropical islands. Partly due to their relative inaccessibility, these forests have been far less affected by human activities and invasive alien species than the coastal ecosystems. Differences in precipitation patterns have led to climatic conditions that vary greatly from one mountainside to another, and create multiple “bioclimatic micro-regions”, depending on the orientation and altitude. Increased temperatures and longer dry seasons resulting from climate change may result in the dry bio-climate of lower to mid elevations developing in the higher altitude regions. This disruption of the existing equilibrium runs the risk of creating favourable conditions for invasive alien species and may eventually impoverish these tremendously diverse, but limited in expanse, and thus vulnerable high altitude forest habitats. Models showing the potential impacts of climate change on high altitude forests have been developed in Martinique and French Polynesia¹⁷ (Figure 2).

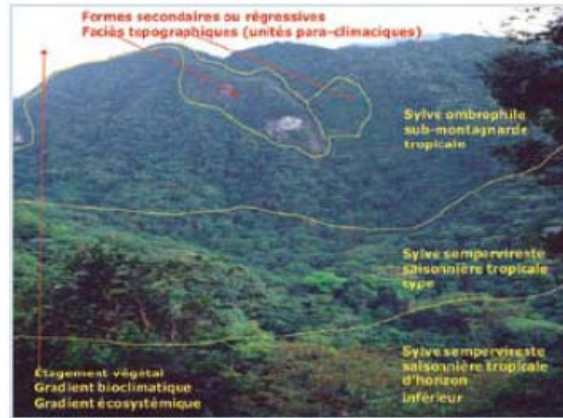


Figure 2: Zoning of mountainous forest in Martinique, showing changes at high altitude

22. Jamaica, Saint Lucia, and Trinidad & Tobago are members of the Caribbean Meteorological Organisation (<http://www.cmo.org.tt/>), a specialised agency of CARICOM that coordinates the joint scientific and technical activities in weather-, climate- and water-related sciences in 16 English-speaking Caribbean countries. Furthermore, all project countries have submitted their “Initial National Communication on United Nations Framework Convention on Climate Change (UNFCCC)”. All these communications mention biodiversity and adaptation, but it is only the Bahamas that makes direct reference to IAS. It is worth noting that the report recommends the review the suitability of alien (exotic) saline-adapted species of timber trees for the Bahamas to adapt to climate change. Similarly, the Dominican Republic considers the importation of exotic forest trees with tolerance to drought and high temperatures. Coordination with UNFCCC at the national level is facilitated by the fact that this framework is generally implemented by the same agency as the GEF OFP. At the regional level, the Caribbean Community Climate Change Centre (CCCCC) (<http://caribbeanclimate.bz/>) in Belize is leading UNFCCC implementation with UNDP GEF support. Furthermore, the four CARICOM countries participated in CCCCC’s “Caribbean Planning for Adaptation to Climate Change” Project, which was initiated under a GEF-World Bank project in 1997, and its successors, the “Adapting to Climate Change in the Caribbean” (ACCC) project (2001-2004) and the “Mainstreaming and Adaptation to Climate Change” (MACC) (2004-2007).

Complexity of the insular Caribbean

23. 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.

24. The WCR is highly complex, not only ecologically, but also in terms of politics, socioeconomics and culture. Four major language groups are dominant: French, Spanish, English and Dutch. The political systems in the 36 states and territories are also extremely different, e.g. Cuba compared to the USA.

25. Even individual countries can be highly complex. For example, the archipelago of the Bahamas consists of about 700 atolls and cays, of which between 30 and 40 are inhabited. As another example, the two main islands of the Republic of Trinidad & Tobago exemplify a piece of mainland South America, severed in geological times from Venezuela, and a Caribbean coral island, respectively.

Extreme vulnerability of the insular Caribbean

26. At the 9th Conferences of the Parties (COP9) in 2008 the vulnerability and fragility of biodiversity on small and fragile islands¹⁹ was again stressed. Some key reasons for this are:

- ◆ 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 defenses 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.

As a result, islands exhibit the highest proportion of recorded species extinctions brought about by, among other key factors, IAS. BirdLife International has implicated IAS in nearly half of the recent bird extinctions²⁰. The majority of species (95%) are affected by introduced predators and are frequently subject to multiple impacts from a range of invasives. Predation by introduced dogs, pigs and mongooses, and habitat destruction by sheep, rabbits and goats, have been implicated in some cases. However, predation by introduced rats and cats, and diseases caused by introduced pathogens, are now recognised as the most deadly cause. This fact is well illustrated by the example of Maria Island of Saint Lucia, which is located 1000 metres off the south-eastern coast of the main island. Maria Island is only 25 acres in size, but is home to the most threatened, endangered and endemic reptile species of all of Saint Lucia's protected areas. Altogether there are eight reptile species on Maria Island of which five are endemic to Saint Lucia. This high rate of endemism on such a vulnerable, small and fragile habitat is of serious concern. The area 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. Maria Island is the subject of one of the pilot projects in Saint Lucia

27. The mostly small sized economies of countries in the insular Caribbean are highly dependent on sectors very vulnerable to IAS, such as fisheries, agriculture, trade and tourism. The data in Table 2 illustrates some of the factors contributing to the vulnerability of the project countries. Their Exclusive Economic Zones (EEZ) far exceed the national land areas. The average percentage of protected land area for Caribbean and Central America is 8.6%, compared to a global average of 10.8%. Two project countries have a very low percentage of their area under protection to date. The Bahamas is committed to creating a representative and effectively managed network of protected areas by 2010 on land and 2012 in the marine environment that will protect, in total, 10% of the territory²¹. The other three countries have a relatively low Gross Domestic Product (GDP), an indication that despite the efforts made in terms of protected areas, their IAS management resources are likely to be insufficient without additional support. Furthermore, most countries and territories in the insular Caribbean have a negative merchandise

¹⁹ <http://www.cbd.int/decisions/?m=COP-08&id=11013&lg=0>

²⁰ <http://www.birdlife.org/action/science/sowb/pressure/44.html>

trade balance, especially due to the need to satisfy the tastes of the large number of visitors that can exceed the populations of Caribbean islands. The only exception among countries participating in this GEF project is Trinidad & Tobago. Their Environmental Vulnerability Indices (EVI) range from “at risk” (Bahamas) and “highly vulnerable” (Dominican Republic) to “extremely vulnerable” (Jamaica, Saint Lucia, and Trinidad & Tobago).

Table 2: Key statistical parameters of pilot countries for 2007/2008 unless otherwise stated.²¹

<i>Statistical Parameter</i>	Bahamas	Dominican Republic	Jamaica	Saint Lucia	Trinidad & Tobago
Total national area (km ²)	13,878	48,730	10,991	620	5,128
Percent water	28	1.6	1.5	1.6	negligible
Exclusive Economic Zone ²² (EEZ, km ²)	654,715	255,898	258,137	15,617	74,199
Per capita, nominal Gross Domestic Product (GDP in US\$)	24,960	4,670	4,194	5,700	16,041
Merchandise trade balance (2001, million US\$)	- 998	- 3,451	- 2,113	- 313	716
Population	307,541	9,904,000	2,804,332	160,765	1,305,000
Tourist (stop-over) arrivals (2007)	1,527,622	3,979,582	1,700,758	287,435	449,452
Cruise-ship visitors (2007)	2,970,659	384,878	1,179,504	610,165	76,741
Environmental Vulnerability Index (EVI)	248 (at risk)	324 (highly vulnerable)	381 (extremely vulnerable)	393 (extremely vulnerable)	381 (extremely vulnerable)
Biodiversity sub-index	3.00	3.32	4.58	4.62	3.74
Number of protected areas (all categories)	25	47	165	20	74
Land area under protection (IUCN categories I & II in km ²)	210	9000	-	0	130
Ramsar sites	1	1	3	2	3
Wetland area under protection (IUCN categories I & II in km ²)	330	200	60	0	60
Protected land area (all categories in %)	1.6	20.5	15.9	14.7	4.7
Number of threatened animals on IUCN Red List	49/451	94/474	71/399	38/357	47/712
Number of threatened plant on IUCN Red List	5/11	30/35	209/290	6/8	1/7

²¹ Information compiled from the following sources: IUCB 2008 Red List; <http://www.acs-aec.org/>; <http://earthtrends.wri.org>, <http://www.cbd.int/countries/>, <http://www.onecaribbean.org/statistics/tourismstats/>, <http://www.ramsar.org/sitelist.pdf>, http://www.vulnerabilityindex.net/EVI_Country_Profiles.htm, <http://www.wikipedia.com>

²² A state's EEZ extends to a distance of 200 nautical miles (370 km) out from its coastal baseline, except when EEZs would overlap, i.e. states are less than 400 nautical miles apart. In that case, any point within an overlapping area defaults to the most proximate state, although it is up to the states to delineate the actual boundary.

Insufficient baseline data

28. Marine invasive species (MIS) and their potential impact on marine ecosystems and coastal economies is a relatively new and under-researched topic, particularly in the WCR. Regionally relevant baseline studies are generally judged inadequate. For example, the Bahamas Environment, Science and Technology (BEST) Commission stated: “*Very little information exists on the natural history, behaviour, ecology and venomology of lionfish, even in its native range of the Indo-Pacific ... Until key deficiencies are addressed the likelihood of successfully controlling the spread of lionfish and mitigating its impacts is low.*”

29. Where regionally relevant information does exist, it is not adequately shared between countries and territories. This lack is particularly severe in marine ecosystems, which dominate the Caribbean region. A 2001 workshop²³ on invasive species held in Costa Rica did not single out any MIS in the WCR, including Mesoamerica and the United States. In the first systematic regional study of invasive species in the Caribbean²⁴, the authors found 18 MIS and explicitly stated that “*adequate documentation / information on marine IAS and their management in the Caribbean is lacking*”. The authors speculated that this discrepancy was at least partly due to the only recent technological advances facilitating the reporting of marine species (e.g. improvements in diving equipment). A review in the United Kingdom Overseas Territories (UK OTs)²⁵ recorded 2,261 invasive species across all ecosystems, which was considered “*a significant underestimate*”. The scarcity of information was found to be particularly severe in aquatic (marine and freshwater) ecosystems: Varnham (2006)²⁵ identified only four non-native aquatic species of unknown invasiveness, adding that “*this was not because they were deliberately ignored, simply that there was no information available upon them*”. There is a common difficulty in determining whether newly reported marine species are introduced aliens or merely native species that had formerly gone unobserved. In their desk study, Lopez & Krauss (2006)⁵ recorded 118 MIS, including 39 fish and 31 arthropod species in the WCR, nearly ten times more than listed in the preceding study by Kairo *et al.* (2003)²⁴, and concluded that “*apart from activities being undertaken in the United States on the development of lists and mitigation methods for some of the more damaging species, there is little published information on MIS management*”.

30. During the critical situation analysis (CSA) carried out during PPG, the majority of countries lamented the lack of accurate and up-to-date distribution data of IAS. The lack of baseline information frequently inhibits informed decision-making on available IAS management options and thereby initiates a vicious cycle. This is illustrated by the fact that eligible countries did not respond to a regional call for proposals by the Inter-American Biodiversity Information Network (IABIN) with the objective of providing seed funding for making national IAS data and information publicly available through the IABIN Invasives Information Network (I3N). It was felt that they did not yet possess the high quality metadata necessary to participate effectively – or to compete successfully for funding.

²³ Hernández G, Lahmann EJ & Salicido RP-G (2002) *Invasives in Mesoamerica and the Caribbean..* Results of the regional workshop on Invasive Alien Species: Meeting the Challenges Posed by their Presence in Mesoamerica and the Caribbean, Costa Rica, 11 & 12th June 2001). IUCN, San Jose, Costa Rica. http://www.iucn.org/places/orma/publica_gnl/especies.pdf

²⁴ Kairo M, Ali B, Cheesman O, Haysom K & Murphy S. (2003). *Invasive Species Threats in the Caribbean Region*. Report to The Nature Conservancy. 134 pp <http://tinyurl.com/awoxl>

²⁵ Varnham, K. 2006. Non-native species in UK Overseas Territories: a review. JNCC Report No. 372. 39 pp. <http://www.jncc.gov.uk/page-3634>

Insufficient stakeholder involvement and coordination

31. The multi-sectoral nature of IAS issues demands the involvement of governmental and non-governmental agencies, as well as a broad range of stakeholders from the private sector and general public. This requires superior communication and coordination, which is rarely present in Small Island Developing States (SIDS), let alone between them. There is little awareness of IAS beyond the agriculture and trade sectors. Participating countries unanimously recognised a need to raise public awareness, as many sectors that regularly interface with IAS are oblivious to the problem.

32. The involvement of the private sector has been minimal to date. Although this is recognised as a constraint, Government agencies leading IAS project development find it hard to communicate with private entrepreneurs and to agree on constructive collaboration of mutual benefit, such as public private partnerships. Some of the most relevant companies operate in more than one Caribbean country and tangible collaborative efforts may have to be brokered by an independent body, such as CABI.

33. Potential trade implications related to agricultural pests have created a culture of reluctance to disclose detection records and distribution data to other countries.

Low IAS management capacity

34. Effective IAS management requires institutional, human and physical resources that are often unavailable in developing and threshold countries, including Caribbean SIDS. The physical infrastructure in most countries is barely sufficient for the agricultural sanitary and phytosanitary (SPS) and quarantine for which it was procured.

35. Another notorious problem in SIDS is that some of the most competent professionals are required to take on multiple responsibilities, with substantial commitments to two or more jobs. As IAS are not yet a high priority for politicians and other national decision makers, they are rarely an operational priority for technical staff, particularly those IAS still absent from the national territory. Thus preventative measures, the most cost-effective IAS management approach, are underutilised in the insular Caribbean.

36. As recently as 2006, countries in the WCR, except for Colombia and the USA, had no experience of MIS management⁵. None had participated in any relevant programmes. A needs assessment indicated that:

- ◆ Awareness-raising activities in MIS are necessary in all countries at policy, planning and implementation levels as well as at the research level
- ◆ Countries need to consider acceding to the Ballast Water Convention in order to access funding, technical advice and other support. Saint Kitts & Nevis is the only country in the WCR to have signed up to this convention. However the Bahamas, Jamaica, Trinidad & Tobago and Venezuela are partners to the GEF-funded GloBallast project which may be a stepping stone to acceding to the convention.
- ◆ There is a need for fundamental capacity building at the national and regional level, taking into consideration existing experience and capacity from relevant areas. Coordination mechanisms need to be put in place to ensure that this is undertaken and followed through.
- ◆ Available infrastructure needs to be upgraded and adapted to accommodate MIS/ ballast water (BW) work, at both the national and regional level.
- ◆ Linkages need to be established among ongoing and planned programmes in MIS management in the WCR region and beyond. Existing networks (electronic groups, listservers) should be revitalised as necessary.

- ◆ A Regional Action Plan with stakeholder participation is needed to link together individual national and/or sub-regional plans to regional and global plans, in order to maximise synergies and narrow gaps and differences.

2.4. Institutional, sectoral and policy context

Multilateral Environmental Agreements

37. Since IAS introductions are international in character, the development of an international legislative framework through global, regional and/or bilateral agreements is necessary to prevent or minimise unwanted introductions and provide mechanisms for eradication or control. This is one of the goals of Multilateral Environmental Agreements (MEAs). Generally participation in relevant MEAs among the project countries is good (Table 3), creating a favourable starting point for enactment at national and regional level as well as for more strategic integration into a regional strategy. However, further harmonisation and more efficient dissemination of lessons learnt will also be required. For example, Saint Lucia could act as a nodal point for the other countries in the Organisation of Eastern Caribbean States (OECS), whilst the Dominican Republic is in a good strategic position to share knowledge with Haiti and Latin American neighbours, not least because of its participation in the Dominican Republic – Central American Free Trade Agreement (DR-CAFTA). Integration of overseas territories will be endeavoured by CABI in close collaboration with partners such as the Caribbean Community (CARICOM) and the Caribbean Invasive Species Working Group (CISWG).

38. Internationally agreed instruments may be binding or non-binding. The CBD, with 191 states becoming parties since the text was adopted in 1992, is the only globally applicable, legally binding instrument to address IAS introduction, control and eradication across all biological taxa and ecosystems. All countries in the WCR are parties to the CBD with the exception of the USA, which is a signatory, but has not ratified the treaty. The World Trade Organisation (WTO) Sanitary and Phytosanitary (SPS) Agreement is also binding and enforced. Except for the Bahamas, which has observer status, all independent countries in the WCR are parties to the WTO. However, most other MEAs have only guiding character and infractions are neither audited nor sanctioned.

Table 3: Participation of project countries in relevant MEAs, other agreements and associations

	Bahamas	Dominican Republic	Jamaica	Saint Lucia	Trinidad & Tobago
UNITED NATIONS (UN) PROGRAMMES AND FUNDS					
Convention on Biological Diversity (CBD): <i>Guiding Principles for the Prevention, Introduction and Migration of Impacts of Alien Species</i>	Party	Party	Party	Party	Party
Cartagena Protocol of Biosafety	Party	Party	Signatory	Party	Party
Convention on the Conservation of Migratory Species of Wild Animals	-	-	-	-	-
UN Framework Convention on Climate Change	Party	Party	Party	Party	Party
Cartagena Convention (Convention for the Protection and Development of the Marine Environment of the WCR):	-	Party	Party	Party	Party
<i>Protocol Concerning Specially Protected Areas and Wildlife (SPAW)</i>	-	Party	Signatory	Party	Party
<i>Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol)</i>	-	Signatory	-	Party	Party
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Party	Party	Party	Party	Party
UN SPECIALISED AGENCIES AND RELATED ORGANISATIONS					
Food and Agriculture Organisation (FAO): International Plant Protection Convention (IPPC)	Party	Party	Party	Party	Party
FAO Code of Conduct for Responsible Fisheries	Member	Member	Member	Member	Member
International Maritime Organisation (IMO): UN Convention of the Law of the Sea (UNCLOS):	Party	Party	Party	Party	Party
<i>UN Fish Stocks Agreement (Convention and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks)</i>	Party	-	Party	Party	Party
IMO: International Convention for the Control and Management of Ships' Ballast Water and Sediments (GloBallast)	- Project partner	-	- Project partner	-	- Project partner
IMO: Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	-	Party	Party	Party	-
World Health Organisation (WHO): International Health Regulations	Party	Party	Party	Party	Party
International Civil Aviation Organisation ICAO: Resolution A33-18 Preventing the Introduction of Invasive Alien Species	Party	Party	Party	Party	Party
World Heritage Convention	-	Party	Party	Party	Party

	Bahamas	Dominican Republic	Jamaica	Saint Lucia	Trinidad & Tobago
Ramsar Convention (Convention on Wetlands of International Importance especially as Waterfowl Habitat)	Party	Party	Party	Party	Party
World Trade Organisation (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)	WTO Observer	Party	Party	Party	Party
OTHER RELEVANT MEMBERSHIPS					
FAO: Caribbean Plant Protection Commission	-	Member + OIRSA	Member	Member	Member
Association of Caribbean States	Member	Member	Member	Member	Member
Alliance of Small Island States (AOSIS)	Member	Member	Member	Member	Member
Caribbean Community (CARICOM)	Member	- (CARIFORUM)	Member	Member	Member
Organisation of Eastern Caribbean States (OECS)	-	-	-	Member	Interested

39. Polar & Krauss (2008)²⁶ mapped the participation of non-project countries in these MEAs in preparation for the development of a regional IAS strategy and communication plan. No country in the WCR is party to or a member of all 28 international conventions and organisations reviewed. Barbados (17) is the country with the greatest participation, while Haiti (11 + 2 signatory) has the least. This implies that no country has an international legal framework capable of addressing all aspects of policy and legislation relating to IAS. However, almost all countries in the WCR are parties to the major conventions (CDB, CITES, UNCLOS, Cartagena Convention, Ramsar Convention, IPPC) or members of the key organisations (FAO, WHO, IMO, IPPC, WTO). This suggests that there is a fair level of harmonisation in the mechanisms for the control of IAS in the WCR particularly in the broad pathways such as trade, travel, transport and tourism. However, the limited participation in GloBallast and the Convention on the Control of Harmful Anti-fouling Systems on Ships indicates that the marine pathway for IAS requires further harmonisation.

National Policies

40. The policy environment of most countries in the Caribbean is fragmented and sometimes weak. Applicable policies in participating countries are listed below.

List of current policies relevant to invasive species by country

Bahamas

- National Biodiversity Strategy and Action Plan (NBSAP, 1999)
- The National Invasive Species Strategy for The Bahamas (NISS, 2003)

²⁶ Polar & Krauss (2008) *Status of International Legislative Framework for the Management of Invasive Alien Species in the Wider Caribbean Region*. CABI Caribbean and Latin America, Trinidad & Tobago.

Dominican Republic

- Normativa de Cacería en La República Dominicana (2006)
- Criterios y Requisitos de Inscripción en el Registro de Prestadoras y Prestadores de Servicios Ambientales(2005)
- Guía para las Buenas Prácticas Ambientales en el Sector Hotelero (2004)
- Norma Ambiental sobre Calidad de Aguas Subterráneas y Descargas al Subsuelo (2004)
- Reglamento de Investigación en Áreas Protegidas y Biodiversidad (2004)
- Reglamento para el Comercio de Fauna y Flora Silvestres (2004)
- Norma para la Gestión Ambiental de Marinas y Otras Facilidades que Ofrecen Servicios de Embarcaciones Recreativas (2003)
- Normas Ambientales para la Gestión Ambiental de Residuos Sólidos no Peligrosos (2003)
- Normas Ambientales para las Operaciones de la Minería no Metálica (2002)
- Procedimientos para Autorización para Extraer Material de la Corteza Terrestre (2002)
- Procedimiento de Evaluación de Impacto Ambiental (2002)
- Procedimientos para la Tramitación del Permiso Ambiental de Instalaciones Existentes (2002)
- Normas y Procedimientos para los Permisos Forestales (2001)
- Normas Técnicas para el Establecimiento y la Certificación de Plantaciones Forestales (2001)
- Normas Técnicas Forestales para Planes de Manejo Forestal (2001)
- Normas Técnicas Forestales. Ruta Nacional de Transporte de Productos Forestales (2001)
- Normas de Calidad del Agua y Control de Descarga (2001)
- Norma para la Gestión Integral de Desechos Infecciosos (Biomédicos) (draft, 2004)

Jamaica

- NBSAP (2003)
- The Strategic Environmental Assessment Policy (2005)
- National Programme for the Protection of the Marine Environment from Land-based Sources of Pollution (2005)
- Policy on Oceans and Coastal Zone Management (2002)
- Environmental Management Systems Policy and Strategy
- Jamaica National Environmental Action Plan
- Ocean and Coastal Zone Policy
- Policy for Jamaica's System of Protected Areas
- National Programme of Action for protection of the Marine Environment from land based sources and land based activities (submitted to Cabinet)
- Orchid Policy (submitted to Cabinet)
- Beach Policy for Jamaica (final draft)
- National Implementation Plan for Persistent Organic Pollutants (2005) (final draft)
- Watershed Policy for Jamaica (final draft)

Saint Lucia

- NBSAP (2000)
- Emergency Action Plan for Agricultural Pests and Diseases in Saint Lucia (2005)
- Donations and Importation of Relief Supplies Policy (1996?)

Trinidad & Tobago

- Water Pollution Rules (2001, 2006)
- National Environmental Policy (2005)
- Certificate of Environmental Clearance Rules (2001)
- Environmentally Sensitive Areas Rules (2001)
- NBSAP (draft, 2006)

41. The Bahamas, Jamaica, and Saint Lucia have completed their National Biodiversity Strategy and Action Plan (NBSAP). Trinidad & Tobago possesses a draft version from 2006. However, relevance to IAS varies from country to country, as detailed in Section 2.6 below. In this context, it is noteworthy that the Bahamas is the only participating country with a National Invasive Species Strategy (NISS) (see also paragraphs 67-68). This could serve as a model for the remaining countries to develop their NISS during the FSP.

42. In most countries, national legislation and policy is fragmented across multiple ministries and other agencies. Responsibilities are often not clearly defined, or the technical expertise that should inform the authorities falls under a different department. This hinders a coordinated approach, often delays appropriate action and even prevents enforcement. A regional desk study on MIS⁵ found that maritime and ballast water (BW) matters were usually dealt with by the relevant Port Authority, and MIS by the marine or coastal zone management body. Several national examples of this phenomenon are given in Section 2.6.

2.5. Stakeholder mapping and analysis

43. The GEF Implementing Agency (IA) is UNEP. The project Executing Agency (EA) is CABI, with the lead being provided by CABI's Regional Centre for the Caribbean and Latin America (CLA) in Trinidad & Tobago. Committed partner countries for the PPG and the FSP are the Bahamas, Dominican Republic, Jamaica, Saint Lucia, and Trinidad & Tobago through their respective GEF Focal Points and agencies who will undertake key aspects of project implementation. The National Executing Agencies (NEAs) are as follows: The Bahamas: The Bahamas Environment, Science and Technology (BEST) Commission, Ministry of Health and Environment; Dominican Republic: Secretaria del Estado de Medio Ambiente y Recursos Naturales (SEMARENA), Secretaria del Estado de Agricultura, TNC-DR; Jamaica: Ministry of Land and Environment, Ministry of Agriculture (MoA), National Environment Planning Agency (NEPA), Rural Agriculture Development Authority (RADA); Saint Lucia: Ministry of Agriculture, Lands, Forestry and Fisheries (MALFF) in collaboration with Ministry of Physical Planning, Housing, Urban Renewal, Local Government and the Environment; Trinidad & Tobago: Environmental Management Authority (EMA), Ministry of Agriculture, Land and Marine Resources (MALMR), Institute of Marine Affairs (IMA), Council of Presidents of the Environment (COPE), the Trust for Sustainable Livelihoods (SUSTRUST). Regional partners and their roles are summarised in Table 4.

Table 4: Regional Partners and their Roles

Partner agency	Role	Date of Letters of Commitment
CABI Caribbean and Latin America (CLA)	<ul style="list-style-type: none"> • Preparation and submission of the FSP proposal and implementation • Active lobbying for co-finance with a wide range of stakeholders • Continued stakeholder liaison and networking (electronic and in person) to maintain current momentum of interaction created during PDF-A at national, regional and global levels • Attendance of relevant meetings for continued stakeholder sensitisation and building of partnerships, i.e. through CBD, CISWG and GISP • Support PPG management and implementation 	18 June 2007
Caribbean Community (CARICOM)	<ul style="list-style-type: none"> • Publicity at relevant meetings and in relevant bodies, e.g. CISWG • Support to policy and legislative regime including harmonisation of Plant and Animal Health Legislation • Support for infrastructure development • Advocacy for strategies for managing IAS in the CARICOM countries • Support or development of mechanisms for coordination of IAS issues 	26 November 2008

Partner agency	Role	Date of Letters of Commitment
Centre for Resource Management and Environmental Studies (CERMES)	<ul style="list-style-type: none"> • Provide training through the delivery of short courses • Supervise student research projects in areas relevant to the project 	22 June 2007 and 10 November 2008
Caribbean Invasive Species Working Group (CISWG)	<ul style="list-style-type: none"> • Assist the 12 countries represented in CISWG, which include four of the five GEF pilot countries, with the development and implementation of national invasive species strategies (Components 1, 4 & 5 of GEF project) • Collaborate with CABI on the further development of CISWG's CRISIS to cover also IAS of primarily environmental importance, including aquatic IAS (Component 2) • Continue to organise regular (at least annual) CISWG meetings at which the GEF initiative will be invited to share experiences with all attending CISWG members (Component 3) • Provide access to CISWG's d-groups on priority IAS for interested project partners for regular information exchange (Component 3) • Coordinate the further development of the <i>Caribbean Invasive Species Surveillance and Information Program</i> (CISSIP) (Components 2 & 3) with CABI • Influence policy makers to endorse and collaborate with the GEF initiative, e.g. with the relevant CARICOM bodies and/or Governments (Component 2) 	13 June 2007 and 19 November 2008
Caribbean Taxonomic Network (CARINET) and Caribbean Pest Information Network	<ul style="list-style-type: none"> • Diagnostic services, staff involvement (arthropods, micro-organisms, nematodes, molluscs, weeds) • Design and development of a searchable database for IAS photo gallery • Capacity building – regional training workshop 	21 June 2007
Caribbean Pest Information Network CARIPESTNET	<ul style="list-style-type: none"> • Active participation in CISWG meetings and associated activities • Miscellaneous – meetings, surveys, office supplies 	12 November 2008
Council of Presidents of the Environment (COPE)	<ul style="list-style-type: none"> • Communication and dissemination of information, especially to Non-Governmental Organisation (NGOs) in Trinidad & Tobago 	Offer made during PDF-A and PPG stakeholder workshops, 22-26 Jan 2007 and 29 Sept. – 3 Oct., 2008, respectively
Environmental Law Institute (ELI)	<ul style="list-style-type: none"> • Include an invasive species expert as a presenter at the ELI's judicial training for judges in the insular Caribbean project • Feature the invasive species issue in the moot court exercise as part of the judicial training for judges in the insular Caribbean • Include appropriate materials on invasive species in the course book provided to the judge participants 	17 December 2008

Partner agency	Role	Date of Letters of Commitment
Florida A&M University (FAMU) – Center for Biological Control	<ul style="list-style-type: none"> • Active participation in CISWG meetings and associated activities 	16 June 2007
	<ul style="list-style-type: none"> • Research on priority invasive pest threat – mainly insects. • Development and deployment of lucid identification tools. • Development of human capital through training. • Contribute to the development of regional safeguarding strategies through active participation in CISWG and other regional networks. 	2 December 2008
FAO	<ul style="list-style-type: none"> • Knowledge sharing • Global Networking • Participation in CISWG meetings • Technical support, back-stopping 	28 November 2008
Global Invasive Species Programme (GISP)	<ul style="list-style-type: none"> • GISP training materials and publications • Networking electronically and at relevant meetings 	22 June 2007
	<ul style="list-style-type: none"> • Global networking, both electronically and by attendance of relevant meetings • Raising awareness of the threat posed by invasive species and promoting the proposed project through GISP's global network • Provision of training materials and publications • Facilitating the transfer of results and output from the project into policy recommendations 	24 November 2008
InGrip Consulting and Animal Control (Germany)	<ul style="list-style-type: none"> • Work worldwide on control and eradication of terrestrial invasive alien vertebrates and exotic ants • Strong interest in conservation of native species which are under threat of IAS, e.g. sea turtles, iguanas, snakes, seabirds, doves and the last endemic mammal spp. of the terrestrial Caribbean (the hutias) • Training of governmental and non-governmental staff and conservation workers in techniques of permanent control or eradication of terrestrial invasive vertebrates • Assistance in setting up monitoring schemes for future protection of cleared areas and the prevention of new invasions by invasive animals at these sites • Facilitation in establishment of contacts or partnerships and assistance at seeking funds or donations for urgent projects and practical field work against invasive species 	21 June 2007
Institute of Marine Affairs (IMA)	<ul style="list-style-type: none"> • Research (e.g. physical monitoring, desk studies of databases) on <i>Perna viridis</i> and <i>Caulerpa taxifolia</i> • Training, public awareness and dissemination of information on MIS 	06 July 2007 See also Govt of Trinidad & Tobago letter 13 January 09
Inter-American Biodiversity Information Network's (IABIN) Invasives Information Network (I3N)	<ul style="list-style-type: none"> • Contribute to the development of this proposal at a level according to the level of support from the PPG. • Provide IABIN Invasive Information Network (I3N) Standards and Protocols on IAS data exchange for the Caribbean region • Train users in the Caribbean on IAS issues and I3N tools • Adapt the I3N tool to risk analysis and pathway analysis to Caribbean priorities • Administer an IAS content building grant for the Dominican Republic 	19 June 2007 1 December 2008

Partner agency	Role	Date of Letters of Commitment
Inter-American Institute for Cooperation in Agriculture (IICA)	<ul style="list-style-type: none"> • Provide technical support for the FSP phase of the project • Attendance and participation in the FSP International Stakeholders Workshop • Attendance and participation in CISWG meetings • Provide technical support to countries on controlling, managing and/or eradicating IAS that are plant and animal pests • Dissemination of relevant information • Stage and/or participate in seminars, workshops or special activities on IAS • Make available the IICA country offices for seminars, workshops, meetings and special activities • Provide secretarial support, materials and equipment such as computers, printers, fax machines, paper and CDs. 	13 June 2007 and 8 December 2008
The World Conservation Union (IUCN)	<p>Managing IAS that are threatening important biodiversity:</p> <ul style="list-style-type: none"> • Application of the ecosystem approach • Invasion reduction and the restoration of affected systems • IAS knowledge management • Support to GISP 	28 June 2007
Regional Activity Centre - Regional Marine Pollution Emergency Information and Training Centre (RAC/REMPEITC)	<ul style="list-style-type: none"> • Capacity building; i.e. inform of courses and workshops undertaken by GloBallast in the region, if possibly invite persons in Island states IAS project as observers • Exchange guidelines etc. developed by GloBallast i.e. GloBallast water course; Guidelines for rapid assessment of current status; Guidelines for national BW management system; Model legislation and training thereof; Compliance, monitoring and enforcement models and indicators; Port baseline survey protocols; Database design criteria • Assist countries with ratification of Cartagena convention and SPAW protocol, which instrument can be used as a legal basis of the response of the IAS issue 	21 June 2007
	<ul style="list-style-type: none"> • Assist Lead Partner Countries on GloBallast project with a view to share the knowledge gained regarding the implementation of BW management initiatives in the region • Organise a regional BW management meeting in 2009. The targeted countries for this activity are: Jamaica, Venezuela, Trinidad & Tobago, Bahamas, and Barbados. Additional; countries may be included if more funding materialises 	26 November 2008
The Trust for Sustainable Livelihoods, Trinidad & Tobago (SUSTRUST)	<ul style="list-style-type: none"> • Assist in project development, implementation and evaluation in areas related to biodiversity and natural resources management. • Access to human resources in various disciplines across the Caribbean through network of professionals across the Caribbean, including senior officers in government, intergovernmental and non-governmental agencies. 	11 November 2008
The Nature Conservancy (TNC)	<p>Policy specialists will contribute recommendations for IAS prevention:</p> <ul style="list-style-type: none"> • Participation of programme staff in national planning and strategic activities for the Bahamas • Capacity assistance on invasives species management in national parks (e.g., Melaleuca quinquenervia) in the Bahamas; • Participation of programme staff in national planning and strategic activities for the Dominican Republic 	18 July 2007

	<ul style="list-style-type: none"> • Identification and prioritization of specific pathways for the movement of invasive species within the Caribbean and Meso-American region • Policy assistance through the development and dissemination of a national model invasive species strategy and integration of regional priorities into the upcoming in depth review of invasive alien species under the Convention on Biological Diversity • Information assistance on national invasive species databases through the Nature Conservancy's work with the Inter-American Biodiversity Information 	
	<ul style="list-style-type: none"> • The Bahamas: Involvement and support in IAS pilot projects (2009-13) • The Dominican Republic: Involvement in the development and implementation of priority national IAS activities (2009-13) • Regional: Sponsorship of a regional workshop to establish a learning network on IAS and fire management (2009) • Regional: Support for regional coordination, particularly involvement in and follow up to an international workshop sponsored by the Conservancy and the government of New Zealand on Islands and Invasives: Regional Island Coordination to Manage Invasive Species Threats (2010) • General: Support to project countries on technical, policy and information management issues from regional and international staff (2009-13) 	1 December 2008
United Nations Environment Programme – Caribbean Environment Programme (UNEP-CEP)	<ul style="list-style-type: none"> • Capacity building and training activities in the marine sector, focusing on Marine Protected Areas • Development of National Strategies for SPAW Contracting Parties • Establishment of region-wide cooperation programme • Capacity building for management and early detection of marine systems 	14 June 2007 27 November 2008
University of Florida – Institute of Food and Agricultural Sciences (UF-IFAS)	<ul style="list-style-type: none"> • Provide technical input and support to CISWG to further elaborate and implement CRISIS and the operational component of this strategy, which is CISSIP 	25 June 2007
	<ul style="list-style-type: none"> • Financial support for selected Caribbean regional participants to participate in the annual T-STAR invasive species symposium as a concurrent session with the annual Caribbean Food Crop Society (CFCS) meeting • Support the hosting and facilitate the meeting of CISWG concurrent with the annual CFCS meeting • Technical and research support for Red Palm Mite management and mitigation • Coordination of Caribbean regional activities involving IAS through the UF-IFAS office on International Programs, which serves as the principal point of contact 	8 December 2008
United States Department of Agriculture – Animal and Plant Health Inspection Service (USDA-APHIS)	<ul style="list-style-type: none"> • Support to the Annual Caribbean Plant Health Director's Meeting • Support to the meetings and related projects of the associated working groups • Support to the fruit fly trapping program for the Caribbean 	19 December 2008

University of the West Indies (UWI)	Research on marine invasive aspects of the project; these will include: <ul style="list-style-type: none"> • Contributions to the data on marine biodiversity (NBSAP) for Trinidad & Tobago , from baseline surveys in coastal and marine areas • Generating support for the project from marinas and ports in Trinidad & Tobago where pilot project may be located • Co-ordinate and supervise student research projects on marine invasives (e.g. attached fauna or BW studies) • Support for key staff member/s to attend appropriate workshops 	22 June 2007 See also Govt of Jamaica letter 13 January 2009
-------------------------------------	--	---

44. CABI is an international, intergovernmental, not-for-profit organisation established by a UN treaty level agreement between its member countries. CABI's mission is, *'To improve people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment'*. CABI specialises in scientific publishing, research and communication. Since its establishment in 1910, CABI has worked on the taxonomy, prevention and management of IAS on five continents and in nearly 70 countries. *Invasive Species* is one of CABI's three Global Themes. CABI is actively involved in the management of IAS using Integrated Pest Management approaches, advising on national IAS strategies and is specialised in the biological control of invasive plants, arthropods and micro-organisms. More recently, CABI has also been implementing projects on the prevention of IAS, specifically through the provision of technical support to the IPPC and the SPS Agreement under the WTO.

45. CABI has supported the CBD and its Secretariat from its inception in 1992, and in 2003, signed a Memorandum of Cooperation. CABI contributes IAS expertise through provision of technical support, information and knowledge tools, thereby contributing towards the implementation of Article 8h of the CBD. CABI has provided support to developing countries to assist with their implementation of the CBD in relation to IAS and continues to provide advice to the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) and COP delegations under the CBD. CABI and IUCN were instrumental in ensuring that IAS were a significant inclusion in the Environment Action Plan of the New Partnership for Africa (NEPAD) and its five sub-regional environment actions plans and the proposed project will draw upon this expertise.

46. CABI is a world leader in providing scientific and unbiased information. Good examples of the products constantly updated or currently being produced, often in collaboration with other public and private sector partners such as IUCN, The Nature Conservancy (TNC) and the Invasive Species Specialist Group (ISSG) include the Crop Protection Compendium, Biocontrol Abstracts, CABI's IAS glossary *Invasive Alien Species Concepts, Terms and Context*, which is available on CABI's website, and CABI's Invasive Species Compendium (ISC), which aims to draw together scientific information and databases on IAS for policy makers, scientists, extension workers, students and practitioners. The latter will be a comprehensive global interactive encyclopedia on all aspects of IAS including their taxonomy, biology, ecology and habitats, distribution and spread, host range and symptoms, risks, impacts, and management, all supported by published literature. Ultimately, CABI's ISC will cover all geographic regions, all natural and managed ecosystems, and all IAS taxa while focusing on organisms that have the highest impact on livelihoods and the environment.

47. CABI, IUCN and TNC are founding members of GISP, which will facilitate the communication of regional findings at a global level. GISP also provides an opportunity for the project partners to liaise with other regional initiatives and to exchange knowledge on strategies to tackle IAS through multilateral cooperation. GISP developed the Global Strategy on IAS, jointly with the Scientific Committee on Problems of the Environment (SCOPE) in 2001.

48. UNEP has been an active participant and supporter of GISP since its inception in 1996 and served as the GEF IA for the Medium Size Project (MSP) “*Development of Best Practices and Dissemination of Lessons Learned for Dealing with the Global Problem of Alien Species that Threaten Biological Diversity*”. During the MSP, executing agencies produced a number of best practice guidelines including: Assessment of Best Management Practices; Economics of Invasives; Education, Legal and Institutional Frameworks; Risk Assessment; Pathways/Vectors of Invasives; Climate Change & Invasives; and Early Warning Systems. Sections of these products and other information were subsequently integrated by CABI on behalf of GISP into the ‘*Toolkit for Best Prevention and Management Practices of Invasive Alien Species*’²⁷, which is an invaluable tool in development and implementation of IAS management strategies. It aims to assist those involved in environmental and biodiversity conservation and management. Topics covered in the manual include building strategy, prevention, early detection and management, together with 100 case studies from around the world that are used to illustrate specific aspects of ‘best practice’, with a particular focus on SIDS.

49. Within UNEP’s Division of Environmental Policy Implementation (DEPI), a number of the Regional Seas Programmes (RSPs) have relevant articles on IAS in their Conventions or Protocols, or have already embarked on developing strategies and activities on IAS. The RSP supported by the Caribbean Regional Coordinating Unit (CAR/RCU), has commissioned CABI to compile information on national and regional capacities and experiences on marine IAS management programs in the Wider Caribbean, including ballast water management²⁸. The RSPs’ principal activities with regard to IAS have been implementation of a capacity building training course on marine IAS management which it developed with GISP. The course has been implemented in the Caribbean, as well as the Black Sea, and Mediterranean. The UNEP RSP, through the CAR/RCU, is a co-financier of the PPG for the project. Also with GISP and the CBD, the RSPs have developed a brochure aiming to increase information and awareness on marine IAS in all regions. Additionally, RSPs are providing technical expertise to the IMO’s efforts to combat the spread of IAS through ballast water.

²⁷ Wittenberg R & Cock MJW (Eds.) (2001) *Invasive Alien Species: A Toolkit for Best Prevention and Management Practices*. CAB International, Wallingford, Oxon, UK, pp 228. <http://www.gisp.org/publications/toolkit/Toolkiteng.pdf>

²⁸ Lopez V, Krauss U (2006) *National and Regional Capacities and Experiences on Marine Invasive Species, Including Ballast Waters, Management Programmes in the Wider Caribbean Region – a Compilation of Current Information*. UNEP-CAR/RCU, Jamaica, <http://www.cep.unep.org/newsandevents/news/2006/final-cabi-unep-car-rcu-report.pdf>

2.6. Baseline analysis and gaps

Regional Challenges

50. The WCR is both an attractive tourist destination and a maritime trade hub. Most Caribbean SIDS are being overwhelmed by international and regional traffic in relation to their size and population. Many islands have more overnight visitors than citizens and an even greater number of excursion visitors, such as cruise line passengers⁸. The Bahamas and Jamaica are among seven WCR countries and territories that may receive more than 90,000 contaminated shipping containers annually¹⁰. These numbers far exceed the management resources available to these countries.

51. Marine ecosystems dominate the WCR. While management options and mechanisms for IAS have been relatively well studied and understood for terrestrial systems, particularly for species impacting upon human activity, Wittenberg & Cock (2001)²⁷ acknowledge that much more research and capacity building activities are necessary before any management of MIS can be successfully undertaken. Lopez & Krauss (2006)⁵ collated existing information and experience on MIS in the WCR not only from the literature but also accessed professionals expertise via questionnaires. Their study highlighted the need for in depth revision of both the (limited) scientific literature and less well documented experiences from practitioners scattered throughout the region.

Legislative framework

52. A range of international instruments relating to IAS in the context of biological diversity conservation are relevant to countries in the WCR, i.e. the CDB, *Barbados Plan of Action*, *Johannesburg Plan of Action*, *Mauritius Strategy*, *Convention on the Conservation of Migratory Species of Wild Animals*, CITES, UNCLOS, *Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region* (commonly known as the “Cartagena Convention”), including the SPAW Protocol, *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* (“Ramsar Convention”) and the *FAO Code of Conduct for Responsible Fisheries* (see also paragraphs 37 to 39, including Table 3).

53. A range of protocols treat living modified organisms (LMOs) in a similar context to IAS. The *Cartagena Protocol on Biosafety* is the major protocol with respect to regulation of movement of LMOs. Other protocols which make reference to LMOs include CBD, IPPC, *FAO Code of Conduct for Responsible Fisheries* and the *SPAW Protocol*.

54. Some overlap exists between the IPPC, which operates under the umbrella of the FAO and gave rise to numerous relevant *International Standards for Phytosanitary Measures (ISPM)* and the *WTO SPS Agreement*, the key legal instrument governing global trade via binding rules, enforced by a compulsory dispute settlement mechanism. ISPM are defined as legislation, regulation or official procedure aimed at preventing the introduction or spread of plant pests of potential economic importance. These are adopted by Regional Plant Protection Organisations (RPPOs), inter-governmental organisations functioning as coordinating bodies for National Plant Protection Organisations (NPPOs), which all IPPC members are required to set up. The Caribbean Plant Protection Commission (CPPC), which is now largely defunct, has facilitated the participation of NPPOs in the WTO/SPS standard setting process. The CARICOM Single Market, which allows for free movement of goods and services through measures such as eliminating all barriers to intra-regional movement, is likely to impact on the movement of IAS. As part of harmonisation efforts in the region, the Caribbean Agricultural, Health and Food Safety Agency (CAHFSA) will be created to cover food safety, animal health and plant health matters for CARICOM and should eventually replace the CPPC.

55. International instruments relating to IAS in the context of marine transport include *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*, the *Convention on the Control of Harmful Anti-fouling Systems on Ships* and the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*.

56. Civil aviation is an important pathway for the movement of IAS hence the International Civil Aviation Organisation (ICAO) has adopted a resolution A33-18, *Preventing the Introduction of Invasive Alien Species* in 1998. This resolution requests ICAO members to work with other UN organisations to identify approaches the ICAO may take and support efforts to minimise the risk of introducing potential IAS. However, the responsibility of IAS control measures remains with individual countries.

57. The impact of IAS on tourism has been recognised and international instruments include the CBD's *Guidelines on Biodiversity and Tourism Development* and the *World Heritage Convention*.

58. The *Food Aid Convention* and the *Agreement on the Importation of Educational, Scientific and Cultural Materials* have the potential to create pathways for IAS to be spread through the supply of emergency food relief and transfer of biological collections.

59. Military activities could lead to the introduction and spread of IAS. However, little can be done to regulate military operations. The *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction* and the *Convention on the Prohibition of Military or any Hostile Use of Environmental Modification Techniques* may also include IAS.

60. Polar & Krauss (2008)²⁶ recommended the following to improve the international legislative framework relevant to IAS in the WCR:

- ◆ Individual countries should investigate conventions and organisations of which they are not currently parties or members to determine if the benefits of participation are appropriate in their developmental context.
- ◆ Participation in conventions which control specific marine IAS pathways such as GloBallast and the Anti-fouling Convention needs to be improved
- ◆ In conventions and organisations where there is maximum participation of WCR members, *ad hoc* groups such as the Alliance of Small Island States (AOSIS) should be established to fine tune mechanisms for the control of IAS pathways through regional or bilateral agreements under advice from CISWG.
- ◆ At COP meetings, WCR countries need to lobby for greater emphasis to be placed on developing specific mechanisms for the control of IAS beyond general guidelines.

61. No comprehensive national legislation on invasive species has been developed in any of the participating countries. However, legislation related to invasive species is embodied in other sectoral laws which define official powers, regulations and penalties (Table 5). For example, the Control of Importation of Live Fish Act in Saint Lucia and the Mongoose Act in Trinidad & Tobago are effectively species specific invasive species legislation, indicating that impacts of the introduction of non-indigenous species were historically recognised.

62. The IUCN has published a comprehensive *Guide to Designing Legal and Institutional Frameworks*²⁹. It provides a high level strategic roadmap for law and policy makers, with emphasis on international cooperation, but also explains principal legal instruments that could be exploited for IAS management. The Environmental Law Institute (ELI) in the USA has published a hands-on toolkit³⁰ that may serve as a starting point for drafting of laws and regulations in pilot countries. The report analyses the current legal tools available at the state level to combat invasive species and identifies 17 state tools that are grouped into five categories: prevention, regulation, control and management, enforcement and implementation, and coordination. For each tool, examples of strong and intermediate policies are provided. Building onto existing invasive species tools, the study provides guidance on assigning roles of authority, monitoring, enforcement, emergency powers, funding implementation and offers a user friendly, three-step compliance standard.

Table 5: List of national laws related to IAS in pilot countries

Legislation reviewed	Bahamas	Dominican Republic	Jamaica	Saint Lucia	Trinidad & Tobago
Integrative Environmental Legislation	Environmental Health Services Act (1987)	Law number 64-2000 General law on Environment and Natural resources (2000)	Natural Resources Conservation Authority Act (1991)	National Conservation Authority Act (1999)	Environmental Authority Act (2000)
Animals	Animal Contagious Diseases Act (1963) Dog Licence Act (1942)	Law number 85 (1931) Law number 4030 (1973)	Animals (Disease & Importation) Act (1948)	Animals (Disease & Importation) Act (1956)	Animals (Disease & Importation) Act (1955) Dogs Act (1918)
Apiculture		Law number 62 (1974)	The Bees Control Act (1918)	Importation of Bees Act (1912)	Bees Keeping and Bee Products Act (1935)
Coastal and Marine Environment	Fisheries Resources (Jurisdiction and Conservation) Act (1986)	Law number 5852 (1962) Law number 186 (1967)	Fishing Industry Act (1976) Aquaculture, Inland and Marine Products and By-Products (Inspection, Licensing and Export) Act (1999)	Fisheries Act (1984)	Fisheries Act (1916) Marine Area (Preservation and Enhancement) Act (1970)

²⁹ Shine C, Williams N, Gündling L (2000). *Guide to Designing Legal and Institutional Frameworks*. IUCN Environmental Policy and Law Paper No. 40, pp. 138.

³⁰ Filbey M, Kennedy C, Wilkinson J & Balch J (2002). *Halting the Invasion. State Toolkit for Invasive Species Management*. Environmental Law Institute, Washington DC, USA, http://www.elistore.org/reports_detail.asp?ID=10678&topic=Biodiversity_and_Invasive_Species.

Legislation reviewed	Bahamas	Dominican Republic	Jamaica	Saint Lucia	Trinidad & Tobago
			Beach Control Act (1956)		
Forests		Law number 3003 (1962) Law number 118 (1999)	Forests Act (1996)	Forest Soil and Water Conservation Act (1946)	Forests Act (1916)
Plant Protection	Plants Protection Act (1916)	Law number 4990 (1958) Decree number 58-03 (1993)	Plants Quarantine Act (1951)	Plant Protection Act (1988)	Plant Protection Act (1975)
Protected areas	Agriculture and Fisheries Act (1964)	Law number 632 (1962) Law number 627 (1962) Law number 67 (1974)	Watersheds Protection Act (1963) Public Gardens Regulations Act (1899)	Saint Lucia National Trust Act (1975)	
Quarantine/Import Export	Export Control Regulations (1955) Import Control Regulations (1955)	Regulation number 1113 (1943) Decree number 5304 (1948) Decree number 6775 (1950) Various circulars	Agricultural Produce Act (1926) Keeping of Animals Act (1979) Quarantine Act (1944)	Control of Importation of Live Fish Act (1952) Quarantine Act (1944)	Control of Importation of Live Fish Act (1950) Mongoose Act (1918) Quarantine Act (1944)
Wildlife Protection	Wild Animals (Protection) Act (1968) Wild birds Protection Act (1952)		Wildlife Protection Act (1945) Endangered Species (Protection, Conservation and Regulation of Trade) Act (2000)	Wild birds Protection Act (1885)	Conservation of Wildlife Act (1963)

63. All the project countries possess plant, animal health and quarantine legislation that encompasses the management of invasive species and other biotic threats. Other legislation related to apiculture, coastal and marine environments, forests, protected areas and wildlife relates to invasive species in so far as it defines the territories of the respective countries and regulates activities which may result in the introduction or export, internal spread and management of invasive species.

64. Given that IAS-related national legislation was and is primarily driven by agriculture, it is important to note that environmental IAS legislation only started in 1990s, under various UN initiatives, at the regional rather than national level. The CBD is the leading agreement driving the process.

65. Prior to the 1980s, environmental legislation in the Caribbean was largely inadequate and contained in several different acts. Responsibility for the administration of applicable legislation was also distributed across several governmental departments and unsupported by the appropriate institutional arrangements needed to coordinate and direct relevant initiatives. With the advent of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, and the United Nations Global Conference on the Sustainable Development of Small Island States (UNGCSIDS) in Barbados in 1994, Caribbean governments instituted improvements in their environmental legislative frameworks. Countries have passed legislation in an attempt to unite environmental management within single institutions, and have developed regulatory procedures for integrated environmental management. Generally however, environmental legislation remains relatively weak due to the lack of incorporation of international conventions and standards into national law. A notable exception is Jamaica, whose national legislation reflects its commitment to upholding international agreements such as the CBD and CITES.

66. The adoption of harmonised legislation based on international standards and conventions will enable Caribbean countries to meet the requirements of international conventions, such as the WTO's *SPS Agreement*, the CBD, and the *International Maritime Convention*, and will also put the necessary precautions in place to limit the introduction of invasive species

Policy and implementation at the national level

67. The Bahamas is the only participating country with a NISS³¹. This document offers a draft policy on invasive species, a Code of Conduct for Government, Voluntary Codes of Conduct for Botanical Gardens, for Landscape Architects, for the Gardening Public, for Nursery Professionals, for Zoos and Aquaria, for Farms (Agricultural and Aquacultural), for Pet Stores, Breeders and Dealers, for Pet Owners, and for Veterinarians. Furthermore, it specifies IAS recommended for control and eradication.

68. A list of all IAS recognised in the Bahamas is shown in its NISS. For the CSA during the PPG, they prioritised one marine vertebrate and four plant species for control by localised elimination: Lionfish (*Pterois volitans*), Australian Pine/Casuarina (*Casuarina littorea/equisetifolia*), Brazilian Pepper/Bahamian Holly (*Schinus terebenthifolia*), Asian ink berry / White ink berry (*Scaevola taccada*), Paper Bark Tree (*Melalueca quinquenervia*). The Bahamians see a need to involve all its citizens as they recognise that whether as homeowners, gardeners, construction workers, truck drivers, landscapers, etc., everybody is regularly confronted with IAS.

69. The Dominican Republic has not yet developed its NBSAP or a NISS. However the country completed three National Reports to the CBD in 1998, 2003, and 2007 respectively. Thematic reports to the CBD cover IAS (2002), forest (2002) and mountain (2003) ecosystems, though these have not been translated into policy yet. The Government has issued a large number of fragmented laws, norms and regulations in recent years (paragraph 40 and Table 5). Particularly relevant to IAS is a policy amending the *Reglamento Forestal*, soil and water regulations, and management of environmental quality, as well as a range of largely administrative resolutions relating to DR-CAFTA.

³¹ <http://www.bahamaschm.org/Webdocs/Invasive%20Species%20Document%20for%20CHM.pdf>

70. On the national level there is a conflict in the implementation of the law between the Wildlife and Biodiversity Direction and the Sub-Secretariat of Marine Coastal Resources. Both institutions have responsibility for the implementation of the legislation but there is an ill defined allocation of responsibility for the management and control of aquatic species. A further conflict of interest exists between environment institutions and other government sectors such as agriculture and tourism, as the latter sometimes implement activities that affect natural habitats and biodiversity without adequate consultation of the environmental sector, e.g. issue a permission to destroy a mangrove for building a hotel or approve credit for an agricultural project in a natural protected area. These prevailing conflicts underline the urgent need for cross-sectoral coordination with respect to the management of IAS at the national level.

71. Because IAS have only recently been recognised as an issue in the Dominican Republic, few stakeholders are involved in IAS management. Awareness raising workshops should first target tourist guides, sea and airport inspectors, as well as the armed forces because of their high likelihood of exposure to new IAS and their role in national biosafety. The Dominican Republic has not participated in any IAS management programmes for the past ten years. Capacity building is in its infancy, with IABIN I3N paving the way for further expansion. The Dominican Republic sees an urgent training need in all aspects of IAS management.

72. The limited information available in the Dominican Republic about IAS and their status was used during the PPG in order to shortlist the following invasive mammals and plants for eradication in specific, critical habitats: *Rattus rattus* and *Rattus norvegicus* (rats), *Felis catus* (feral cats), *Procyon lotor* (raccoon), *Calliandra calothyrsus* and *Azadirachta indica* (neem). They all threaten endemic species in protected areas and this information was also used to select the pilot projects.

73. Jamaica has an Alien Invasive Species Working Group (AIWG) that incorporates a wide range of agencies collaborating to monitor and manage the impacts of IAS. The AIWG also publishes a quarterly newsletter, *Aliens of Xamayca*³². The Jamaican model could assist other countries to develop their national IAS task force, or a similar multi-sectoral coordination body, as well as efficient communication tools.

74. Jamaica also sees a further need to engage additional sectors, including the Jamaica Customs Department, Ministry of Health, aviation authorities, pet shop industry, tourism sector, media, landscapers, tour operators, as well as its citizens into IAS issues. AIWG also highlighted the urgent need for a nationwide public awareness campaign on IAS that is not restricted to agricultural pests.

75. Despite the existence of an AIWG in Jamaica, no agency has the mandate for the overall management of IAS in the country. Instead, the management of IAS is split among several agencies with specific species falling within the authority of a particular agency (NEPA, MoA, etc). Policy making and the review of how this relates to the environment and sustainable development is currently executed by the Environmental Management Division (EMD), formerly an agency of the Ministry of Health and Environment, which has recently been reassigned to the Office of the Prime Minister (Central Government). Monitoring and execution of Acts that relate to the management of IAS is split among several agencies, such as NEPA and MoA (Plant Quarantine, Veterinary Services and Fisheries Division). In many instances these responsibilities overlap. When infractions are detected, the specimen(s) are seized and the matter is dealt with under the relevant legislation/act (Customs, NEPA, veterinary services, plant quarantine). There is a need to review sanctions so that these are relevant to current infractions.

³² <http://www.jamaicachm.org.jm/Article/>

76. Schedules 7 and 8 of the amendments to the Wildlife Protection Act contain lists of IAS and potential IAS in Jamaica, respectively. A recent capacity building exercise by the Institute of Jamaica (IOJ) produced an updated list and an online database of all IAS found in the country up to 2007. The 2007 national consultation identified the following IAS as the top priority for management: *Hydychium gardnerianum* (wild ginger), *Pittosporum undulatum* (wild coffee / mock orange), RPM, *Ceratitis capitata* (Mediterranean fruit fly), feral animals (eradication) and marine IAS (early detection). However, since this consultation priorities have changed slightly and possible IAS species for pilot projects assessed during the PPG CSA were: wild ginger; wild coffee; *Polygonum chinense* (red bush); *Herpestes javanicus* (Indian mongoose); *Pterois volitans* (lionfish); feral animals, such as cats, dogs, goats, mongoose, and pigs (eradication); *Cherax quadricarinatus* (Australian red claw lobster), *Pterygoplichthus paradalis* (Sucker mouth catfish), Mediterranean fruitfly, and *Papilio demoleus* (lime swallowtail butterfly).

77. The Environment and Planning legislation is currently being reviewed. A concept note was developed for a Conservation Easement Act.

78. The NBSAP of Jamaica, which was completed in 2003, is currently under implementation. It also addresses IAS issues, and amendments have been suggested to the Wildlife Protection Act to include measures to manage and eradicate IAS. A Biosafety and Enforcement Policy and a Dolphin Policy are in preparation. Only the Jamaica Conservation and Development Trust (JCDDT) has formally incorporated IAS policy into the management plan for the Blue and John Crow Mountains National Park. Otherwise invasive species are managed on a case by case basis, especially where the IAS is a direct threat to the agricultural industry.

79. Jamaica has benefited from capacity building with respect to several agricultural pests, i.e. Red Palm Mite (RPM), *Maconellicoccus hirsutus* (pink hibiscus mealy bug - PHMB) and Moko disease (caused by *Ralstonia solanacearum*), as well as IABIN's I3N Project and GloBallast, the Jamaican Iguana Recovery Program (predator control as a conservation tactic), and the Forest Rehabilitation of the Blue and John Crow Mountains (Management of the IAS wild coffee and wild ginger - removal and monitoring techniques). An assessment of the current status of and the future needs for infrastructure and human capacity during the PPG included:

- ◆ an increase of resources at the existing agencies that are currently assisting with IAS management
- ◆ increased risk analysis skills within all agencies
- ◆ increased taxonomic identification capabilities and resources
- ◆ provision of additional transportation support for some agencies
- ◆ development of an effective public awareness campaign that reaches the average Jamaican

80. Past and ongoing IAS projects in Saint Lucia have been concerned primarily with agricultural pests: *Achatina fulica* (giant African snail), pink hibiscus mealy bug, *Aceria guerreronis* (coconut mite), and red palm mite.

81. Saint Lucian legislation includes protection of plant and animal resources as well as environmental health. However, neither the Biodiversity Act nor the legislation relating to international trade of wild fauna and flora are enacted. No regulations yet exist for the Maritime Area Act, 1994, No.6. Neither Saint Lucia's NBSAP or the Global Environmental Outlook mention IAS. In the Biodiversity Country Study Report of 1998 very little attention is given to IAS, except in the Legislature Framework – animal and plant quarantine and surveillance laws. The PPG has identified the need to update these documents and to develop a NISS.

82. The main gaps in the sustainable management of IAS from a Saint Lucian perspective are:

- ◆ Inadequate knowledge base (base does not exist)
- ◆ Knowledge of the actual pathways by which IAS are carried from place to place is lacking
- ◆ Identification of pathways by taxonomic groups and ecosystems
- ◆ No national/regional emergency action plan
- ◆ Constraints on funding
- ◆ Gaps in institutional coordination
- ◆ Constraints on risk and assessment tools
- ◆ Lack of national capacity and adequate legal and institutional frameworks and
- ◆ Regional and sub regional constraints.

The CSA specifically recommends the establishment of an Invasive Species Coordination Agency. National stakeholders prioritised Maria Island as the pilot site for preventative measures because it possesses a high endemism (5 endemic reptile species) and is an important habitat for nesting seabirds. Maria Island is a nature / wildlife reserve with marine reserve components and forms part of the Point Sable National Park. IAS constitute a significant potential threat (including avian influenza and lionfish) for this unique and relatively intact ecosystem. The national species shortlisted for the CSA included feral monkey, green iguana (eradication) and avian influenza (prevention).

83. Past and ongoing IAS projects in Trinidad & Tobago were / are concerned with agricultural pests with the infrastructure and human capacity is found within the Ministry of Agriculture, Land and Marine Resources (MALMR). The CSA prioritised Nariva swamp, a Ramsar site, because of the vulnerability of the endemic palms to palm pests that are common on agricultural commodities (cocoanut and ornamentals), such as red palm mite. Shortlisted species during CSA were frosty pod rot (FPR) of cocoa (*Theobroma cacao*), caused by *Moniliophthora roreri*, for prevention, and *Acacia mangium*, the macroalgae *Caulerpa taxifolia* and green mussel (*Perna viridis*) for management of existing IAS.

84. The final drafting of all national legislation rests with the Ministry of Legal Affairs, specifically the Chief State Solicitor Office. This Ministry also oversees legal obligations under international law. Since laws relevant to IAS generally fall within the technical mandate of the MALMR, it is this Ministry that provides technical baseline information for legal updates. However, the mandate for environmental protection rests with the Environmental Management Authority (EMA), which is a semi-autonomous body funded by the Ministry of Planning, Housing and the Environment and governed by the Environmental Authority Act of 2000.

85. The EMA produced the National Environmental Policy in 2005, which gives priority to early detection and control of IAS rather than eradication, because this is more cost effective. The NBSAP was drafted in 2006 and the NISS is pending.

86. In practice, the EMA deals with policy, whereas MALMR deals with implementation. While both agencies collaborate on IAS issues, dialogue between the two Ministries still leaves room for improvement, leading to poor coordination and even conflict, i.e. over the Department of Forestry, which was recently transferred from the EMA to MALMR.

2.7. Linkages with other GEF and non-GEF interventions

GEF interventions

87. The Bahamas is developing a national UNEP/GEF project: *Building a Sustainable National Marine Protected Area Network*, which aims to expand and strengthen Bahamian marine protected areas in terms of technical capacity, communications, and funding. Management of the invasive lionfish is a key pilot theme that both this project and the one proposed here have in common, and BEST will act as the national executing agency for both projects. The two projects will address different aspects in close coordination, and the fact that BEST is executing both projects simultaneously will ensure that there is no duplication of effort as well as providing opportunities for the exchange of ideas and lessons learnt.

88. The proposed FSP will work particularly closely with the GEF-funded United Nations Development Programme (UNDP) - IMO global project on *Building Regional Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships' Ballast Water (GloBallast Partnerships)*. GloBallast is assisting 14 developing sub-regions and will include 13 Lead Partnering Countries (LPC) from five high priority sub-regions, including the WCR. Currently, four countries have been identified as LPCs in WCR, namely the Bahamas, Jamaica, Trinidad & Tobago and Venezuela. GloBallast support comprises technical cooperation, capacity building and institutional strengthening. Cooperative links have already been established with the GloBallast project, which is assisting developing countries in understanding the problem of ballast water as a pathway for aquatic IAS. The Bahamas, Jamaica and Trinidad & Tobago are partners in both initiatives. GloBallast expertise will also be applied to fouling, another important pathway for IAS entry. It will thus underpin measures to safeguard marine protected areas and mariculture from IAS damages in the five participating pilot countries.

89. Component 3 of the proposed Caribbean IAS project will seek linkages and knowledge exchange with the following GEF Projects in various stages of development and implementation: UNDP/GEF: Seychelles IEM Program *Mainstreaming Prevention and Control Measures for IAS into Trade Transport and Travel across the Production Landscape*; UNDP/GEF: Ecuador – *Control of Invasive Species in the Galapagos Archipelago*; UNDP/GEF: Regional – *Pacific Invasive Species Management*; UNEP/UNDP/GEF: Regional – *Integrating Watershed and Coastal Area Management (IWCAM) in the Small Island Development States (SIDS) of the Caribbean*; GEF/UNDP/IOCARIBE/UNESCO: Regional - *Caribbean Large Marine Ecosystem Project*; and UNEP/GEF: Regional - *Removing Barriers to Invasive Plant Management in Africa*. These referenced projects are aimed at improving the ability of developing countries and regions to prevent the incursion of IAS; and to manage existing and new introductions.

90. UNEP will work closely with the GEF Secretariat in the context of the forthcoming GEF knowledge management effort to ensure uptake and dissemination of good practice and lessons learned from the FSP.

Non-GEF interventions

91. The proposed project will liaise closely with CISWG in relation to project Component 2 (Establishment of Caribbean-wide Cooperation and Strategy). CISWG was formed in 2003 by scientists, policy makers and trade specialists. The group comprises as its organisational members: CABI, CARDI (chair), CARICOM Secretariat, Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), the FAO, Inter-American Institute for Cooperation on Agriculture (IICA), Pan-American Health Organisation (PAHO), USDA-APHIS, University of Florida (UF), and the University of the West Indies (UWI). Furthermore, all of the Caribbean countries and territories (English, French, Spanish and Dutch speaking) have been invited to nominate a CISWG representative and current membership goes beyond CARICOM.

The purpose of CISWG is to develop strategies that safeguard the Caribbean against IAS, focusing on those that present a threat to agriculture and agricultural trade. Currently this includes crops and livestock and excludes fisheries.

92. CISWG has developed a *Caribbean Regional Invasive Species Intervention Strategy (CRISIS)* and is looking for funding to put it into operation. CISWG developed the CRISIS³³ with agricultural pests as its main focus. Under the proposed project, the mechanisms proposed by CRISIS will be adapted and expanded to IAS which threaten biodiversity. The FSP will develop regional strategies for marine, terrestrial and aquatic IAS which will be used to broaden the scope of the CRISIS document. In the future CRISIS could therefore provide the appropriate framework for addressing new IAS such as the chytrid fungus *Batrachochytrium dendrobatitis*, an infectious disease affecting amphibians worldwide, whose spread is facilitated by trade.

93. Another CISWG initiative supporting the implementation of CRISIS is the proposed Caribbean Invasive Species Surveillance and Information Programme (CISSIP). As it is anticipated that the five pilot countries in the FSP will also be involved in the CISSIP project, capacity building activities in the two projects will complement each other. In turn, dissemination and capacity building of wider sub-regional scope will be spearheaded by CISWG, which comprises 12 national Governments as well as global and regional organisations, including CABI, CARDI, CARICOM Secretariat, CIRAD, FAO, IICA, PAHO, USDA-APHIS, and several Universities, such as UF-IFAS, the University of Puerto Rico and UWI.

94. GISP has an ongoing collaboration with UNEP RSP on management of MIS, principally through capacity building activities

95. Several Caribbean countries, among them the Bahamas, Dominican Republic and Jamaica, are closely collaborating with the IABIN-I3N which integrates and provides access to IAS information from Western Hemisphere countries, using the internet and other tools to support the detection and management of IAS. I3N data, information standards, distributed data creation tools, as well as pathways and risk analysis tools are also specifically incorporated into the GISP-TNC national IAS strategy template. This will be reviewed with respect to its feasibility to support the countries in implementing Components 1 (national IAS strategies) and 2 (Caribbean-wide strategy) in the FSP.

SECTION 3: INTERVENTION STRATEGY (ALTERNATIVE)

3.1. Project rationale, policy conformity and expected global environmental benefits

96. As seen in the previous section, all the participating countries already have some measures in place to prevent, control and/or eradicate IAS, but those measures focus mainly on agricultural pests and weeds. The proposed FSP will widen this narrow approach to dealing with IAS by establishing an extensive framework addressing IAS that threaten marine, aquatic and terrestrial ecosystems and their biodiversity, including strategies to mitigate these in national policy frameworks. It will build on existing national measures in the plant and animal health sector and feed biodiversity capacity into the project by linking with diverse national and regional stakeholders. It will tackle economic issues from the perspective that many people in the region depend upon biodiversity for their subsistence, regular livelihoods and coping strategies in times of adversity. The proposed project will provide the participating countries and others in the Caribbean region with the necessary tools and capacity to address existing and future biological invasions.

³³ CISWG (2005). *Caribbean Regional Invasive Species Intervention Strategy (CRISIS)*.

97. A main strength of the proposed project is its regional approach. The five participating countries are all classified as small scale economies and have very restricted resources to successfully prevent and/or manage IAS introductions. Through cooperation, the countries' ability to manage IAS will be increased through cost effective knowledge generation and capacity building. Furthermore, a cooperative, regional approach is obligatory for the management of IAS in the WCR as one country failing to prevent and/or control an IAS introduction will inevitably jeopardise other countries' efforts to do so.

98. The project is consistent with GEF-4 Biodiversity Strategic Program 7: Prevention, Control and Management of IAS, addressing the following priorities:

- ◆ *Strengthening the enabling policy and institutional environment for cross-sectoral prevention and management of invasions* through Component 1, where national strategies will be put in place to inform and develop policies, legislation, regulations and management, and through Component 2 which will establish a region-wide IAS strategy and framework for cooperation;
- ◆ *Implementing communication and prevention strategies that emphasise a pathways and ecosystem approach to managing invasions* through Component 3, where knowledge generation and dissemination activities will strengthen access to and implementation of best practices in prevention;
- ◆ *Developing and implementing appropriate risk analysis procedures for non-native species importations* through pilot projects under Component 4, which support and inform Component 1;
- ◆ *Early detection and rapid response procedures for management of nascent infestations*—through innovative and cost effective pilot projects under Component 5;
- ◆ *Managing priority alien species invasions in pilot sites to ensure conservation and sustainable use of biodiversity* also through Components 4 and 5, piloting prevention and response measures to biological invasions.

99. The project is in line with Goal 6 of COP8: *Control threats to island biological diversity from IAS*, which calls for collaborative pathway analyses at the island, national, regional and global level, combined with the establishment of effective control systems at national and inter-island borders. It also calls for the development and implementation of measures for early detection of and rapid response to the introduction or establishment of IAS in both terrestrial and aquatic ecosystems and prevention, as well as eradication and management plans for long term management of priority IAS.

100. The project is consistent with the global and regional aims of the CBD's Global Island Partnership (GLISPA), which assists islands to conserve and sustainably use their natural resources by bringing together islands worldwide in an attempt to mobilise leadership, increase the resource pool, and share skills, knowledge, technologies and innovations in a cost effective way.

101. The small scale of the Caribbean economies necessitates a regional approach, which is legally supported through the Cartagena Convention of 1983. In particular the SPAW Protocol, which came into force in 2000, calls on its parties to initiate a Caribbean-wide IAS control programme and to enforce capacity building activities³⁴. The pilot countries selected for the proposed GEF project are representative of the ecosystem diversity and species richness, as well as for the geophysical, political, socioeconomic and socio-cultural complexity of Caribbean states. It is therefore anticipated that each participating country will act as a model for the wider dissemination of the project findings in the Caribbean.

102. Marine ecosystems comprise a major share of the region's globally important biodiversity, a fact recently recognised by the UN, which designated the Caribbean Sea as Special Area. IUCN expressed deep concerns about IAS threatening marine ecosystems at the 3rd World Conservation Congress in November 2004³⁵: "Globally, preliminary findings of the Millennium Ecosystem Assessment confirmed IAS as one of the major drivers towards homogenisation of ecosystem biodiversity in marine environments.... Invasions are less likely to be accurately recorded and monitored in marine, as opposed to terrestrial, environments." The report concludes that "increased baseline and monitoring surveys, and more detailed and quantitative risk assessment methodologies were identified as key priorities." Following that recommendation, the proposed project will collaborate closely with GISP and the UNEP RSP on marine IAS management training. This process was initiated during PDF-A and yielded the first regional study of its kind⁵, which is expected to form the baseline against which future projects can be developed as well as assessed. In particular, this study concluded that "*there is a need for fundamental capacity building at national / regional levels, taking into consideration existing experience and capacity from relevant / related areas*". The project proposed here follows on from this recommendation with an incremental strategy: (1) further in depth information gathering and critical analysis, (2) validation of local applicability - adaptation where necessary - in the planned pilots, and (3) systematic information sharing among all partners in two regional languages.

³⁴ UNEP Caribbean Environment Programme (2005) *Workplan and Budget for the SPAW Regional Programme for the Biennium 2006-2007*.

³⁵ IUCN (2004) 3rd World Conservation Congress, November 2004, *Marine Highlights*.
http://www.iucn.org/themes/marine/pdf/PostWCC_KeyMarineMsgs.pdf

103. CISWG developed the CRISIS document³³ that states: “*Since no country in the Caribbean region can unilaterally prevent the invasion from abroad of harmful organisms, a cooperative regional defense is imperative. [...] IAS do not recognize political borders. Therefore, an effective strategy is needed to link the various countries and comprise the participation and partnership of all stakeholders in order to provide a coordinated approach to prevention, management, capacity building and, awareness and education in the wider Caribbean*”. The proposed project has evolved together with CISWG since its formation in 2003, but has a unique focus on biodiversity, while CISWG’s interest is essentially in agricultural IAS.

104. The project was developed in a participatory manner (see also Section 5). Through learning-by-doing in the pilot activities, the countries will further enhance their capacity to control existing invasions and prevent new introductions. The outputs of the pilot projects will be shared between the countries and disseminated within the WCR to ensure expansion to a regional approach from actual case studies.

3.2. Project goal and objective

105. The project goal is to conserve globally important ecosystems, the species and genetic diversity within the insular Caribbean.

106. The project objective is to mitigate the threat to local biodiversity and economy from IAS in the insular Caribbean, including terrestrial, freshwater, and marine ecosystems.

3.3. Project components and expected results

107. The overall structure of the proposed FSP comprises seven components addressing national and regional policy development (Components 1 and 2); information management (Component 3); capacity building to prevent biological invasions (Component 4); early detection, management and eradication of IAS (Component 5); project management (Component 6) and Evaluation (Component 7). The simultaneous implementation of the components and their mutual interaction and knowledge exchange ensures that IAS are addressed at every level necessary.

108. The technical implementation aspects of the project are designed as pilot projects within Components 4 and 5. There are a total of twelve pilot projects across the five partner countries, addressing marine, terrestrial and aquatic IAS. These are summarised briefly in this section, and described in detail in Appendices 16-20.

109. ***Component 1: Development of National IAS Strategies*** During the PDF-A and the PPG countries assessed their national needs, priorities and actions concerning IAS. Using the baseline of existing sector strategies, and following a multi-sectoral consultative process, recommendations for national IAS policy and legal frameworks will be developed. The involvement of all key stakeholders from relevant sectors is crucial to the development of successful national IAS strategies. The participation of policy makers and government institutions is instrumental in agreeing to and implementing IAS strategies. At the beginning of the project a National Steering Committee (NSC) will be set up in each country to oversee development of a NISS that will also address the risks of climate change and associated IAS risks. This will ensure that altered IAS risks due to climate change are an integral part of each country’s invasive species strategy. All countries participating in the project have access to meteorological services and historic data. The IMA in Trinidad has remote sensing capabilities and receives surface sea temperatures continuously through US satellite installations. This data is stored in a database at the IMA and is used to supplement the Meteorological Office data. This meteorological information will be used to facilitate the inclusion of climate change considerations in the NISS.

110. The NSC will also guide the overall strategic direction of the project to ensure coherence and integration of the project components. The role of the NSC in project management is discussed further in paragraph 141. At the end of the project a cross-sectoral working group, based on the NSC, will be formally constituted to continue coordination of actions relating to IAS at a national level. By the end of FSP, all five countries are thus expected to possess a functional IAS working group as well as a NISS. At present, Jamaica is the only country with a cross-sectoral body on invasives (AIWG), and the Bahamas is the only country in the region that already has a NISS in place. They can therefore share expertise and experience with other countries in the region.

111. ***Component 2: Establishment of Caribbean-wide Cooperation and Strategy***

Regional IAS strategies for marine, terrestrial and aquatic IAS that recognise the economical, ecological and political complexities in the region will complement the national efforts described under Component 1. The regional strategies will build on individual national strategies and expand the draft CRISIS document (which is currently primarily focused on agricultural pests and diseases) as well as providing a platform for the exchange of IAS expertise and best practice. The development of a strategy at a regional level will be addressed separately for marine, aquatic and terrestrial invasives. Separate regional consultations will be held in year 1, in each of these subject areas, to draw upon the most relevant expertise in each area, including representatives from related projects and initiatives, as well as from countries in the region which are not participating in the project. One of the principal outputs of the regional consultations will be the establishment of working groups to develop the three regional strategies. The inclusion in the working groups of representatives from parallel initiatives such as GloBallast, CISWG and IABIN-I3N (see also Section 2.7) will ensure continued cooperation and harmonisation of strategic direction with these projects, and avoid duplication of effort. In developing a Caribbean-wide cooperation and strategy we consider it essential to liaise closely with regional organisations and their programmes, i.e. those identified in Section 2.7, as well as to establish links to and strengthen the participation in regionally significant multilateral agreements on agriculture, trade and the environment. The regional dimension of the project will be overseen and coordinated by an international Project Steering Committee (PSC) which will meet at least once a year throughout the project.

112. One of the outcomes of the UNEP/GEF MSP “Development of Best Practices and Dissemination of Lessons Learned for Dealing with the Global Problem of Alien Species that Threaten Biological Diversity” was to develop best practice guidelines which included “Climate Change & Invasives; and Early Warning Systems” as part of the ‘Toolkit for Best Prevention and Management Practices of Invasive Alien Species’²⁷. In addition, a recent Canadian publication³⁶ that mainly concentrates on temperate and cold regions, clearly explains the different mechanisms by which climate change and IAS interact and provides good illustrations for capacity-building. It discusses a range of tools, including policy measures that can be used to manage the climate change and IAS interaction which could be adapted to the Caribbean region. Similarly, a US publication³⁷ focuses on policy tools for the management of climate change and aquatic IAS, which could also potentially be applicable to the Caribbean. The sparse information known about how climate change influences the distribution and likelihood of establishment/invasiveness of

³⁶ “*Integrating Climate Change into Invasive Species Risk Assessment/Risk Management*”, Workshop Report, November 2008, Policy Research Initiative, Ottawa, Canada, http://www.policyresearch.gc.ca/doclib/WR_SD_InvasiveSpecies_200811_e.pdf

³⁷ U.S. Environmental Protection Agency (EPA). (2008) “*Effects of Climate Change for Aquatic Invasive Species and Implications for Management and Research*”. National Center for Environmental Assessment, Washington, DC; EPA/600/R-08/014. http://www.elistore.org/Data/products/d18_04.pdf

aquatic organisms (freshwater as well as marine) has been reviewed for the UKOTs³⁸. Some tools have been adapted to European OTs³⁹ and both could serve as models. The latter is one of very few studies that focus on tropical islands in the climate change and IAS threat discussion, with numerous examples from EU OTs presented in a systematic territory-by-territory manner. The working groups responsible for developing the regional strategies under Component 2 will draw upon these guidelines and tools to ensure that these important elements are fully considered within each strategy.

113. As part of its commitment to Caribbean-wide cooperation, the project will also reach out to those countries and territories not participating in the GEF initiative. For example, CABI is liaising with the Fondation pour la Protection de la Biodiversité Marine (FoProBiM) in Haiti and well as stakeholders in Cuba in order to update them about the GEF project. Cuba participated in the PDF-A and possesses tremendous biodiversity. In turn, Cuba made its current knowledge and training modules available in the form of the proceeding of a 2008 workshop⁴⁰ and Haiti provided a copy of its environmental laws.

114. CABI is also working with the UK overseas territories (OTs), which are not eligible for GEF funding, to allow the OTs to take advantage of this bigger initiative. This two way process was initiated during the PDF-A and continued during the PPG with CABI briefing the French, Dutch and UK OTs about the proposed initiative, and in return being briefed on IAS in Anguilla⁴¹. OT representatives will be invited to participate in the regional strategy working groups and, where possible, to undertake pilot projects addressing prioritised IAS issues to run in parallel with the pilot studies conducted under the FSP. Contacts already exist with CIRAD's regional office in Guadeloupe and the French IUCN Committee, both of which cover the French Antilles and Guiana, the Governments of the UK OTs, the Joint Nature Conservation Committee (JNCC) in the UK, the Saint Eustatius National Park (STENAPA) and RAC/REMPEITC in Curaçao.

115. ***Component 3: Knowledge Generation, Management and Dissemination.*** The threat posed by IAS is a cross-cutting issue, affecting marine, freshwater and terrestrial ecosystems as well as different sectors (including agriculture, animal and human health, fisheries, food safety, forestry, off shore oil production, transportation, trade and tourism). During the PPG, each country drafted a CSA to identify gaps in the legislative, institutional and policy framework, provide an overview of the status of Protected Areas, and identify species of particular conservation value. Information about the most important invasive species was also collated in a standard format to include risks, impacts and management options, as well as knowledge gaps. These analyses were central to the selection of pilot projects for the FSP, but also include a wealth of more widely applicable information to guide other initiatives against IAS. Under the FSP, the CSAs will be finalised through a more comprehensive desk study than was possible under the PPG.

116. A multi-sectoral approach to knowledge management and dissemination is key to successful uptake of the project outputs, and Component 3 of the FSP will target a wide range of stakeholders to ensure that the project findings are translated into accessible messages,

³⁸ Varnham, K 2006. "Non-native species in UK Overseas Territories: a Review". JNCC Report No. 372, http://www.jncc.gov.uk/pdf/jncc372_web.pdf

³⁹ Petit J. & Prudent G. 2008. Climate Change and Biodiversity in the European Union Overseas Entities. IUCN, Brussels, 178 pp., http://www.reunion2008.eu/pdf/en/42.10_LOW_FINAL_book_EN.pdf

⁴⁰ TEMATEA (2008) Módulo Temático de Especies Exóticas Invasoras y Aguas Interiores. La Habana, Cuba

⁴¹ Anguilla National Trust (2007). Invasive Species in Anguilla. Workshop Report, Paradise Cove Hotel, Anguilla, 29 May 2007, www.axanationaltrust.org.

recommendations and guidelines that will lead to positive action against IAS at every stakeholder level from senior policy makers to the general public. The complete, expanded CSAs, together with results from the pilot projects as they become available, will form the basis for the development of best practice guidelines which, together with the CSAs, will be produced in booklet form for distribution to a wide range of stakeholders.

117. The management of knowledge generated by the pilot projects, including the exchange of lessons learnt among the participating countries is a key part of Component 3. The National IAS Experts will prepare technical reports on the pilot projects which will be circulated to the other countries. Project Steering Committee meetings (see paragraph 111) will include visits to the pilot project sites.

118. Public awareness campaigns will also be implemented for each of the pilot projects, including posters, brochures and fliers; TV and radio coverage including public service announcements; newspaper articles and supplements devoted to IAS; and public lectures, particularly in the pilot site areas. Schools will also be targeted, with lectures about IAS issues and visits to the pilot sites.

119. At the global level, the project outcomes will be shared with the wider island community through the GLISPA which is recognised by the CBD as a partnership that will advance the implementation of the CBD 2010 biodiversity target. National and regional delegates will attend a regional technical workshop for islands, to be hosted by New Zealand in partnership with The Nature Conservancy under a programme of work on IAS, to showcase lessons learned from the Pacific Invasives Initiative and provide the opportunity for an exchange of experiences.

120. The FSP will establish and strengthen several electronic networking initiatives, including the establishment and maintenance of a project website, linkages to GISP and databases such as GISIN, the Global Invasive Species Database (GISD), IABIN, and Nonindigenous Aquatic Species Database (NASD), as well as the moderation of the Caribbean_IAS_Threat Yahoo group. The project will also promote the use of the electronic Invasive Species Compendium that is currently under development by CABI under a free access model. Project findings will also be fed back to the Compendium, providing a means to disseminate them globally.

121. ***Component 4: Increase Capacity to Strengthen Prevention of new IAS Introductions in Terrestrial, Freshwater and Marine Systems.*** Prevention is the most cost effective measure for managing IAS and is a key component of the CBD Guiding Principles. The pilot projects relating to prevention under the FSP will examine unintentional and intentional introductions as well as individual and generic pathways of introduction. The countries will build a prevention framework, apply risk assessments, quarantine measures, management interventions and capacity building through these pilot projects. Results will be validated through trial schemes and disseminated and demonstrated to stakeholders. Two contrasting scenarios have been selected as case studies.

122. In Trinidad & Tobago, surveillance, quarantine and early detection mechanisms will be strengthened using Frosty Pod Rot (FPR) as the model: see Appendix 20 for full project description. This fungus is still absent from the insular Caribbean, but is posing a threat through its presence on the nearby South American mainland, including western Venezuela. This puts Trinidad at an extremely high risk of becoming the entry point for the region. Despite prevention being the most cost effective IAS management measure, the immediate impact of IAS that are already present frequently means decision makers do not focus on the threat posed by potentially new invasives. The arrival of FPR in Trinidad & Tobago would not only be devastating to the cocoa producing sector, but may also affect the globally important cocoa germplasm bank that is located in Trinidad. Putting an effective system in place to prevent the introduction of FPR could be a vehicle to strengthen the country's IAS prevention system as a whole.

123. Within three years of the introduction of the pathogen, *Moniliophthora roreri*, to cocoa producing areas in Latin America yields were reduced by an average of 80%. This frequently rendered the production of this understory crop unattractive in highly diverse agroforestry systems, resulting in the abandonment and conversion of the affected agroforests^{42, 43}. This resulted in habitat loss for wildlife through the felling of trees and fragmentation of landscapes and also triggered unsustainable trends in livelihood strategies⁴⁴.

124. Surveys in agroforestry landscapes have indicated that agroforests can harbour a substantial proportion of the regional avifauna, including typical forest species with the chosen land use system determining the potential conservation value⁴⁵. Deforestation and the accompanying urbanisation and conversion of forest into cattle pasture had the most negative impact, followed by monocultures of annual crops. In contrast, agroforestry systems based on shade tolerant tree crops such as cacao can support a significant number of forest birds if the natural, diverse and structurally complex vegetation is maintained. As a result, remnant forest trees and riparian strips can be disproportionately important for the persistence of forest birds and have been recommended as the most important conservation measure in tropical urban environments⁴⁵. Whereas at least a proportion of abandoned cocoa farms in Latin America are left to be overgrown by the forest, land prices and growing urbanisation especially in Trinidad, puts great pressure on landowners to clear the forest and convert to real estate.

125. A pilot project in Saint Lucia, described in detail in Appendix 19, will address the protection of the unique biodiversity of Maria Island, a marine reserve and bird sanctuary only one kilometre from the mainland in a major tourist area but so far free of serious IAS problems. It contains the most threatened, endangered and endemic reptile species of all of Saint Lucia's protected areas, the Saint Lucian whiptail lizard (*Cnemidophorus vanzoi*). The pilot project will build capacity among local field staff in biodiversity monitoring and inventory techniques; raise awareness among both local community stakeholders and the general public (including tourists) of the dangers posed by IAS, and establish monitoring guidelines and a rapid response plan in case IAS are detected in the reserve. The project will also build capacity in IAS detection among quarantine officers and port workers.

126. ***Component 5: Increase Capacity to Detect, Respond, Control and Manage***

127. ***IAS Impacts in Terrestrial, Freshwater and Marine Systems.*** Pilot projects under Component 5 address options for the management of IAS that are already present, at four levels: early detection and rapid response; eradication of incipient invasions or contained (island) populations; management of established IAS invasions for which eradication is not feasible; 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 will be identified and recommended during this project.

⁴² Krauss U & Soberanis W (1999) A case study on the effect of biological disease control on the rehabilitation of abandoned cocoa (*Theobroma cacao*) farms under two shading regimes and with two application times in Tingo María, Peru. In *Multistrata Agroforestry Systems with Perennial Crops*, F. Jiménez & J. Beer (Eds.), Turrialba, Costa Rica, Feb. 22-27, 1999, pp 116-119.

⁴³ Krauss U, Ten Hoopen M, Hidalgo E, Martínez A, Arroyo C, García J, Portuguéz A & Sánchez V (2003) Manejo Integrado de la moniliasis (*Moniliophthora roreri*) del cacao (*Theobroma cacao*) en Talamanca, Costa Rica. *Agroforestería en las Américas* **10**, 52-58.

⁴⁴ Dahlquist RM, Whelan MP, Winowiecki L, Polidoro B, Candela S, Harvey CA, Wulforst JD, McDaniel PA, Bosque-Pérez NA (2007). Incorporating livelihoods in biodiversity conservation: a case study of cacao agroforestry systems in Talamanca, Costa Rica. *Biodiversity Conservation* **16**: 2311–2333.

⁴⁵ Sodhi NS, Posa MRC, Lee TM & Warkentin IG (2008). Effects of disturbance or loss of tropical rainforest on birds. *The Auk* **125**: 511–519.

128. After prevention, early detection and rapid response are the next most cost effective measures to address IAS. A pilot project in Trinidad & Tobago (Appendix 20) addresses the problem of the marine invasive macroalga *Caulerpa taxifolia*. Originally native to the Caribbean, an invasive variety bred for aquaria is thought to have been reintroduced from the Mediterranean, posing a serious threat to the native biodiversity of coastal ecosystems. *C. taxifolia* first appeared outside its native range in 1984, when a 1m² patch was observed in the Mediterranean Sea off Monaco. Within five years, this aquarium strain had covered 1 hectare of sea bed and had begun to spread along the French Mediterranean coast covering 30 hectares in 1991. In the following two years the algae was observed off Spain and Sicily where it had extended to 1000 hectares. By 2004, over 30,000 hectares had been affected in the Mediterranean and the algae had been disseminated to Australia and California. In Trinidad *C. taxifolia* was originally recorded on the east coast and presumed to be the native variety. Now it is present and showing signs of dominance in critical seagrass beds on the west coast.

129. Seagrasses comprise several families of underwater marine flowering plants. Seagrass is usually found in close physical proximity to mangroves and coral reefs and grows in dense beds. These provide home, food and shelter for a variety of marine animal taxa and are particularly important as grazing grounds for turtles and nursery habitats for coral reef fishes, because they help the fish to avoid predators and contain an abundant food supply. As the tidal range in the Caribbean is very small, the seagrass beds are never exposed to the open air, but remain covered by water. Moreover, seagrass beds provide habitat for transient fish that migrate between mangrove and coral reefs and thus contribute invaluable ecosystem services to fisheries and hence the livelihood of those in the fishing industry. At least four seagrass species exist in Trinidad & Tobago: turtle grass (*Thalassia testudinum*), shoal grass (*Halodule wrightii*), *Halophila decipiens* and *Halophila baillonis*. The presence of manatee grass (*Syringodium filiforme*) has yet to be confirmed⁴⁶. The most extensive seagrass beds are found on the west coast of Trinidad, where the recent surge in *C. taxifolia* was observed. The project will identify and eradicate occurrences of the invasive strain as well as monitor the ecological impact of *C. taxifolia* on seagrass communities in the coastal waters around Trinidad & Tobago.

130. Where populations of IAS are newly established and therefore limited in extent, or where the population is confined geographically (typically on an island), eradication is a feasible option, and this is addressed in different contexts by several pilot projects. The former approach will be used in one of the Saint Lucian pilot projects (see Appendix 19). The highly endangered St Lucian iguana is under threat from a recently established population of alien iguanas in the Soufriere area that is threatening to spread. The pilot will address the eradication of this nascent invasion. Similarly, in the Bahamas, recently established populations of invasive plant species (*Casuarina equisetifolia*, *Melaleuca quinquenervia*, *Schinus terebinthifolia* and *Scaevola taccada*) will be manually removed from the Harold and Wilson Pond National Park and the Lucayan National Park.

131. A recent study employed modeling to compare the cost effectiveness of five management strategies in reducing the threat to native species. The strategies were designed to eliminate or control introduced predators. Immediate eradication, where this could be adequately funded, was the most successful strategy for controlling non-native predators. However, in cases where this is not possible, keeping predator numbers below a predetermined upper limit proved to

⁴⁶ Juman R (1998). Seagrass Beds. Another form of Wetland in Trinidad and Tobago. The Independent, 3 February 1998, p 20, <http://www.nalis.gov.tt/Agri/Agri-Seagrassbeds.htm>

be the most cost effective method of control⁴⁷. Eradication of mammalian predators on small islands is the focus of pilot projects in Jamaica and the Dominican Republic.

132. In Jamaica, the objective is the protection of the critically endangered endemic Jamaican iguana (*Cyclura collie*) in the Portland Bight Protected Area, where nesting populations in the Hellshire Hills are already the subject of intensive protection and multiplication efforts (see Appendix 18). While efforts to secure the surviving Hellshire population continue, the two Goat Islands, which lie close to the western margin of the Hellshire Hills, will be restored through the removal of goats and the eradication of cats, dogs and mongooses. Once the eradications are complete, carefully selected founding iguanas from the Hellshire population will be reintroduced to the Goat Islands, where, in the absence of non-native predators, their population should expand rapidly to carrying capacity. As the Goat Islands iguana population rebounds it will provide a major source of iguanas to release back into the Hellshire Hills, enabling the accelerated restoration of at least 1,000 Jamaican Iguanas in the wild. As the work progresses, improved techniques for invasive predator control may enable wide area reductions in mongooses, feral cats, and other problematic species.

133. In the Dominican Republic, eradication of invasive mammalian predators and herbivores from Alto Velo and Cabritos islands will enable restoration of native plant and animal communities. The offshore island Alto Velo, part of the Jaragua National Park, is home to a rare endemic *Anolis* lizard and important seabird colonies which are under threat from rats and cats. Also present on the island is the invasive neem tree (*Azadirachta indica*) which will also be targeted for eradication. Isla Cabritos, the biggest island in Lago Enriquillo, part of Lago Enriquillo National Park is a designated Ramsar site, and provides habitats for two critically endangered endemic iguana species of the genus *Cyclura* as well as the threatened American crocodile. In addition to mammalian predators, feral livestock (goats, donkeys) posing a problem to this native biodiversity will be targeted. Eradication interventions on both islands will be combined with individual management plans putting measures for habitat and ecosystem restoration in place. Both pilots are described in detail in Appendix 17.

134. While the two pilot projects identified by the Dominican Republic will largely employ the same implementation techniques, differences in the geographical features and the ecosystems of the pilot sites will provide valuable lessons in terms of scale of an eradication programme and managing the threats of IAS re-invasion. The logistics of project implementation will be more challenging for Alto Velo as it is a remote offshore island of 1 km² with variable topography. Operations on Isla Cabritos, with an area of 2,400 hectares, will need to be conducted on a much larger scale. A further challenge for the latter pilot site is that a land bridge periodically forms with the western shoreline of the lake at times of low water levels. This will make the island more vulnerable to IAS re-invasion than Alto Velo and the project will explore options to effectively manage this particular pathway.

135. For marine IAS, eradication is not usually an option because further invasion cannot be prevented. Two of the pilot projects address the management of established marine invasives: lionfish (*Pterois volitans*) and green mussel. Pilots on lionfish will be carried out simultaneously, and in close collaboration, in the Bahamas, where lionfish is already firmly established (see Appendix 16), and Jamaica, where the first positive sighting was in 2008 (see Appendix 18). As lionfish spreads southwards through the Caribbean, complementary studies in these two contrasting stages of the invasion process will provide valuable lessons for the many other islands

⁴⁷ Baxter P, Sabo JL. & Wilcox C (2008). Cost-Effective Suppression and Eradication of Invasive Predators. *Conservation Biology*. 22(1): 89-98.

facing the same challenge. The principal output from these studies will be a regional strategy for lionfish management within the overall marine IAS strategy.

136. In the waters around Trinidad & Tobago, the green mussel is a highly damaging invasive, both to the native ecosystem and in terms of its economic impact due to fouling of ships and equipment. It also poses a risk to human health, as it is seen as a food resource (it is harvested commercially) but contains high levels of toxins, parasites and heavy metals and is linked to shellfish poisoning. The pilot project, described in Appendix 20, will make an ecological and economic assessment of the impact of the green mussel, evaluate management options (manual, chemical and biological) and recommend a management strategy.

137. Two of the pilot projects will study the effects of IAS at the ecosystem level. One in Jamaica examines the control and management of invasive freshwater animals and plants in the Lower Black River Morass, a Ramsar site (see Appendix 18). The pilot aims to assess the current biodiversity status, monitor, understand and predict biodiversity change and its impact on ecosystem services; and build local capacity in IAS control. Practical measures will include removal of target species and establishment of a native species nursery. In Trinidad & Tobago, the threat to rare and endangered native palm species (and associated native fauna) in the Nariva Swamp, from the invasive red palm mite and coconut moth (*Batrachedra nuciferae*) will be addressed (see Appendix 20). The project site will be regularly monitored to assess pest status and risk to palm species with respect to their susceptibility to these insects. Pest-free seedlings will be raised to enable rapid response through eradication and replanting in the event of a pest outbreak in this area of very high conservation value.

138. **Component 6: Project management.** The complexity and diversity of the interventions proposed under the FSP, together with the need for close collaboration and exchange of information amongst the partners, make it essential that the project is tightly and efficiently managed. This need is reflected in the design of a discrete component dedicated to project management. As well as coordinating activities at both national and regional levels, the project management team will be responsible for monitoring and evaluation (M&E).

139. CABI, as the EA, will appoint a Project Manager/ International Coordinator (IC), and set up a dedicated project office, the Project Management Unit (PMU) within the CABI CLA office. Each country will appoint a National IAS Expert/National Coordinator (NC). The IC 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 coordination activities (mainly under Component 2). The NCs will be responsible for all activities within their respective countries. The IC and NCs will together comprise the Senior Management Team of the FSP. They will meet at least every six months, and hold teleconferences at least once a month.

140. The project will be managed using the principles of the PRINCE 2™ project management system. The proposed organisation structure is shown in Appendix 10.

141. This is a typical PRINCE 2 structure, in which the project's activities are managed and coordinated by the Project Manager (IC), but ultimate responsibility for timely and targeted project implementation lies with the Project Board. This comprises the Project Executive, who will be CABI CLA's Director, and Senior Users and Senior Suppliers who represent, respectively, the users of the project outputs and those involved in the production of the project's deliverables. Representatives from the five pilot countries will be identified as the Senior Users and will form a User Committee. The Senior Suppliers will comprise different regional and global co-financing organisations, to ensure that project inputs in form of information, training and co-financing will be coordinated and will match the Users' needs. The Project Board has the authority to monitor and control the project progress, to commit the resources required, to deal with conflicts arising out of the project and is responsible for the overall accomplishment and quality of the project. The

Project Manager will regularly report to the Project Board, and the Project Board will hold teleconferences whenever a new project stage has to be approved. The stages will be defined during the initial planning meeting.

142. A National Steering Committee (NSC) will be established in each country (see also paragraph 109) and will meet every 3-6 months. This will comprise the National Coordinator (NC), representatives of partner organisations, and technical experts contracted according to need from GEF and co-finance sources. The NC will, whenever possible, be housed in the agency leading the country's IAS and/or biodiversity portfolios. Committee members will report to the NC, who in turn will report to the IC.

143. At the international level, a PSC (see also paragraph 111) will be set up and will meet at least once a year to oversee and coordinate regional activities and collaboration under Component 2. Membership will include representation from each of the National Executing Agencies (NEA), the CABI Project Leader, the Regional Project Coordinator and the UNEP/GEF representative. PSC responsibilities include: reviewing biannual progress and quarterly financial reports and annual summary progress reports, providing policy guidance to the project, assisting the Project Implementation Units (PIUs) in developing linkages with other related projects, and overall guidance for the project implementation. The PSC will be meeting once a year.

144. UNEP/GEF in consultation with the UNEP/CEP office will execute the Project Assurance role, ensuring throughout the lifetime of the project that it meets the required UNEP/GEF standards and that its outcomes are aligned with global IAS policy, in particular the CBD.

145. As a regional project with global ramifications, targeted and timely project implementation and execution will depend on excellent communication. Checkpoint Reports from the NCs to the Project Manager will be kept brief but punctual (after each NSC meeting). Quarterly Highlight Reports will be compiled by the IC and sent to the Project Board. The Highlight Reports will include information from the Checkpoint Reports and, when relevant, inputs from partner organisations. These will be shared with the IA (UNEP), all pilot countries and partner organisations to ensure a dynamic information exchange.

146. ***Component 7: Independent Evaluations.*** The independent mid-term and terminal evaluation will include all parameters recommended by the GEF Evaluation Office for terminal evaluations as well as piloting the Tracking Tool Draft for GEF Strategic Priority 7. The evaluation will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted.

3.4. Intervention logic and key assumptions

147. The project aims to build regional IAS management capacity of global importance at key intervention points, progressing from strengthening the national IAS management capacity (Component 1) in five participating countries to regional integration and strategy (Component 2). Three key avenues of intervention are knowledge management (Component 3), IAS prevention (Component 4) and cost effective control (Component 5) (see Section 3.3 for detail on components). Although IAS are a global issue, each country or region has specific priorities that require specific solutions. During the preparatory phases of the projects, the PDF-A and PPG, these needs were analysed with the objective to tailor FSP activities to overcome barriers relevant to individual countries. Simultaneously, existing strengths and experiences were identified so that they can be harnessed to contribute to the regional common good during FSP. The identification of lead agencies for some regional activities during the PPG (see Section 3.10) illustrates the efficacy and applicability of this approach. Eventually it is anticipated that the five pilot countries together with partners from other CABI and UNEP managed projects (see Section 2.7) will form a

nucleus sufficiently large to trigger the crystallisation of a larger and more robust network throughout the WCR and, where appropriate, beyond.

148. The impact of this approach depends on the willingness of national agencies as well as countries to cooperate on IAS issues (see also Appendix 4). Progress to date illustrates that regular networking, including meetings during the PDF-A and PPG, is essential as this creates a mutual awareness, reduces distrust and thereby fosters cooperation. In this context, it is important to note that the focus on environmental IAS is particularly conducive for regional integration, whereas the agricultural IAS targeted by several previous interventions had potential trade implications that rendered countries more reluctant to share detailed information. However in some countries (principally Saint Lucia and Trinidad & Tobago) existing IAS management capacity (human and infrastructure) is largely concentrated in the agricultural sector under SPS and quarantine and so the project will work through these agencies as well as with environmental managers to create an institutional framework that will allow the cost efficient sharing of resources for a common goal.

149. The threats, root causes and barriers highlighted in Section 2.10 are inexorably linked to livelihoods, with the infamous “four Ts” providing both income opportunities and pathways for IAS introduction. Pilot projects (see paragraphs 121 to 136) were selected and developed in a participatory manner with extensive stakeholder involvement, which will be maintained and further consolidated during the FSP (see Section 5) to avoid conflicts of interest and thereby to reduce several risks flagged in Appendix 4. At the same time this participatory approach allows facilitated interfacing at community level so that the awareness of the threat posed by IAS to livelihoods in the long term becomes a part of the culture and changes behaviour in an informed and sustainable manner.

150. The generic tools developed during the MSP mentioned in paragraphs 48 and 112 provide a good foundation on which this proposed GEF intervention can build once the fundamental barriers to the management of IAS in the Caribbean have been addressed. The toolkit identifies the need for pilot projects in individual or small groups of neighbouring countries with common invasive species problems and management challenges to adapt, expand and regionalise the toolkit to strengthen its effectiveness. The proposed project will utilise and validate the toolkit, specifically for the Caribbean situation, which in some cases will be replicable in other Caribbean and GEF beneficiary countries, particularly SIDS.

151. A four year project involving five countries has to be able to adapt to changing conditions in a coordinated manner, taking into account the views and concerns of stakeholders who are affected by the changes, whether positively or negatively. Such changes may result from project activities or may be due to factors entirely beyond the control of the project. The use of participatory approaches with wide stakeholder consultation provides the principal tool for maintaining the public and political support needed for a sustainable and positive impact from the project.

3.5. Risk analysis and risk management measures

The main risks to the project have been identified below together with measures taken to manage these risks.

Table 6: Main Risks and Associated Management Measures

RISK	RISK RATING*	RISK MANAGEMENT MEASURES
Governments commitment to regional collaboration is reduced due to changes in the political environment	L	The existence of the CISWG provides the basis for regional collaboration and the FSP should be able to feed into this working group. The PSC will also have members from each country's NEA, allowing greater regional collaboration.
Lack of cross-sectoral communication and coordination between agencies	H	The establishment of an inclusive, multi-sectoral NSC in each country will provide a forum for communication between agencies and different sectors.
Key stakeholders do not agree to national strategies or participate in these strategies	L	Stakeholder workshops, liaison and networking will be undertaken to ensure they are fully engaged and able to contribute to the development of the national strategies.
Public not receptive to environmental information and display no interest in IAS control.	L	A multi-media public awareness campaign will be implemented, including a focus on the potential benefits of IAS control and the use of school groups, which may present a more receptive audience.
Enforcement of regulations may be difficult due to a lack of awareness of IAS issues at both the institutional and public level.	M	The public awareness campaign should enable stronger enforcement of regulations to be undertaken, as the public will become aware of the regulations, as well as general IAS issues.
Key personnel lost from key institutions and stakeholder groups	M	A full time national co-ordinator, funded by the project, will be appointed in each country. Robust, well-documented management systems will be established which are not dependant on individuals
Biodiversity is threatened by other pressures on the habitat and ecosystems	M	All five countries have a NBSAP describing threats to biodiversity and strategies to reduce these threats. All five countries also have designated protected areas, and two of the pilot sites (Jamaica and St. Lucia) are in protected areas.
Changes in IAS status affected by climatic variability, changing the impact of project interventions	M	Best practice guidelines for "Climate Change & Invasives; and Early Warning Systems", from the 'Toolkit for Best Prevention and Management Practices of Invasive Alien Species' will be integrated into IAS management strategies and methodologies for pilot activities.
Unforeseen financial pressure due to current economic climate	H	All financing has been agreed and committed with all partners providing a detailed breakdown of their project contributions. However the value of local co-financing relative to GEF funding will be unavoidably affected by exchange rate fluctuations.

*Risk Rating – H (High Risk), M (Medium Risk), and L (Low Risk)

3.6. Consistency with national priorities or plans

152. The concept of the proposed project is closely aligned with the countries' national priorities relating to the threats of IAS to biodiversity, as evidenced in the following country sections.

153. The Bahamas identifies IAS as one of the five major human related drivers that destroy biodiversity. Their control is among the primary goals of the NBSAP. The Bahamas has already established a NISS in 2003, which lists 19 aquatic and 55 terrestrial species (including 34 plant and 21 animal species) as invasive on the islands. The GEF project will contribute to the fulfillment of the NBSAP and NISS, by building awareness through further development of existing databases, providing training, identifying specific sites for regular monitoring on IAS impact and management success, and amending and enforcing existing legislation.

154. The Dominican Republic has ca. 7420 known species of which about 33% are endemic to the island. The rate of endemism in reptiles and amphibians (over 90%) is particularly high. It is noteworthy that overall 138 species have been reported as invasive in the Dominican Republic, among which are 17 of the 100 most invasive species of the world. The main challenges identified for dealing with IAS in the Dominican Republic are insufficient public education and awareness as well as the lack of technical, human and financial resources and scientific interventions. The country will benefit from regional cooperation and can act as a platform for efforts in other Spanish speaking countries in the Wider Caribbean. The Dominican Republic recognises that IAS known in neighboring or biogeographically similar countries constitute a problem for their own country, and they have strong links regarding this issue with Cuba, Haiti and Puerto Rico.

155. The Jamaican NBSAP recognises the severe impacts on ecosystems, habitats and native species that have resulted from the introduction of IAS. The Jamaica NBSAP outlines 45 specific goals relating to IAS. The preparation of an IAS management strategy has been listed as one of Jamaica's highest priorities and the proposed FSP will support the Jamaican Government in its efforts. It will provide the resources necessary for efficient and scaled-up implementation of initiated as well as incipient activities, thereby adding value via the means of pilot projects and capacity building together with regional networking and cooperation.

156. Saint Lucia's NBSAP recommends that policy initiatives at all levels contribute to maintaining and, whenever possible, restoring the integrity of the country's rich biological diversity as well as strengthening local capacity in order to address potential threats to biodiversity and to achieve the vision and programs outlined in the NBSAP. The third national report of Saint Lucia to the CBD summarises national IAS efforts to date, including the alien species of greatest concern. Saint Lucia has identified an urgent need for improved infrastructure, adequate equipment, and trained manpower to tackle the invasive species problem. Saint Lucia is the only member of the Organisation of Eastern Caribbean States (OECS) among the five participating countries, and is very well placed and eager to disseminate the knowledge acquired through the proposed GEF project to its partner countries in the OECS.

157. The draft NBSAP for Trinidad & Tobago identifies the introduction of exotic species as one of the 'evil quartet' that threatens biological diversity and specifies factors exacerbating the potential impact of IAS. The third national report of Trinidad & Tobago to the CBD points out that work on selected IAS has started. The proposed GEF project will address those limitations and, in particular, will work on marine IAS in this country for the first time. Trinidad & Tobago will benefit from a regional exchange of expertise on IAS.

3.7. Incremental cost reasoning

Baseline scenario

158. This baseline analysis includes a GEF investment of US\$225,000 (7% of total baseline) during the PDF-A and PPG (Appendix 3).

159. IAS have increasingly been recognised as a threat to livelihoods in the Caribbean since 2003, when the Kairo *et al.* report²⁴ was published and CISWG was founded. The focus during the early years was almost entirely on agricultural pests and gave rise to CRISIS. Projects strengthening agricultural SPS and quarantine results in Component 4 have baseline funding that is nearly a quarter of that for Component 5.

160. The Bahamas is the only country that has developed a NISS (also in 2003) that includes environmentally important IAS. However, regional vision does not extend to the conservation of globally important biodiversity in any participating country.

161. The preparatory phases of the project required the commitment of the Governments and NEA of participating countries, including the provision of co-finance matching the amount requested from GEF. Six countries took this step initially and five of them sustained their efforts throughout the PPG. The results comprise a tentative analysis of the threat posed by IAS already present in the countries, by those still absent from national territory, of mitigation approaches to date, and of research and capacity building needs to strengthen the IAS management capacity of these countries (\$44,400 for GEF and \$57,739 from others; Appendix 3). Although the lack of baseline distribution data was generally lamented, significant advances were made regarding a more strategic approach towards the protection of terrestrial vertebrates from IAS, e.g. endemic bird, reptiles (iguanas) and the endangered hutias, as information on these taxa is relatively abundant and accessible. Information on MIS was found to be particularly scarce. A fundamental desk study⁵, conducted with UNEP-CEP co-finance, collated available information throughout the WCR and made recommendations for the way forward. Links were established to GEF and non-GEF interventions with technical expertise in MIS management, such as the GloBallast or UNEP's CEP, to make cost-effective use of resources and add value to their activities.

162. Caribbean livelihoods depend strongly on trade, transport, travel and tourism - the infamous "four Ts" – which also provide pathways for IAS introduction at regional and global levels. These were found to be increasingly active in the Caribbean, putting a great demand on national resources to curb the risk for the benefit of a regional or global common good. This difficult baseline scenario is further complicated by the complexity and vulnerability of the insular Caribbean.

163. The national legislative and policy framework was reviewed in participating countries. MEAs were also reviewed for the relevance to IAS management in the WCR and the participation of project countries was analysed. In general, legislative, policy and institutional frameworks were found to be weak in the face of such complex challenges. This in turn is causally linked to inadequate stakeholder involvement and in adequate interaction between stakeholders and IAS management capacity. Mutual awareness of strengths and weaknesses was poor among countries and also regional and international agencies. In an iterative process of information exchange and gap analyses during the PDF-A and PPG, this situation was improved, but on-the-ground action resulting from better awareness remains in its infancy.

164. Although prevention is recognised as the most cost-effective IAS management approach, it received only 8% of total baseline investment, compared with 37% for the management of IAS already present in countries.

Alternative scenario

165. As described in Section 3.1, the GEF-funded intervention will meet the individual countries where their prioritised needs lie (mostly Component 1) and bring them up to par with one another to create an enabling environment for coordinated and participatory development of a regional strategy (Component 2), not least via the improvement of knowledge management (Component 3). The regional approach is crucial here. However, the 20% of baseline investment expended on Component 2 may give a misleading picture, as 85% of the \$635,472 came from partner organisations, including the EA and IA, and only 7.3% from the countries (Appendix 3). In contrast, the national contribution to the \$256,807 invested into Component 1 amounted to 39%. In the alternative scenario, Component 2 is strengthened, with the GEF intervention contributing 37% of investment into regional interaction. This is only exceeded by the co-finance of partner organisations (39%), while countries add 17%. Overall, the increment more than doubles the value of the Component 2 baseline.

166. All participating countries have some IAS management measures in place, but these are biased towards the agricultural sector. While building on the existing capacity (infrastructure as well as human resource) in a cost-effective manner, the FSP will expand the scope of these interventions to IAS of global environmental importance. This is reflected by investing GEF funds into Component 5 to eliminate some IAS from pilot sites of great conservation value. This will be institutionalised with the help of traditional environmental players, e.g. IUCN, TNC, UNEP CEP, and with partners of a traditionally agricultural nature but that have technically relevant expertise, such as CISWG, IICA, and USDA-APHIS; policy-makers, such as CARICOM, GISP and ELI, and training institutions, e.g. CERMES, FAMU, UF-IFAS, and UWI.

167. Regional knowledge exchange and integration will be systematically fostered. This approach has been formally adopted by CARICOM. These agencies were relatively unaware of the needs of participating countries in relation to their expertise, prior to the concluding workshop of the PDF-A. In turn, countries were largely unaware of the wealth of expertise available and how to access it. The exchange between countries and relevant organisations was continuously enhanced and fine-tuned during the PPG, a process that proved beneficial and will be intensified during the FSP.

168. The regional recognition of IAS issues and the concerted effort of addressing them will form the basis for expanding globally accessible databases, e.g. IABIN I3N, and for cross-fertilisation with other SIDS in the global arena, e.g. by a review of participation in MEAs and via GLISPA.

169. In an attempt to mitigate the damage already being done by IAS to native biodiversity, the relative GEF contributions for Component 5 (29%) exceeds that for preventive measures (Component 4: 22%) in the alternative. However, the increase in investment into Component 4 is 344% and in the same range as that of Component 5 (337%), indicating that prevention, as the most cost-effective IAS management approach, is not neglected (Appendix 3).

170. The total cost of project management is estimated to be \$ 1,205,230, of which \$343,315 is requested from GEF. This will not only fund a full-time IC, but also provide the seed money to build up the NSC. It is expected that over the four-year duration of the FSP, these committees will grow to be the national coordinating body for IAS issues and the national IAS management capacity will be sustainably enhanced.

Incremental cost and benefits

171. At the national level, GEF funds will facilitate inter-agency collaboration that is otherwise hard to initiate because nobody wants to make the first step and invest for the perceived benefit of others. The result will be the establishment of multi-sectoral IAS coordination bodies in each country and the development of a NISS.

172. At the regional level, there is already improved awareness of strengths and needs among participating SIDs. Furthermore, the approach was instrumental in leveraging significant co-finance of nearly 1.5 million US\$ from regional and global organisations to support activities in participating as well as non-participating countries during the FSP. Without this wider collaboration throughout the WCR, the five SIDS supported by GEF in this FSP would probably remain below critical mass to effect a regional impact.

173. It is expected that the CRISIS document will be expanded to include environmental IAS across terrestrial and aquatic ecosystems. This in turn will add value to the operationalisation of the strategy by CISWG and partners.

174. Increased integration into relevant networks of global significance will increase the visibility of Caribbean IAS issues and build up a scientific reputation for the region. This in turn is expected to assist in accessing larger, global funding opportunities in the long term. The GEF share of funds shows a 76% increment for Component 3 (Appendix 3).

Table 7: Summary of Incremental Cost Analysis

Grand Totals	Baseline	All stakeholders	2,062,489
	Increment	GEF	3,034,028
		Non-GEF	3,379,366
		Total Increment	6,413,394
	Alternative	Total	8,475,883

3.8. Sustainability

175. The sustainability of the actions proposed under the FSP may be defined as *the extent to which benefits continue, within or outside the project domain, from a particular project or programme, after GEF assistance/external assistance has come to an end*⁴⁸. Among the range of factors which may contribute to and enhance sustainability, the key elements for this project will include strengthening of the legal and policy framework for IAS prevention, management and control; improving coordination of activities relating to IAS at the national level; strengthening regional cooperation; and developing the necessary institutional capacity to address the threats posed by IAS rapidly and effectively. Public awareness-raising is an essential prerequisite for real and sustainable engagement with IAS issues at community level, and this will be another major focus of the project. Finally, financial mechanisms to provide a continuing funding stream after the end of the GEF will also be explored during the FSP.

176. Component 1 of the FSP addresses the national strategic and institutional framework relating to IAS in each partner country. By the end of the project each country will have a National Invasive Species Strategy (NISS) to inform the direction of IAS interventions beyond the life of the project. Equally important for the continuation of effective action at the national level is good communication and coordination among the government agencies and other stakeholders working on IAS. To this end, an inter-agency IAS Working Group will be constituted during the project, based on the project's National Steering Committees (NSC) and including representatives of the major IAS stakeholders in each country. In this way the project aims to institutionalise IAS management within the relevant government ministries and agencies by creating awareness of the need for a holistic, cross-sectoral approach and by demonstrating the value of this approach.

⁴⁸ Guidelines for Implementing Agencies to conduct Terminal Evaluations (GEF, 2003)

177. Since IAS do not recognise national boundaries, a regional perspective is essential for sustainable management and control, for instance to avoid re-introductions. In the context of the WCR, this is particularly true for marine invasives. Since their movement between countries cannot be controlled, coordinated management strategies are needed. Component 2 of the project will address this need by defining cooperation frameworks and setting up working groups to conduct regional consultations on marine, terrestrial and aquatic IAS. The outcomes of the consultations will form the basis for regional strategies which will be included in an updated CRISIS document. In addition, one of the pilot projects (on lionfish control) will be jointly implemented by the Bahamas and Jamaica.

178. Effective action on IAS, whether prevention, management or eradication, requires specific skills among field staff and government officials such as quarantine officers. Substantive capacity building is therefore a key element of all the pilot projects planned under the FSP as well as a key factor in the long term sustainability of the project's impact. It is envisaged to keep the personnel benefiting from the project's capacity building activities employed by the national agencies beyond the life of the project, to create long term sustainability in national IAS management.

179. Increased levels of public engagement and concern with IAS problems will contribute to sustainability, both by improving the general public's ability to identify and report invasives (and particularly new invasions), and by generating political will to give IAS issues higher priority. For these reasons, all the pilot projects include a strong element of awareness-raising and dissemination. Attitude changes arising from these interventions will be assessed by surveys near the beginning and end of the project.

180. The involvement of a wide range of stakeholders, including private sector groups such as hotel and restaurant owners, scuba dive operators, marine operators, pet trade industry and ornamental plant nurseries, in the IAS management and pilot activities as well as the dissemination of good practice will have a multiplier effect and will contribute to wider sustainability. However, government financial allocation to IAS activities is unlikely to be adequate; therefore alternative financial mechanisms will be required and explored during FSP, including opportunities for developing financial sustainability through cost recovery mechanisms. For example, for international imports of plants that demonstrate a potential risk of invasiveness, importers could be required to contribute to the necessary monitoring after import. Funding the control of IAS could be based on the 'polluter pays' principle, which would require appropriate laws and regulations. Simultaneously, incentive schemes, such as the *Blue Flag*, *Green Globe International, Inc.* and *Green Hotel Certification* will be targeted.

181. *Institutional sustainability* will be ensured through the establishment of the NISS for each country together with a formally constituted and functional cross-sectoral working group to coordinate IAS actions at the national level. At the regional level, a regional level strategy for marine, aquatic and terrestrial invasives will lead to the permanent establishment of a regional Caribbean wide Cooperation Framework. The sustainability of the project can also be measured at project end by the policy instruments enacted, and the preventive measures established. Sustainability will be enhanced through the capacity built and the awareness-raising achieved at national and regional levels. Pilot projects will specifically test the application of best practice methodologies for the prevention and eradication of invasives, building country level capacity to deal with IAS over the longer term.

182. *Social sustainability* will be achieved at national level through a multi-sectoral consultative process, with participation of policy makers, private sector and government institutions critical to implementing IAS strategies across the various sectors including agriculture, animal and human health, fisheries, food safety, forestry, off shore oil production, transportation,

trade and tourism. Regional level consultations will include relevant experts in each target invasive group and participant country representatives, together with representatives of countries not participating in the project.

183. *Financial sustainability* is envisioned by working within existing government institutions and private sector partners affected by IAS. Sustainability will be promoted by demonstrating the value of IAS interventions to all stakeholders early in the process, and mainstreaming defined interventions into operations. Government commitment to the IAS has been demonstrated through a direct match in co-financing with governmental resources, both in cash and in kind. The range of regional partners, which has grown, and continues to grow, since project concept inception provides a measure of assurance that the threat of IAS will continue to be taken seriously at the regional and global levels. Uptake of best practices will also be a measure of sustainability at the national and regional levels.

3.9. Replication

184. The pilot projects proposed under the FSP have great scope for replication, in that the methods developed and lessons learned will be applicable much more widely than is possible within the limits of the present project. Approaches proven to be effective are likely to be adopted and scaled out, both by the national partners themselves and by other stakeholders. For example, lionfish control methods developed at the pilot sites can easily be used at many other sites throughout the region, and in the future by countries where lionfish has not yet arrived. Adoption will be facilitated by the improved communication among stakeholders which will arise from the project's coordination actions at national and regional level.

185. As the barriers to IAS prevention and control are common to many countries and territories in the Caribbean region, the potential for replication of the project outputs is very high. The partner countries are representative for the various Caribbean economies and ecosystems and are well placed to distribute the lessons learned through different communication channels on the regional level. Moreover, the project has strong links to regional and global organisations which will support dissemination activities to a wider audience. A comprehensive strategy to disseminate and promote the project outputs is central to the design of the FSP.

186. The country selection is representative of the Greater Antilles (Dominican Republic and Jamaica) and the Lesser Antilles (Saint Lucia and Trinidad & Tobago). Three of these are located in the Caribbean biodiversity hotspot, whilst the fourth, Trinidad & Tobago, represents a unique ecological situation: because of its recent separation from the South American mainland, the biota and terrestrial habitats reflect the ecology of equatorial South America unlike the other Windward Islands, which have ecosystems dominated by island endemic species. These countries thus reflect the geophysical complexity of the Caribbean in terms of both scale and type of ecosystems.

187. Country representation also reflects the political and social-cultural complexity within the Caribbean, which is of significance to some of the major IAS pathways (see also paragraph 23-25). The Dominican Republic represents the most populous Spanish-speaking Caribbean islands, whereas the others are CARICOM countries and English-speaking. Saint Lucia is the only OES country. It is envisaged that through these different affiliations a critical mass will be reached which will maximize awareness raising and dissemination of results in a wider range of Caribbean countries and bodies.

188. The exchange of information about IAS, and measures to prevent, control and/or eradicate them, is beneficial to all concerned and saves both time and money. Since the countries participating in the proposed project are representative of the ecosystem diversity and species richness, as well as the geophysical, political, socio-economic and socio-cultural complexity, of

Caribbean states, it is anticipated that each partner country will act as a model for the wider dissemination of the project findings in the Caribbean.

3.10. Public awareness, communications and mainstreaming strategy

189. Communication and information are crucial for tackling regional and multi-sectoral issues such as IAS. The design of the FSP recognises this by dedicating a whole component of the project (Component 3) to knowledge management and dissemination activities. These are described in detail in Section 3.3.

190. Information needs were identified by the participating countries and by CABI elsewhere in the region. Measures for raising public awareness will be strengthened in a coordinated manner, based on approaches that have proved locally successful, such as Jamaica's newsletter *Aliens of Xamayca* and the weekly columns in the *Diario Libre* that reaches ca. 112,000 readers in the Dominican Republic. At the regional level, the project findings, information and data generated, as well as best practice on IAS management will be disseminated by electronic networking systems, e.g. a dedicated project website for mostly internal communication, as well as I3N, the Carib_IAS_Threat Yahoo Group, and public communication media for the wider public awareness.

191. All partners mentioned in Section 2.5 will be regularly apprised of progress via reports and/or meetings. This will also provide an opportunity to capture their feedback for discussion and consideration. Saint Lucia submitted the framework for a regional environmental education plan, covering tools that can be adapted to need, such as a regional IAS awareness logo, a webpage with a link to the CABI website, a brochure, a monthly e-newsletter, posters, periodic project country exchange, a public information educational/informational pack (comprising an environmental education series), public service announcements, regional article blasts, and videos for public education.

192. The project will systematically collate existing information (inventories, databases, etc) and will link to global initiatives such as GISP and GISIN as well as regional initiatives, particularly IABIN-I3N. For regional mainstreaming of the strategy, CISWG will be a key forum. It is envisaged that by the end of FSP, all participating countries will have a NISS, a functional IAS committee as well as representation on CISWG.

3.11. Environmental and social safeguards

193. The project is considered to have positive environmental and social impacts due to improving IAS management and enhancing regional collaboration in the insular Caribbean to reduce the risk posed by IAS to biodiversity of global significance. This will be achieved through its investment in national capacity building, in national and regional infrastructure, in knowledge generation and dissemination and public awareness raising as well as through conducting pilot studies for IAS management. Social and environmental safeguards have been integral to the project during its design and development phases and will be also be adhered to during its implementation.

194. Stakeholder participation constitutes an important mechanism to provide social safeguards and national cross-sectoral stakeholder participation from both the governmental as well as NGO sector has been a priority during the project design (PDF-A and PPG phase) to ensure ownership of the project. Equally, regional and international stakeholders have been identified and engaged in the project development through intensive networking and the establishment of collaborative partnerships. One of the main project components is “Knowledge Generation, Management and Dissemination” in order to ensure the successful uptake of project outputs at all levels. Mechanisms to provide all partners and stakeholders with information on project progress and to capture their feedback for consideration will ensure a continuous assessment of the ongoing work of the project against the national and regional social and environmental backdrop. Public awareness campaigns addressing the threats of IAS and their management in general, and specific IAS problems in relation to individual pilot projects aim to engage local communities with the project. This will provide buy-in from the general public, raise the sensitivity and understanding of IAS issues and their impact on livelihoods and ensure lasting support for IAS management beyond the duration of the project. Overall, this participatory approach will provide the mechanism to address concerns and changing points of view within the stakeholder community throughout the course of the project and to make necessary adjustments.

195. All pilot projects have been developed in line with environmental and social priorities in the respective countries as identified through stakeholder consultations. Hence these pilot projects are designed to provide environmental and social safeguards against the impact of IAS on biodiversity and livelihoods with the purpose to contribute to environmental sustainability.

196. Where pilot projects have been proposed following the precautionary approach to IAS, i.e. preventing the arrival of FPR of cacao in Trinidad & Tobago and protection of Maria Island Nature Reserve in Saint Lucia from the threat of IAS, preventative actions will be put in place as environmental safeguards to protect biodiversity. Where pilot projects have been designed to deal with existing IAS problem, i.e. invasive mammal predators in the Dominican Republic, competition and habitat destruction through invasive plants and/or animals such as *Caulerpa taxifolia* in Trinidad & Tobago, and four identified invasives at a Ramsar site in Jamaica, interventions will be undertaken in line with Best Management Practice for IAS control (Wittenberg & Cock, 2001). Baseline studies will be conducted before interventions will take place to capture the status of existing biodiversity and the impact of the respective IAS as well as to verify the most environmentally compatible control methodology for the targeted habitat/habitats.

197. It is recognized that the project will also have an impact on the livelihoods of local communities especially in the pilot areas. While in some instances this may be positive, (eg reducing the number of lionfish present thereby allowing native food fish populations to increase) there may also be more negative impacts (eg stopping communities from clearing land for farming) on people's livelihoods. The pilot projects will therefore aim to involve the local communities, not just as stakeholders, but also by providing possible livelihood opportunities. In the Nariva Swamp pilot in Trinidad & Tobago for example, the swamp directly supports 1050 people. Fire has been used to clear land for farming, the local hydrology has been altered through blocking some waterways and creating new ones. However various measures have been taken to employ people in building work and ecotourism activities and these opportunities will continue in the project, with requirements for construction of a nursery, labour for the nursery etc.

198. All interventions will be undertaken with the aim to prevent or mitigate undue harm to the environment and local communities and will be combined with measures for ecosystem restoration as detailed in management plans devised for the respective pilot sites. Monitoring and evaluation programmes will be put in place as a long-term environmental safeguard in order to capture the impact of the intervention on local/regional biodiversity and to detect not-anticipated negative side effects and/or potential re-invasion of the targeted IAS and thus to enable appropriate rapid responses. National capacity building and public awareness raising will provide the skills, understanding and sensitivity to deal with IAS issues and, therefore, constitute an additional environmental safeguard with respect to detecting and reporting re-occurring or new IAS invasions.

SECTION 4: INSTITUTIONAL FRAMEWORK AND IMPLEMENTATION ARRANGEMENTS

199. Project management arrangements have been detailed under Section 3.3 (paragraphs 137 to 144).

200. CABI, as the EA, will be responsible for the implementation of the project in accordance with the objectives and activities outlined in Section 3 of this document. UNEP, as the GEF IA, will be responsible for overall project supervision to ensure consistency with GEF and UNEP policies and procedures, and will provide guidance on linkages with related UNEP and GEF funded activities. The UNEP/DGEF Coordination will monitor implementation of the activities undertaken during the execution of the project. The UNEP/DGEF Coordination will be responsible for clearance and transmission of financial and progress reports to the GEF.

201. CABI, as the EA, will cooperate with UNEP so as to allow the organisation to fulfill its responsibility as IA accountable to the GEF. To this end, free access to all relevant information will be provided by CABI. Project operational arrangements are detailed in Section 3.3 (Component 6), Section 5 and Appendix 5.

202. Each country's PIU will have a National IAS Expert/Coordinator (NC), a staff member from the NEA, a national administrative/accounting assistant (to be hired by the project part time or full time), and Technical Advisors/Subject Matter Specialists.

203. CABI will serve as the executive agency at the global level. The project will be part of CABI's Global Theme "Invasive Species". CABI will oversee the PMU, located at the CLA regional centre in Trinidad. The PMU will include the IC and a full time administrator/accountant. The PMU will be assisted by a project advisory panel which will include Technical Advisors from the EA. The PMU will establish reporting guidelines for all partners and ensure that they submit quality reports, prepare biannual progress reports, quarterly financial reports and annual summary progress reports for UNEP; the PMU will also carry out a programme of regular visits to project

countries and a schedule of regional stakeholder meetings being hosted by participating countries on a rotation basis, to share experiences and visit each other's pilot sites.

SECTION 5: STAKEHOLDER PARTICIPATION

204. The main stakeholders are the NEAs listed in paragraph 43. They include Government Ministries, largely state run agencies such as the EMA and Universities, as well as NGOs. Furthermore, a wider range of regional and international agencies are involved in specific aspects of the project (Table 4). These were identified during the PDF-A and refined during the PPG.

205. Stakeholder groups in each of the five countries contributed actively to the project design during the PDF-A phase. Activities were initiated in six pilot countries originally – The Bahamas, Cuba, Dominican Republic, Jamaica, Saint Lucia, and Trinidad & Tobago. The main objective of the PDF-A was to confirm which countries would be involved in the project and revisit the 'baseline situation' in order to refine the objectives of the two subsequent phases, the PPG and the FSP. Three activities were undertaken towards the fulfillment of these objectives: a national consultation in each country, an international workshop (IWS), and two baseline desk studies. In each country, the national consultations were coordinated by one or more lead agencies, using existing structures to involve relevant stakeholders in the process. Key stakeholders attended an in-country workshop, facilitated by CABI, to review existing capacities and gaps in order to identify the needs to be addressed and pilot activities to be set up under the FSP. Structures to guide the in-country activities under the PPG and FSP phases were also discussed.

206. Delegates from the original six pilot countries then joined representatives from 15 global and regional organisations at the IWS held in Trinidad & Tobago from 22-26 January 2007. During the week, the participants exchanged information, refined objectives and outcomes of the FSP and drew up tentative co-finance plans taking into consideration GEF's new Resource Allocation Framework IV (RAF IV). They also reviewed pilot activities and deliberated on coordination mechanisms for the PPG and FSP. CABI coordinated the finalisation and submission of the PPG proposal to GEF and other funding agencies, with the actual five pilot countries' continued commitment.

207. Based on the continued commitment of the Bahamas, Dominican Republic, Jamaica, Saint Lucia, and Trinidad & Tobago to this regional initiative and the pledged co-finance, the PPG was approved by GEF in January 2008, to be implemented from May 2008 to January 2009. The main activities undertaken by each country during this stage in preparation for the FSP were:

- ◆ Collating gaps in plans and policies as a baseline for the subsequent strategic review
- ◆ Outlining national and regional communication and capacity building strategies with a view towards the development of a Caribbean-wide cooperation and strategy on IAS
- ◆ Developing criteria and initiating baseline surveys for species and site selection for pilot projects, and defining pilot projects

All the key stakeholders actively participated in providing inputs to the formulation of the project, agreeing on the national organisational structure for project implementation and also the budgetary requirements for successful implementation of the project activities. Additional co-finance both in kind and in cash was sought to support FSP activities.

208. The overall implementation and execution arrangements for the FSP were developed in consultation with stakeholders for effective coordination of project activities at national as well as regional level.

209. At the site level, public participation will be promoted through the formation of Site Coordinating Committees (SCCs) in each of the pilot areas, which will include public representatives such as community leaders, farmer groups, NGOs and project staff.

210. The gender distribution is expected to be near 50:50 throughout all strata of the project stakeholder groups.

SECTION 6: MONITORING AND EVALUATION PLAN

211. The project will follow UNEP standard monitoring, reporting and evaluation processes and procedures. Substantive and financial project reporting requirements are summarised in Appendix 8. Reporting requirements and templates are an integral part of the UNEP legal instrument to be signed by the EA and UNEP.

212. The project M&E plan is consistent with the GEF M&E 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 summarised in Appendix 7 (Costed M&E Plan). Other M&E related costs are also presented in the Costed M&E Plan and are fully integrated in the overall project budget. The most significant of these relate to the assessment of public awareness about IAS at the beginning of the project (baseline) in comparison with that at the end, i.e. the degree of attitude change generated by the project.

213. 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 M&E. Indicators and their means of verification may also be fine-tuned at the inception workshop. 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 UNEP of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

214. The PSC will receive periodic reports on progress and will make recommendations to UNEP concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures is the responsibility of the Task Manager in UNEP-GEF. The Task Manager will also 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.

215. 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 UNEP. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The quality of project M&E 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.

216. The principal means of assessment of project performance will be the mid-term and terminal evaluations. These will provide an opportunity to pilot the new GEF IAS SP 7 Tracking Tool Draft (also attached as Appendix 15), and to verify the information it provides. The tracking tool 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.

217. The mid-term management evaluation will take place halfway through the project, at the end of year 2. This will include all parameters recommended by the GEF Evaluation Office for terminal evaluations as well as piloting the Tracking Tool Draft. The evaluation will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. The PSC will participate in the mid-term review and develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented.

218. At mid-term, a peer review committee will be invited to critically appraise the project to suggest any improvements. There are a number of experts committees which perform this service gratis. The Cooperative Islands Initiative (currently physically the Pacific Invasives Initiative based at Auckland University, Auckland, New Zealand) is suggested as a possible body to facilitate the process. This service provider would be built into adaptive management approach to ensure highest operational standards and using the best available technology are being used - providing a checks and balances and measures would be in place in accordance with current best practice

219. An independent terminal evaluation will take place at the end of project implementation. This will again make use of the GEF Tracking Tool Draft. The Evaluation and Oversight Unit (EOU) of UNEP will manage the terminal evaluation process. A review of the quality of the evaluation report will be done by EOU and submitted along with the report to the GEF Evaluation Office not later than 6 months after the completion of the evaluation. The standard terms of reference for the terminal evaluation are included in Appendix 9. These will be adjusted to the special needs of the project.

SECTION 7: PROJECT FINANCING AND BUDGET

7.1. Overall project budget

220. The overall project budget is presented in detail in Appendix 1 (budget requested from GEF) and Appendix 2 (co-financing). The numbered columns in both Appendices are 'activity numbers' corresponding to project outputs as follows:

Table 8: Activity numbers and corresponding project outputs

Activity no.	Components & outputs
	<i>Component 1. Development of National IAS Strategies to inform and develop policies, legislation, regulations and management</i>
1	1.1. Produce national IAS strategy for each country
	<i>Component 2. Establishment of Caribbean-wide cooperation and strategy</i>
2	2.1. Develop national and regional coordination mechanisms for a regional cooperation framework
3	2.2. Develop draft region-wide invasive species strategy

Activity no.	Components & outputs
	<i>Component 3. Knowledge generation, management and dissemination</i>
4	3.1. Data, information and best practice on IAS management collated.
5	3.2. Pilot findings, existing and externally funded IAS-related research at national and regional levels documented.
6	3.3 Electronic networking systems, including linkages to GISP, GISIN and IABIN established.
7	3.4. Public communications media & measures developed.
	<i>Component 4. Increase Capacity to Prevent New IAS introductions in terrestrial, freshwater and marine systems</i>
8	4.1. Capacity building for prevention of biological invasions
	<i>Component 5. Increase Capacity to Detect, Respond, Control, and Manage IAS Impacts on Globally Significant Biodiversity</i>
9	5.1. Early detection & rapid response to IAS
10	5.2. Eradication of terrestrial IAS populations
11	5.3. Control and management of IAS
12	5.4. Protection measures for sites of high conservation value
	<i>Component 6. Project management & coordination</i>
13	6.1. Project management & implementation
14	6.2. Monitoring & evaluation

221. Activities 8-12 correspond to pilot projects. In most cases the budgets given in the detailed pilot project descriptions (Appendices 16-20) are somewhat higher than those shown in Appendix 1. This is because some reductions were necessary to accommodate all the project activities within the limits of the GEF funds available for each country. Where such shortfalls exist they will be covered by the substantial co-financing that is available in all cases for the pilot projects.

222. Table 9 summarizes the funding requested from GEF, by year and country, as well as the co-financing committed at national level through the OFPs (see letters in Appendix 12). It does not include co-financing committed by regional partners: see Section 7.2.

Table 9: Project budget summarised by funding source, country/PEA and year

	Funding requested from GEF				
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	TOTAL
BAHAMAS	122,247	57,377	63,073	55,877	298,574
DOMINICAN REPUBLIC	170,235	123,440	116,940	121,940	532,554
JAMAICA	242,925	215,195	148,200	142,700	749,020
ST. LUCIA	215,371	107,280	103,840	107,080	533,570
TRINIDAD & TOBAGO	234,290	146,947	117,138	118,187	616,561
CABI	82,080	74,000	74,000	73,668	303,748
TOTAL	1,067,148	724,238	623,191	619,451	3,034,027

In-cash co-financing					
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	TOTAL
BAHAMAS	27,812	34,644	58,267	51,242	171,965
DOMINICAN REPUBLIC	89,000	84,165	73,835	74,000	321,000
JAMAICA	154,800	164,900	170,030	175,200	664,930
ST. LUCIA	67,500	67,500	67,500	67,500	270,000
TRINIDAD & TOBAGO	148,842	130,803	71,279	55,366	406,288
CABI	0	20,000	20,000	20,000	60,000
TOTAL	487,954	502,012	460,911	443,308	1,894,183
In-kind co-financing					
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	TOTAL
BAHAMAS	45,790	51,141	47,931	39,400	184,262
DOMINICAN REPUBLIC	83,462	73,686	74,062	68,892	300,100
JAMAICA	79,500	80,340	81,628	83,560	325,028
ST. LUCIA	100,000	100,000	100,000	100,000	400,000
TRINIDAD & TOBAGO	56,190	44,881	27,421	27,302	155,794
CABI	34,200	28,600	28,600	28,600	120,000
TOTAL	399,142	378,648	359,641	347,753	1,485,184

7.2. Project co-financing

223. The co-finance committed for the project includes two elements: commitments from national partners, as summarized in the letters from the GEF OFPs, and commitments from regional and global partners which are not country-specific. In general, the latter type of co-finance provides more general support, including complementary activities which will add value to the project outputs, rather than direct support to project activities. For this reason, only the co-finance committed specifically to project activities, through the OFP, is included in Table 9 (above), and in the detailed co-finance budget presented in Appendix 2. The totals for both types of co-financing are given in Table 10, and the full list of regional co-finance commitments in Table 11. Across both these co-financing types, the ratio of GEF funding to co-financing is 1:1.63.

Table 10: Summary of co-financing

	In-cash	In-kind	TOTAL
National co-financing	1,894,183	1,485,184	3,379,367
Regional/global co-financing commitments	566,245	1,003,364	1,569,609
TOTAL	2,460,428	2,488,548	4,948,976

Table 11: Co-finance commitments by regional partners

<i>Name of co-financier (source)</i>	<i>Type</i>	<i>Amount (\$)</i>
UNEP CAR/RCU	In-cash	40,000
UNEP CAR/RCU	In-kind	60,000
APHIS	In-cash	40,000
APHIS	In-kind	40,000
CERMES	In-cash	22,400
CARICOM	In-cash	5,000
CARICOM	In-kind	300,000
CARINET	In-cash	17,200
CARINET	In-kind	8,850
ELI	In-kind	20,000
FAMU	In-cash	60,000
FAMU	In-kind	80,000
FAO	In-kind	100,000
IABIN	In-cash	20,000
IABIN	In-kind	34,500
IICA	In-cash	15,000
IICA	In-kind	25,000
CISWG	In-cash	4,550
CISWG	In-kind	5,850
GISP	In-cash	100,000
GISP	In-kind	100,000
RAC REMPEITC	In-kind	70,000
SUSTRUST	In-cash	20,000
SUSTRUST	In-kind	15,000
TNC	In-cash	82,095
TNC	In-kind	14,164
UF-IFAS	In-cash	40,000
UF-IFAS	In-kind	80,000

7.3. Project cost-effectiveness

224. The cost-effectiveness of the proposed project is a function of the potential damage caused by IAS in the Caribbean in the absence of any project intervention (the ‘business as usual’ scenario). The scale of the threat posed by biological invasions is alarming in both environmental and economic terms.

225. The Caribbean region is regarded as one of the world's biodiversity "hotspots" (Myers *et al.*, 2000)⁴⁹: it supports some 7000 species of endemic plants and 779 endemic vertebrates (148 birds, 49 mammals, 418 reptiles, 164 amphibians). Human-mediated species extinction on the islands of the Caribbean, as elsewhere, is due to a combination of factors, including the impacts of invasive species (Case *et al.*, 1992)⁵⁰. Many species of animals, plants and even microorganisms have been introduced to the Caribbean, either accidentally or deliberately, for a variety of reasons. The Small Indian Mongoose (*Herpestes auropunctatus*) provides a widely-cited example of the environmental damage that has resulted from such introductions. This species was deliberately imported as a biological control agent against rats in sugar cane fields, first being successfully introduced in the Caribbean to Jamaica in 1872 (Cock, 1985)⁵¹. In Jamaica, it has subsequently been linked to the extinction of five endemic species: one lizard (*Celestrus occiduus*), one snake (*Alsophis ater*), two birds (*Siphonorhis americanus* and *Pterodroma caribbaea*) and one rodent (*Oryzomys antillurum*). In the years following its establishment in Jamaica, the mongoose spread to many other Caribbean islands, and has had similar devastating impacts on their biodiversity (in Cuba it has been identified as one of the main agents responsible for the decimation of endemic insectivore populations).

226. Although economic losses due to the pink hibiscus mealy bug (PHMB) have not been computed, the total reported loss to the Caribbean was approximately US\$138 million, excluding control costs and loss of exports. It is estimated that the potential annual loss to the US if the PHMB had been established there would have been US\$750 million. Estimated damage and control costs of invasive species in the U.S. alone are now estimated to amount to more than \$138 billion annually. There are approximately 50,000 foreign species and the number is increasing. About 42% of the species on the Threatened or Endangered species lists are at risk primarily because of IAS (Pimentel, Zuniga and Morrison, 2005)⁵². The cost of damage caused by invasive species globally is estimated as \$US 1.4 trillion per annum - close to 5% GDP and they are recognized as being one of the greatest threats to the environmental and economic well-being of our planet.

227. Prevention is the most cost-effective measure to manage IAS, compared to post-invasion measures such as control, eradication and restoration. It is also a key element of the CBD Guiding Principles. For this reason, Component 4 of the proposed project deals specifically with preventative actions. The PPG phase explored options for pilot projects to address such aspects as pathways of introduction, development of prevention frameworks, risk assessment, quarantine measures, and capacity building relating to prevention, and it was envisaged in the PIF that this would be the largest component with regard to GEF funding. However, it became apparent during PPG that three of the five partner countries (Bahamas, Dominican Republic and Jamaica) were facing such pressing problems from IAS already present in their countries that they were not able to prioritise pilot projects on prevention as originally envisaged.

228. Component 5 addresses early detection, management and eradication of a range of marine, aquatic and terrestrial IAS across the five partner countries. The diversity of approaches

⁴⁹ Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A B. da Fonseca, and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403:853–858.

⁵⁰ Case, T. J., Bolger, D. T., Richman, A. (1992): Reptilian extinctions: the last ten thousand years. Chapter 5 in: Fiedler, P. L., Jain, S. K. (eds.): Conservation biology: the theory and practice of nature conservation, preservation and management. Chapman and Hall, New York.

⁵¹ Cock, M.J.W. (1985) *A Review of Biological Control of Pests in the Commonwealth Caribbean and Bermuda up to 1982*. Commonwealth Agricultural Bureaux, Slough.

⁵² Pimentel, D., Zuniga, R., and D. Morrison. 2005. Update on the environmental and economic cost associated with alien-invasive species in the United States. *Ecological Economics* 52. pp 273-288

and methods reflects the different problems perceived as paramount in each country, and because of this diversity their cost-effectiveness also varies. In general, the earlier the intervention occurs in the invasion process, the more cost-effective it is. Experience shows that prevention of invasive alien species is significantly more cost efficient than engaging in eradication or control efforts after their introduction. Investing project resources solely in the eradication of invasive species would be a costly and short sighted approach to the threat of new IAS species being introduced and spreading to neighbouring island nations. Therefore the pilots address early warning and rapid response (Output 5.1), and eradication of small, incipient or isolated invasions (Output 5.2) as this will be more cost-effective in the long term than those working on management and control of established IAS for which complete removal is no longer a feasible option (Outputs 5.3 and 5.4). This is supported by extensive literature demonstrating that late stage eradication efforts are considerably more expensive than prevention efforts. Experience has shown that eradication efforts of an introduced species must be conducted in the early stages of introduction if there is to be a realistic expectation of success.

229. The growth in tourism and trade increase the risk of invasions. Gaps in the policy setting and the lack of institutional capacity to prevent new IAS species make prevention the most cost effective intervention to limit introductions and the spread of invasives in the Caribbean region. Strengthening the enabling environment, through the introduction of national policies, a regional framework and strengthening capacity at the country and regional level is by far the most effective utilisation of limited technical resources and scarce GEF funding. Therefore capacity-building and public awareness-raising are important elements of all the pilot projects. These are activities which will form part of the costs of the pilots, but will have benefits lasting far beyond the end of the project (see also Section 3.8.). Subsequent replication of the pilot activities at other sites, using staff trained under the project and benefiting from public support generated during the project, will thus be cheaper, and therefore more cost-effective, than the pilot activities themselves.

LIST OF APPENDICES

- APPENDIX 1 GEF FINANCING BUDGET (UNEP FORMAT)**
- APPENDIX 2 - CASH CO-FINANCING BUDGET (UNEP FORMAT)**
- APPENDIX 3 - INCREMENTAL COST ANALYSIS**
- APPENDIX 4 - PROJECT RESULTS FRAMEWORK**
- APPENDIX 5 - WORK PLAN & TIMETABLE**
- APPENDIX 6 - KEY DELIVERABLES AND BENCHMARKS**
- APPENDIX 7 - COSTED M&E WORK PLAN SUMMARY**
- APPENDIX 8 - SUMMARY OF REPORTING REQUIREMENTS AND RESPONSIBILITIES**
- APPENDIX 9 - STANDARD TERMINAL EVALUATION TERMS OF REFERENCE**
- APPENDIX 10 - DECISION-MAKING FLOWCHART AND ORGANISATIONAL CHART**
- APPENDIX 11 - TERMS OF REFERENCE**
- APPENDIX 12 – REGIONAL CO-FINANCE LETTERS**
- APPENDIX 13 – ENDORSEMENT LETTERS**
- APPENDIX 14 – DRAFT PROCUREMENT PLAN**
- APPENDIX 15 – TRACKING TOOLS**
- APPENDIX 16 – BAHAMAS PILOT**
- APPENDIX 17 – DOMINICAN REPUBLIC PILOT**
- APPENDIX 18 – JAMAICA PILOT**
- APPENDIX 19 – ST. LUCIA PILOT**
- APPENDIX 20 – TRINIDAD AND TOBAGO PILOT**