Strategic Programme for Climate Resilience

SAINT VINCENT AND THE GRENADINES

PHASE TWO PROPOSAL

Narrative

2 March 2011

Contents of the SPCR

List of Maps and Figures

Abbreviations and Acronyms

CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CAS	Country Assistance Strategy
CCCCC	Caribbean Community Climate Change Centre
CDEMA	Caribbean Disaster Emergency Management Agency
CEHI	Caribbean Environmental Health Institute
CIDA	Canadian International Development Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
CMO	Caribbean Meteorological Organization
DMP	Disaster Management Plan
EOC	Emergency Operations Center
ERDMP	Emergency Recovery and Disaster Management Project
FAO	Food and Agriculture Organization of the United Nations
FACRP	Fondes Amandes Community Reforestation Project
GEF	Global Environment Facility
ICZM	Integrated Coastal Zone Management
IDB	Inter-American Development Bank
IIED	International Institute for Environment and Development
IFMDP	Integrated Forest Management and Development Programme
IPCC	Intergovernmental Panel on Climate Change
IWCAM	Integrating Watershed and Coastal Areas Management project
LFUG	Local Forest User Group (Saint Vincent and the Grenadines)
MTWH	Ministry of Transport, Works and Housing
NDC	National Disaster Coordinator
NEMO	National Emergency Management Office
NEMS	National Environment Management Strategy
NESDP	National Economic and Social Development Plan
NGO	Non-Governmental Organisations
NMS	National Meteorological Service
NPV	Net Present Value
OECS	Organization of Eastern Caribbean States
PCU	Project Coordination Unit
SLR	Sea level rise
SIDS	Small island developing states
SGD	St George's Declaration
SNC	Second National Communication
SPCR	Strategic Program for Climate Resilience
SVG	Saint Vincent and the Grenadines
TWG	Technical Working Group
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
UWI	University of the West Indies

Organization of the Documents READ ME FIRST!

There are three separate documents that build on the structure established in the Phase One Proposal;

Document 1. **SPCR Narrative**,

Document 2. **Investment Programme**, and

Document 3. **Supporting Resources** (Annexes for both documents).

- **INVESTMENT PROGRAMME**

  The Investment Programme is the heart of the SPCR. The narrative and the supporting documentation provide critical background information and justification for the projects and programmes presented in the Investment Program. This document has three parts: i) a brief introduction, ii) one page detailed descriptions of each proposed investment project (including objectives, rationale, cost and expected outcomes/results), and iii) summary tables of all the investment projects grouped by the four components (see below).

- **FOUR COMPONENTS**

  There are four Components (groups of proposed initiatives or investment projects) in the Investment Programme. The first Component (*Climate Vulnerability, Risk Assessments and Risk Reduction*) includes three Pilot Project Areas: one Grenadine island (Union Island), and two watersheds on Saint Vincent. These Pilot Areas are the sites for testing and modelling the implementation of the other three components (*Component 2: Data collection, analysis and information management, Component 3: Strengthening of existing policy, legal in institutional framework to address climate change, and Component 4: Design and implementation of a public education and capacity building programme*).

- **PARAGRAPH TITLES**

  The main titles of the SPCR Narrative follow the recommended PPCR template. Under each of these headings, main paragraphs are given separate headings, shown in the Table of Contents.

- **PROJECT NUMBERS**

  Each individual investment project in the Investment Programme is given a unique number. This creates a simple reference from the Narrative to projects in the Investment Programme. It is also a means of monitoring and ensuring the necessary discussions and justifications in the narrative match each project.

  e.g. a project number 1.2 means project number two in Component One;

  e.g. 4.6 means project number 6 in Component Four.

- **SUPPORTING RESOURCES**

  This contains all relevant Annexes. If the material in an Annex does not have direct relevance to project components, it is not included. This material will be relevant for Phase II activities.

End READ ME FIRST

SPCR Summary

PILOT PROGRAM FOR CLIMATE RESILIENCE **Summary of Strategic Program for Climate Resilience**		
1. **Country/Region**:	**SAINT VINCENT AND THE GRENADINES CARIBBEAN REGIONAL PPCR**	
2. **PPCR Funding Request (in USD million):**	*Loan: USDmillion$3.0*	*Grant: USDmillion$7.0*
3. **National PPCR Focal Point**:	*Laura Anthony-Browne, Director of Planning, Ministry of Finance and Economic Planning*	
4. **National Implementing Agency** (Coordination of Investment Strategy)**:**	*Ministry of Finance and Economic Planning*	
5. **Involved MDB**	*The World Bank*	
6. **MDB PPCR Focal Point and Project/Program Task Team Leader (TTL)**:	*Headquarters-PPCR Focal Point: Kanta Kumari Rigaud*	*TTL: Niels Holm-Nielsen*

7. Description of SPCR:

Vision

The initiatives and investments proposed in the PPCR will jump-start the transformation of Saint Vincent and the Grenadines into climate resilient communities; an example to the OECS countries, to all of the Caribbean and indeed, small island states around the world. This is the vision and the PPCR is a leap forward in achieving that vision.

Approach of the SPCR

*As outlined in the Phase One Proposal, the SPCR has **two parts;** the SPCR Narrative (this document), and the Investment Programme (a separate document to which the narrative refers).*

*Based on the structure outlined in the Phase One Proposal, the Narrative has **four components**, which also provide the basic structure of the Investment Programme document. It provides objectives and rationale for the inclusion of each of the initiatives and investments included in the Investment Programme. An additional document titled 'Supporting Resources' includes the Annexes referred to in the SPCR below.*

*The key to the approach adopted in the SPCR and Investment Programme is the development of three site-specific vulnerable areas (two watersheds and one island) that will pilot the interventions recommended in the other three components. The three pilot areas will then **implement and test** a broad spectrum of interventions to build resilience in these three vulnerable areas. They will be **model comprehensive interventions**, to be extended in future too all the Grenadine islands and remaining Saint Vincent watersheds.*

(a) Key challenges related to vulnerability to climate change/variability:

- *Extreme concentrations of **population** and critical **infrastructure** along vulnerable coastlines on Saint Vincent and all the Grenadines. Coastal residents and businesses are vulnerable to significant loss or damage from extreme weather events, rising sea levels and storm surge.*
- *Sensitive **marine and coastal environments** in the Grenadines are under increasing **climatic and anthropogenic** (human) **stress** from lowering precipitation levels, increasing volume of recreational boating, inadequate urban drainage, poor solid waste disposal and other climate variables including sea surface temperatures and increasing extreme weather activity that threaten coral beds, reefs, sea grasses and marine ecosystems.*
- *Vulnerabilities are exacerbated by a lack of facility or expertise for basic **information and data** gathering, storage, access and knowledge management in general regarding climate change, and related disaster reduction topics. The need exists to build capacity and to develop a "culture of information" in Saint Vincent and the Grenadines.*
- *Level of **knowledge and awareness** of the potential impacts of a changing climate in urban, rural and island communities is low, thwarting a rapid transformation to a climate resilient population in Saint Vincent and the Grenadines. Technical **skills** in climate adaptation, resilience building, and disaster risk management are limited.*
- *Some important **legislative controls and guidelines** from statutory authorities require strengthening. Many are in a draft form, incomplete or outdated and require revision and updating to accommodate climate adaptation and resilience building components. Enforcement remains patchy. Strengthening these systems will reduce vulnerabilities and potential loss from climate and disaster impacts.*

(b) Areas of Intervention – sectors and themes

Following the activities described in the Phase One Proposal (September 2010), the following four components describe the main themes of proposed interventions for Phase Two. The vulnerable sectors identified include Water, Health, Environment (coastal and inland), Tourism, Agriculture, Fisheries, and Infrastructure. A multi-sectoral approach is embodied in the following four main areas of intervention:

Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction

Component 2: Data Collection, Analysis and Information Management

Component 3: Strengthening of Existing Policy, Legal and Institutional Framework to Address Climate Change

Component 4: Design and Implementation of a Public Education and Capacity Building Programme

(c) Expected Outcomes from the Implementation of the SPCR

- ***Less Vulnerable Communities***

  A comprehensive program for climate resilience that includes key sectors and identified vulnerable groups, including women, children and the elderly, particularly those living along the coast, and especially those in the Red Zone (<5m or 16 feet above sea level). All residents and businesses in the Red Zone will receive basic hurricane awareness training, risk knowledge building, and receive essential vulnerability knowledge relevant to their communities. The assessment of gender sensitive social impacts and resulting action plans will be prepared for all constituencies including each of the Grenadines. Communities will be less vulnerable to climate change.

- ***Lessons Learned and Risks Reduced***

  Both adults and children will have a new and growing awareness of climate change and the impacts of climate on the social, environmental, and economic sectors of Saint Vincent and the Grenadines. The public education programme will add standard curriculum to schools, and every adult in Saint Vincent and the Grenadines will have access to basic risk and vulnerability information for their community (including base maps, localised vulnerability information, and trained local leaders). Curriculum development for primary and secondary schools can be drawn from regional and international examples and adapted for Saint Vincent and the Grenadines schools.

- ***More Knowledgeable Decision-makers, Families and Children***

  Knowledge and capacity in specific Ministries and Agencies will be developed and strengthened. This will be evidenced by a significant number of government, and businesspersons with skills, knowledge and understanding of climate concerns and how climate affects the physical, social and economic environments of Saint Vincent and the Grenadines. Climate impacts on key economic sectors will be mainstreamed into legislative controls and guidelines developed for water conservation and waste-water management for households and small businesses. Geographic Information Systems (GIS), data collection and management skills and capacities, and general climate change knowledge and awareness will be evident in at least six Ministries/Agencies (Agriculture, Physical Planning, NEMO, Works, Lands and Statistics-MoFEP). The collection of climate information (knowledge, needs and awareness questions) will be included in the National Census.

- ***Stakeholder Guidance Strengthened***

  The consultation processes that has been developed over the course of Phase One, will continue throughout Phase Two. From the Technical Working Group members (some twenty-five Ministries and Agencies represented), an Advisory Panel will be formed to provide regular oversight and advice to the implementation of Phase Two. This Advisory Panel will be strengthened by the inclusion of additional businesspersons and citizen representatives from the three pilot areas. The PPCR thus, remains country driven and country led.

- ***Legislation and Enforcement enhanced (mainstreaming)***

  The newly improved legislation (both Acts of Parliament and Guidance documents prepared by Statutory Authorities) will be inclusive of climate change concerns, resilience building activities, and the individual Sectoral Plans that are based on the National Economic and Social Development Plan will include both guidance and incentive measures for voluntary adherence and compliance to recommended climate-related actions. Relevant Strategic Objectives (4.2 to 4.5) of the NESDP will be followed, implemented, and enforced to a new level of compliance. Subsequent Sectoral Plans will be climate and gender sensitive.

  Legislation is strengthened and is climate sensitive. A wide range of policies and plans are finalized (in consultation with key Ministries and agencies) and ready for implementation. These include the Coastal Zone Management Policy and Plan, the Climate Change Adaptation Strategy, the Disaster Management Plan, the Integrated Water Resources Management Plan and the National Economic and Social Development Plan. These plans and policies once finalized would be ready for submission for the approval of Cabinet. Once approved, climate change resilience would formally be mainstreamed into the framework of government. Where appropriate, gender sensitivities should also be added where it is currently missing.

- ***Safer Coastal Areas***

  With a concerted effort aimed at the households and businesses in the Red Zone (less than five meters or sixteen feet above sea level), gradually, people in these areas will become more "climate-aware"and Government will resist construction of infrastructure in these areas, offering incentives to businesses to also take action to minimise potential loss from adverse climate and weather related impacts. Disaster preparedness will be significantly improved by the provision and participation in the development of early warning systems for communities. Effective water conservation techniques will reduce potable water vulnerabilities in the Grenadines.

- ***Water resources conservation and management of watersheds***

  An integrated watershed management policy and action plan will be formulated, implemented and enforced especially to address increased storage capacity, pollution control of water resources, increase collection/harvesting of rainwater and surface waters, providing incentives for increasing household and commercial/private businesses storage capacities and the installation of water conservation devices, and a public policy and drive to equip all public/government buildings especially health, sport and education facilities with water conservation devices. A new water consciousness in Saint Vincent will see the development of rainwater harvesting (currently almost nil) and adherence to new building code regulations relating to water conservation, drainage and wastewater.

  The implementation of a land use zoning and watershed management plan will promote and reflect best practices and include the reduction of impermeable surfaces will allow for more water to infiltrate and percolate into the soil thus increasing ground water storage and replenishment of rivers and wells. A comprehensive public education, awareness and outreach program on water conservation and management, that promotes the installation of water conservation devices and provision of incentives/disincentives, will increase knowledge, change attitudes and practices of the citizens thereby reducing individual and community vulnerabilities.

8. **Expected Key results from the Implementation of the Investment Strategy (consistent with PPCR Results Framework):**	
Result	**Success Indicator(s)**
1. Strengthened Community Resilience *More confident coastal and inland communities better able to cope with the impacts of changing weather systems.*	*Increased ability of coastal communities to cope with climate hazards including extreme weather (incl. better prepared, provided with early warning, increased capability to recover).* ***Measures**: Census data questions on vulnerability and resilience, decrease in economic and social losses post-disaster events, decreased loss of roads and bridges, damage to river banks, decreased loss of livelihoods, lower levels of overall community impacts from climate hazards, improved ability to cope with disaster events (social survey).*
2. Increased Socio-economic stability *Vulnerable communities more knowledgeable of climate resilience, diversified livelihoods and livelihood protection.*	*Communities incur fewer losses, businesses are better prepared, visitors are better informed (marine and land-based tourists), environmental conservation is better managed by improved legislative frameworks, and enforcement achieves increased levels of success.* ***Measures**: Damage and Loss Assessment indicates fewer losses in coastal areas, lower economic impacts (fewer loss of livelihoods), increased awareness of visitors (survey), improved environmental practices (water conservation, water recycling) on the Grenadines, improved water accessibility in the Grenadines, increased use of rainwater harvesting and storage in the island of Saint Vincent.*
3. Increased capacity in Government institutions *Climate change expertise is available to all ministries, regular information sharing amongst Government departments and Regionally on climate issues.*	*Climate resilience becomes a national concern; motto adopted that "climate change is everybody's business"; regional climate change events hosted by Saint Vincent and the Grenadines, Government (Ministries/Agencies) at all levels have a strategy for building climate resilience in their sector.* ***Measures**: Six Ministries/Agencies (Agriculture, Physical Planning, NEMO, Works, Lands and Statistics-MoFEP) have equipped and skilled persons for data management and GIS mapping. Eight Ministries/Agencies have had personnel trained in climate change impacts assessment (sector-specific), increased attendance in Regional climate discussions and activities, Climate change expertise available in Ministry of Finance, Ministry of Health and Environment, publications on Governance available to Government officials (all Ministries).*

4. Strengthened knowledge and awareness *Information on climate change is available to every citizen in Saint Vincent and the Grenadines, and basic training delivered to every constituency and to a strengthened community leadership.*	*The implementation of a National programme of public education and curriculum development in schools results in increased awareness of climate change and resilience that is exemplary in the Caribbean Region.* ***Measures**: Curriculum active in all schools, teachers trained to deliver climate change and disaster reduction education, climate change information and materials available to schools and teachers, number of community leaders trained in Hurricane Preparedness, number of brochures and publications available to the general public on climate change impacts at community level, early warning system (EWS) installed, number of communities trained in EWS leadership. Responses to climate questions in the Census.*
5. Comprehensive hazard maps available to Government and communities *GIS mapping of social, economic and environmental impacts of climate change is upscaled to a National level, with hazard and vulnerability maps available to all vulnerable communities and community leaders.*	*A range of hazard maps prepared, including Red Zone maps, and made available to affected and vulnerable communities. Increased capacity of Government in the use of GIS as a policy and education tool is measureable. NEMO is able to generate a range of Hazard and Vulnerability Maps, with in-house expertise also available to MoFEP, MoHE and Physical Planning Unit.* ***Measures**: Number of constituencies with localised Hazard and Vulnerability maps; number of competent GIS practitioners available to Government departments; amount of data made available for inter-agency use and sharing; number of presentation made by NEMO to agencies, communities on climate change and mapping hazards and vulnerabilities.*
6. Gender sensitive disaster risk management designed and implemented *Considerations of gender and age must be disaggregated to understand that vulnerable communities and individuals suffer disproportionately higher losses, injuries and damages from both natural and anthropogenic hazards.*	*Shelter Management plans include special considerations for privacy, health and personal needs of women and the elderly; gender-specific publications provide guidance to women and men on disaster preparedness, tools to adapt to a changing climate, and basic gender-specific guidelines for response to climate impacts and tools for a speedy recovery.* ***Measures**: Gender-sensitive Shelter Management Policy is operational, implemented and a number of shelters refurbished; publications on gender-specific concerns for preparedness ad response to the impacts of climate hazards; gender issues incorporated into guidelines and legislation.*
7. Collaboration, cooperation and support *Building climate resilience is everybody's business. Communities need to assume control of their collective needs in partnership with Government and businesses. A Team effort is necessary for effective disaster preparedness, response and recovery.*	*Government actively develops a spirit of collaboration, cooperation and support, citizens recognise the Government is committed to climate change and a green, clean Saint Vincent and the Grenadines; Saint Vincent and the Grenadines becomes a model country in the Caribbean with the development of the three Pilot areas demonstrating all aspects of building resilience for families and communities.* ***Measures**: Ministerial support measured by appointment of climate change focal point; number of businesses contributing to publications; number of hotels cooperating on Legislative change for coastal areas; number of communities and constituencies requesting support for building climate resilience; number of appearances in the media of climate issues.*

9. **Project and Program Concepts under the SPCR:** (figures rounded)							
Project/Program Concept Title	**MDB**	**Requested PPCR Amount ($)[1]**	**Grant or Loan**	**Expected co-financing ($)**	**Preparation grant request ($)**	**Total PPCR request**	**MDB Fee**
Component 1: *Climate Vulnerability, Risk Assessments and Risk Reduction*	WB	$6,130,500	Grant	TBD	US$155,000	US$6,285,500	
Component 2: *Data Collection, Analysis and Information Management*	WB	$1,097,000	Concessional Financing	TBD	US$15,000	US$1,112,000	
Component 3: *Strengthening of Existing Policy, Legal and Institutional Framework to Address Climate Change*	WB	$1,340,000	Concessional Financing	TBD	US$38,000	US$1,378,000	
Component 4: *Design and Implementation of a Public Education and Capacity Building Programme*	WB	$805,000	Grant	TBD	US$48,000	US$853,000	
Project Preparation *Design specification and equipment procurement*	WB				US$787,000	US$787,000	
Project Preparation *Administrative support and Project Management (for details see Part Three: Project Preparation Funding*	WB				US$178,000	US$178,000	
For MDB Fee see SCF Financing benchmarks							US$428,000 (not included in Total)
TOTAL		**$9,372,500**		TBD	**US$1,220,000**	**US$10,592,500**	

[1] Includes preparation grant and project/program amount.

10. **Timeframe** (tentative) – Approval[2] Milestones

For all Project Components:
Phase 2. Proposal completed by February 2011; World Bank Board Presentation May 2011; CIF Submission March 2011: Expected Date of Signature of Loan/Grant Agreement between country government and MDB signed Summer (most likely September 2011; First SPCR Investment disbursement: 4th Q 2011 (continuity with Phase 1).

Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project preparation expected to start in April 2011; Grant agreement for project preparation (incl. feasibility study) in April 2011; Feasibility Study disbursement: 2nd Q 2011; Full Project Documentation (Investment Board Approval) 3rd Q 2011 (continuity with Phase 1).

Component 2: Data Collection, Analysis and Information Management
Project preparation expected to start in April 2011; Grant agreement for project preparation (incl. feasibility study) in April 2011; Feasibility Study disbursement: 2nd Q 2011; Full Project Documentation (Investment Board Approval) 3rd Q 2011 (continuity with Phase 1).

Component 3: Strengthening of Existing Policy, Legal and Institutional Framework to Address Climate Change
Project preparation expected to start in April 2011; Grant agreement for project preparation (incl. feasibility study) in April 2011; Feasibility Study disbursement: 2nd Q 2011; Full Project Documentation (Investment Board Approval) 3rd Q 2011 (continuity with Phase 1).

Component 4: Design and Implementation of a Public Education and Capacity Building Programme
Project preparation expected to start in April 2011; Grant agreement for project preparation (incl. feasibility study) in April 2011; Feasibility Study disbursement: 2nd Q 2011; Full Project Documentation (Investment Board Approval) 3rd Q 2011 (continuity with Phase 1).

11. **Key national stakeholder Groups involved in SPCR design**[3]:

Ministry of Works
Bridges Roads and General Services Authority (BRGSA)
Ministry of Health and the Environment
Ministry of Agriculture Forestry and Fisheries
Ministry of National Mobilisation, Social Development Etc
Ministry of National Security
Saint Vincent and the Grenadines Port Authority
Saint Vincent and the Grenadines Coast Guard
Saint Vincent and the Grenadines Maritime Administration
Saint Vincent and the Grenadines Fire Services
National Parks, Rivers and Beaches Authority
Ministry of Housing, Physical Planning, Land and Informal Settlements
Attorney General's Office
Saint Vincent and the Grenadines Meteorological Office
Basic Needs Trust Fund (BNTF)
Central Water and Sewage Authority
Ministry of Finance and Economic Planning
Saint Vincent and the Grenadines' National Trust
Grenadines' Affairs
SANDWATCH
Saint Vincent and the Grenadines' Hotel and Tourism Authority
Private Climate Change Activists
Saint Vincent and the Grenadines' Chamber of Industry and Commerce
Social Investment Fund
Saint Vincent and the Grenadines Electricity Services Ltd
Energy Unit
National Emergency Management Organisation (NEMO)
Ministry of Tourism
International Airport Development Corporation (IADC)

12. **Other Partners involved in SPCR:** *Ministry of Health and Environment*

[2] Expected signature of loan/grant agreement between government and MDB.

[3] Other local, national and international partners expected to be involved in design and implementation of the strategy.

Part 1: Background and Rationale

Introduction

The objective of the PPCR is to provide incentives for scaled-up action and to support transformational change through the integration of climate risk and resilience into core development planning and the design of projects to build resilience to climate change. It also creates a platform to complement other ongoing development activities in other pilot countries in the Caribbean, and the region.

The PPCR in Saint Vincent and the Grenadines is led by the Ministry of Finance, Central Planning Division, in collaboration with the Ministry of Health and Environment – Environment Management Department. Implementation in Phase Two will enable Saint Vincent and the Grenadines to comprehensively address climate risks and vulnerabilities and to reduce climate vulnerabilities in many sectors of the economy.

The comprehensive nature of the PPCR will ensure it's value goes well beyond the immediate needs to request CIF support; it will be utilised to further assist with garnering bilateral and multilateral support to sustain efforts to build resilience, expand knowledge and awareness in the country and to provide a firm basis for transforming policy and National development planning to be risk-, climate- and gender sensitive.

Saint Vincent and the Grenadines, like many Small Island Developing States (SIDS), has many features that serve to increase its vulnerability to the potential impacts of Climate Change. These characteristics include:

- small size, the total land mass is 150 square miles (389 square kilometers);
- surrounded by large expanses of ocean;
- limited natural resources;
- rugged and steep topography, the islands are prone to landslides and sediment flow;
- vulnerability to natural disasters and extreme events;
- openness of the economy;
- poorly developed infrastructure;
- limited access to international financial resources; and
- limited human resources and skills.

Climate Change in Saint Vincent and the Grenadines

Saint Vincent and the Grenadines is a coastal island community of a little over 100, 000 persons. Connections to the sea are, and have always been a central element in the culture and history of Vincentians. Living on or near the coast is both a choice and a necessity; i) for mountainous and steep inland areas on Saint Vincent, and ii) for the beauty and natural resource amenity of coastal beaches for those in the Grenadines (the majority). The projected increase in severity of tropical storms and the concurrent wave surge provides one of the most significant threats to coastal communities. It is however the potential combination of storm surge, seal level rise and tidal fluctuations that cumulatively provides us with a benchmark for planning (priority) and a focus area for much of the SPCR implementation. This was the rationale behind the creation of the "Red Zones" described below.

The impacts of climate change do not occur in isolation. The concurrent impacts on different social, economic, and environmental systems will combine in ways that are outside of our collective experiences. For example, even if precipitation is higher in certain areas, the increased temperature

could result in much higher evaporation and transpiration, leading to reduced runoff into streams and rivers and increased water stress[4]. Building resilience means preparing for such uncertainties.

Saint Vincent and the Grenadines is embarking on a proactive approach to reducing climate risk; i.e. strengthening the country and its people to be able to cope with our changing climate and to minimize potential damage and losses from the impacts of climate hazards – or in short, building resilience.

We know from the International Panel on Climate Change[5] that climate change will have several negative effects around the globe, including greater frequency of heat waves; increased intensity of storms, floods and droughts; rising sea levels; a more rapid spread of disease; and loss of biodiversity. Sea level rise (SLR) poses a particular threat to countries like Saint Vincent and the Grenadines with heavy concentrations of population and economic activity in coastal regions[6]. Sea level rise (SLR) due to climate change is a serious threat: Continued growth of greenhouse gas emissions and associated global warming could well promote SLR of 0.5m – 1.0m in this century, and unexpectedly rapid breakup of the Greenland and West Antarctic ice sheets could easily produce a 5m SLR[7]. To date, there is little evidence that any country has seriously considered the implications of SLR for population location and infrastructure planning. This is what the PPCR is for, and we can confirm that this is an urgent need in Saint Vincent and the Grenadines.

The Red Zone

For precautionary planning purposes, sea level rise (SLR) in the range of 0.5m – 1.0m should therefore be regarded as realistic (this century). For our risk assessments in the SPCR, we have taken a 1.0 meter maximum SLR, added three (3) meters for the projected maximum storm surge (this was confirmed in the 2007 Coastal Vulnerability Assessment for Saint Vincent and the Grenadines), and one meter of contingency (20%), giving us a five (5) meter contour line that defines the most vulnerable coastal zone. This is a conservative red zone, assuming a 3m maximum storm surge will not be exceeded (it has not been exceeded in the past). The Red Zone then has provided a focus for the analyses of the social, economic and environmental impacts of possible inundation to this five (5) meter contour height above sea level. The designation and delineation of this Red Zone is used as a planning tool throughout the Phase Two implementation, giving special emphasis to the vulnerable families and communities living and working in this vulnerable coastal area. Further support for the use of this tool can be found in the rationale described in a number of the coastal zone actions in the Investment Programme. Figure 1. provides the total number of assets located in red zones of the island of St. Vincent.

Figure 1: Critical Assets Exposed to Natural hazards in Saint Vincent

Facilities	Red Zones
No. of Schools	9
No. of Shelters	12
No. of Medical Facilities	4
No. of Building	2970
Total Length of Roads (km)	43.1

[4] *Adapting to Climate Change,* East Asia Environment Monitor, World Bank, 2007, p. 27.

[5] IPCC, 2001b: Synthesis Report 2001- Contribution of Working Groups I, II, and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, R.T. Watson (ed.) and the Core Writing Team. Cambridge: Cambridge University Press, 397 pp.

[6] *The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis*, World Bank Policy Research Working Paper 4136, February 2007, p2.

[7] *Ibid, p.3.*

Figure 2: Social and economic statistics for Saint Vincent and the Grenadine

Social indicators

Population growth rate (avg. annual %)	2005-2010	0.1
Urban population growth rate (avg. annual %)	2005-2010	1.3
Rural population growth rate (avg. annual %)	2005-2010	–0.2
Urban population (%)	2007	46.6
Population aged 0-14 years (%)	2009	26.9
Population aged 60+ years (women and men, % of total)	2009	10.2/8.7
Sex ratio (men per 100 women)	2009	101.9
Life expectancy at birth (women and men, years)	2005-2010	73.8/69.5
Infant mortality rate (per 1 000 live births)	2005-2010	23.3
Fertility rate, total (live births per woman)	2005-2010	2.1

Summary statistics

Region	2000	Caribbean
Currency	2008	E.C. Dollar (XCD)
Surface area (square kilometers)	2008	389
Population in 2008 (estimated, 000)	2008	109
Population density in 2008 (per square kilometer)	2008	280.3
Largest urban agglomeration in 2007 (population, 000)	2007	Kingstown (26)
United Nations membership date	2000	16-Sep-80

Economic indicators

GDP: Gross domestic product (million current US$)	2008	602
GDP: Gross domestic product (million current US$)	2005	438
GDP: Gross domestic product (million current US$)	2000	335
GDP: Growth rate at constant 1990 prices (annual %)	2008	5
GDP: Growth rate at constant 1990 prices (annual %)	2005	1.9
GDP: Growth rate at constant 1990 prices (annual %)	2000	1.8
GDP per capita (current US$)	2008	5514.7
GDP per capita (current US$)	2005	3674.6
GDP per capita (current US$)	2000	2890.8

Source: UNData: World Statistics Pocketbook | United Nations Statistics Division
Accessed: 24 February 2011
http://data.un.org/CountryProfile.aspx?crName=Saint%20Vincent%20and%20the%20Grenadines

1. Country Circumstances

1.1 Location and Size

Saint Vincent and the Grenadines (SVG) is an archipelagic state, consisting of approximately 32 island and Cays, located at latitude 13° 15′ N, longitude 61° 12′ W. Saint Vincent and the Grenadines located 120 km (75 miles) to the north of Grenada, 40 km (24 miles) to the south of Saint Lucia and 160 km (100 miles) to the west of Barbados.

Saint Vincent and the Grenadines covers a total land area of approximately 390 km2 (150 sq. miles). Saint Vincent is the largest island and covers an area of 344 km2, which approximately 84 km of coastline. The Grenadines include the islands of Bequia, Mustique, Canouan, Mayreau, Union Island, Palm Island, and Petit Saint Vincent and extend 72 km (45 miles) to the southwest of Saint Vincent.

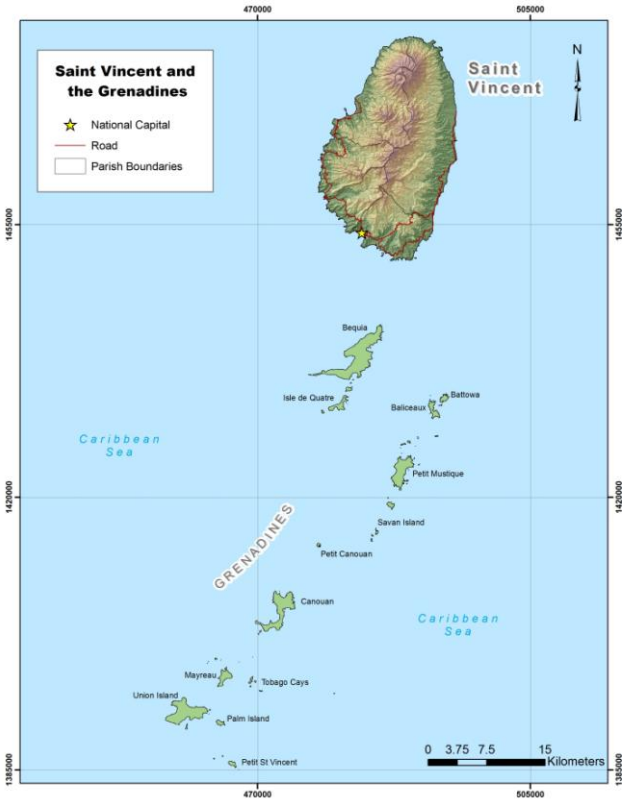


Figure 3: Map of Saint Vincent and the Grenadines

1.2 Topography

Saint Vincent is roughly oval in shape. It has a central spine of volcanic mountains that stretch from north to south along the entire length of the island with steep lateral ridges radiating towards the east and west These steep lateral ridges result in almost vertical cliffs and deep narrow stream filled valleys that drain unto black sand beaches on the Leeward coast while the Windward coast has wider, flatter valleys and truncated spurs which are lower and more rounded than those of the leeward coast.

The highest point on this mountain range is the La Soufriere volcano to the north that rises to approximately 1,246 meters (4,048 feet) above mean sea level. Other mountain peaks south of La

Soufriere include the Richmond Peak, Mount Brisbane, Grand Bonhomme, Petite Bonhomme and Mount Saint Andrew.

The main island of Saint Vincent is very rugged with 50% of the slopes 30 degrees or more and 20% less than 20 degrees (Barker, 1981 cited in Caribbean Conservation Association (CCA), 1991). The topography and population dynamics of the islands result in most towns and villages being established on the flat coastal regions and are thus very vulnerable to sea level rise as a result of climate change.

The Grenadines are geologically older than Saint Vincent and have a much gentler relief with no point higher than 1000 feet. The Grenadines are surrounded by fringing reefs and white sandy beaches.

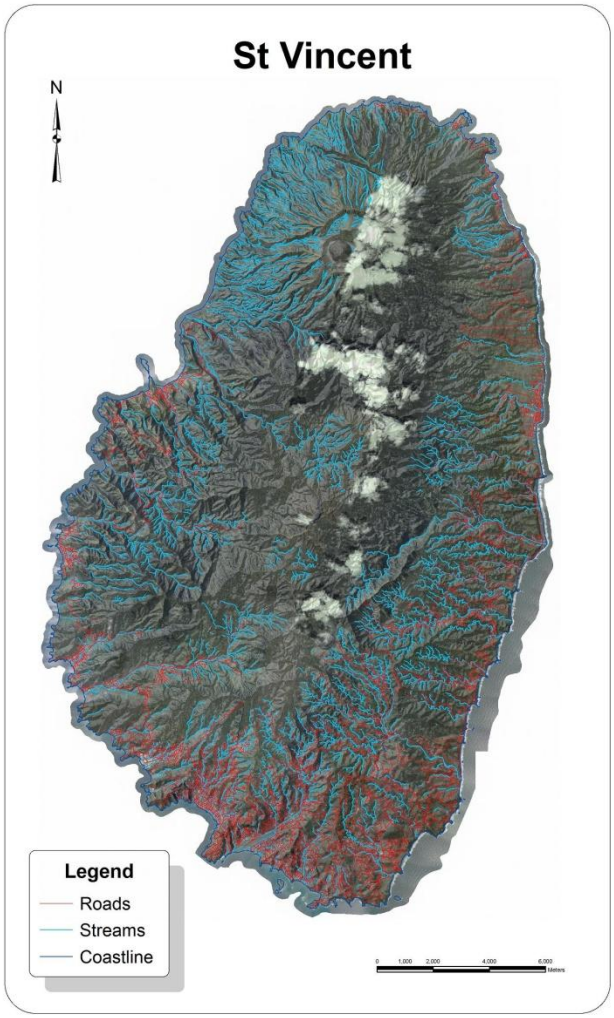


Figure 4: Topography of Saint Vincent

1.3 Climate

Precipitation: On average Saint Vincent and the Grenadines receives 219 cm of rainfall per year. The wet season occurs during June to November and the dry season between January and May. Saint Vincent receives approximately 70% of its total annual rainfall during the rainy season, which is also the period of highest tropical storm activity in the region, which peaks in the months of September, October and November.

Additionally, a number of weather systems affect Saint Vincent and the Grenadines annually. These include tropical Atlantic High Pressure System that brings most of the rain, the Inter-Tropical

Conversion Zone (I.T.C.Z) and the El Nino Southern Oscillation. During the drier months, upper level troughs and the remnants of the cold fronts from the eastern sea border of the United States contribute to the rainfall in Saint Vincent. The island enjoys the cooling effect of the north east trade winds which can be quite gusty at times.

Most models project a drying throughout the year in Saint Vincent and the Grenadines. Maximum possible changes indicate up to 24% less annual rainfall by the 2030's, 41% less rainfall by the 2060's and 58% less rainfall by the 2090's. The models also point to drying occurring in the wet season from June to November.

Temperature: Saint Vincent has a tropical, oceanic climate with an annual mean temperature of 270C while the mean temperature vary by 2°C throughout the year. Maximum temperature can reach a high of 31°C between the months of May and October and minimum temperatures can reach a low of 23°C in February. Both the maximum and minimum temperature records show a warming tread over the past 22 years. The maximum temperature for Saint Vincent and the Grenadines is increasing at a slightly faster rate (0.2°C/decade) than minimum temperatures (0.15°C/decade).

Temperature indices support the conclusion that warm days and nights have increased over the last two decades and cool days and nights have decreased.

Global Climate Models (GCMs) project that for Saint Vincent and the Grenadines mean temperatures are expected to increase over the next century, on average approximately 0.15°C per decade. Under A2(high emissions) GCM project maximum temperature changes of up to 4°C by the end of the century, with median annual increase of up to 1°C, by the 2030s, and 1.8°C by the 2060s ad 2.7°C by the 2090s.

1.4 Sea Level Rise

As a result of global warming, the penetration of heat into the ocean leads to the thermal expansion of the water; this effect, coupled with the melting of glaciers and ice sheets, results in a rise in sea level. Sea-level rise will not be uniform globally but will vary with factors such as bathymetry (underwater profile, depth, shape) currents, winds, and tides-as well as with different rates of warming, the efficiency of ocean circulation, and regional and local atmospheric (e.g., tectonic and pressure) effects.

While it is not possible to project sea level rise for Saint Vincent and the Grenadines, changes in the Caribbean are expected to be near the global mean. Under the A1B scenario, sea level rise within the Caribbean is expected to be between 0.17 m and 0.24 m by 2050 (IPCC 2007).

Sea level rise is expected to lead to greater coastal flooding and damage to shorelines and infrastructure from storm surge. Additionally, deep surface swells from the Atlantic (often called Ground Swells) occasionally cause severe coastal erosion and infrastructural damage particularly on the northeastern side of Saint Vincent. The impacts from a combination of SLR and 1 in 100 year Storm Surge in the CARICOM nations include[8]:

- Over fifty percent of major tourism resorts at risk to damage in Saint Vincent and Grenadines, and
- Potentially severe flooding risk at the Saint Vincent and the Grenadines airport.

[8] Simpson, M.C, *et al*, P.1 (2010) *Quantification and Magnitude of Losses and Damages Resulting from the Impacts of Climate Change: Modeling the Transformational Impacts and Costs of Sea Level Rise in the Caribbean* (Key Points and Summary for Policy Makers Document), United Nations Development Programme (UNDP), Barbados, West Indies.

1.5 Climate extremes

Calculated rainfall indices show an increase in the number of heavy rainfall events that occur in a year. This is reflected in an increase in the number of days with rainfall between (10-20 mm) and the number of consecutive wet days. This trend is also reflected in the increase in some rainfall intensity indices e.g. daily intensity, maximum consecutive five-day rainfall and maximum one-day rainfall.

In general, north Atlantic hurricane frequency is characterised by a multi-decadal cycle that yields active and inactive phases lasting 10 or more years (Goldenberg et al. 2001). It is noteworthy that since 1995, the north Atlantic has swung into an active hurricane phase. Between 1995 and 2000 the region experienced the highest level of north Atlantic hurricane activity on record. Over the last three decades, the Caribbean region has suffered direct and indirect losses estimated at between US$700 million and US $ 3.3 billion owing to natural disasters associated with extreme weather events.

Further, Saint Vincent and the Grenadines over the years has received tremendous damages from storms. For instance, in 2002, Tropical Storm Lili caused damage estimated at EC$978,000 (US$366,000). Damages from Hurricane Ivan in 2004 amounted to EC$100 million (USmillion$37.5). In 2005, Hurricane Emily caused an estimated EC$10 million dollars ((USmillion$37.5) worth of damages, while Hurricane Dean caused EC $2.2 million (USmillion$0.82) worth of damages in 2007. In 2008, Hurricane Omar inflicted damages of an estimated EC$5.6 million (USmillion$2.1). Models indicate that hurricanes in the future will likely become more intense, with larger peak wind speeds and heavier near storm precipitation.

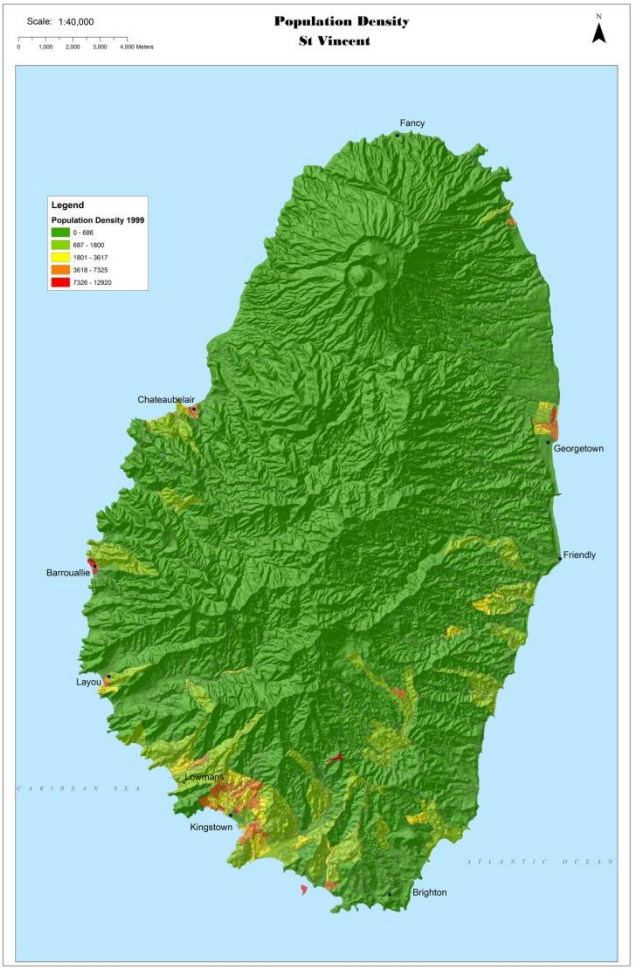
1.6 Population and Demographics

The population of Saint Vincent and the Grenadines as derived from the 2001 Population and Housing Census was 106,253 inhabitants with 25% of the people living in the capital, Kingstown and its suburbs and 8% on the Grenadines. The mainland population from the census count broken down into thirteen administrative census districts shows Calliaqua has the largest population of 22,095 while the smallest population, 2,716 is found Sandy Bay.

Kingstown, the capital, had a population of 13,212 at the time of the census. The census data also indicated that the Suburbs of Kingstown had a 50% population between 1980 and 2000. The latest estimate of the population for Saint Vincent and the Grenadines is 100,237 for the year 2007. The population is young, with 19,819 between the ages of 15-24. The average life expectancy is 67.7 years for males and 74.0 years for females. Since 1960, the infant mortality rate has fallen substantially, from 145.0 to 12.1 per thousand births in 2009. The population is projected to reach 121,399 by the year 2021, an increase of 14.3 % above the 2001 census figure.

Population Density After climbing steadily to reach 700 inhabitants per square mile in 1990, the population density for Saint Vincent and the Grenadines has stabilized at around 700 to 710 persons per square mile over the last decade. The Kingstown district remained the district of highest population density (3,660 per square mile) while the Chateaubelair remains the district with the lowest population density (6.4 per square mile).

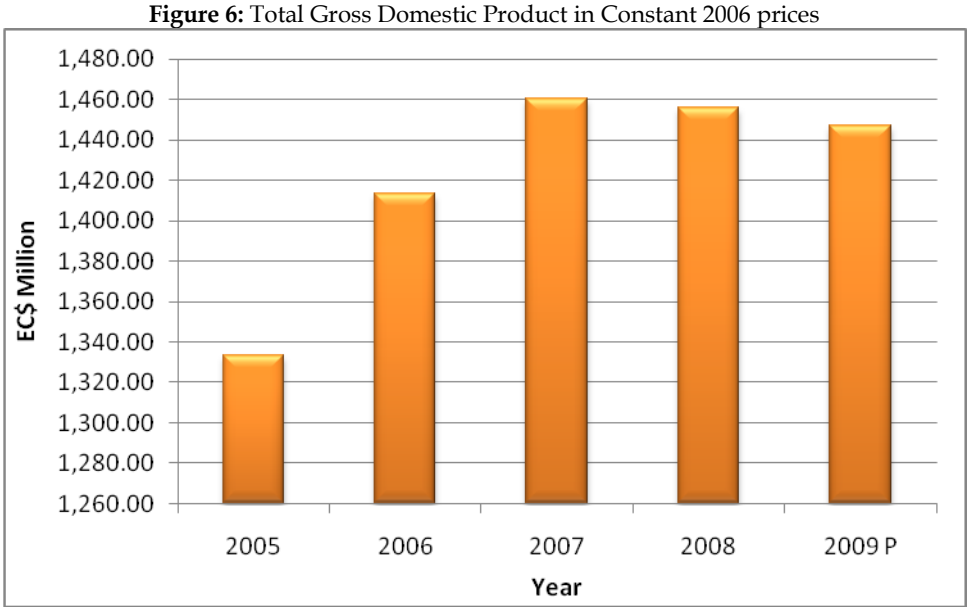
Figure 5: Population Density of Saint Vincent



The Economy Saint Vincent and the Grenadines is a small open economy, highly susceptible to both external economic shocks and natural disasters (European Community, 2002). The banana industry had been the main contributor to the economy with bananas being exported to Europe under preferential arrangements. Globalisation and changes in international trade regimes - trade liberalisation, erosion of market preferences and shares - have all had a disproportionate impact on the local economy.

Gross Domestic Product and Growth Rates During the period 2005 to 2007 the economy of Saint Vincent and the Grenadines experienced moderate to strong real growth, ranging from a low of 3.0 percent in 2005 to a high of 6.0 percent in 2006. Overall the economy grew by an average of 2.3 percent annum during the 2005-2009 period.

Figure 6: Total Gross Domestic Product in Constant 2006 prices



Source: Government Statistical Department

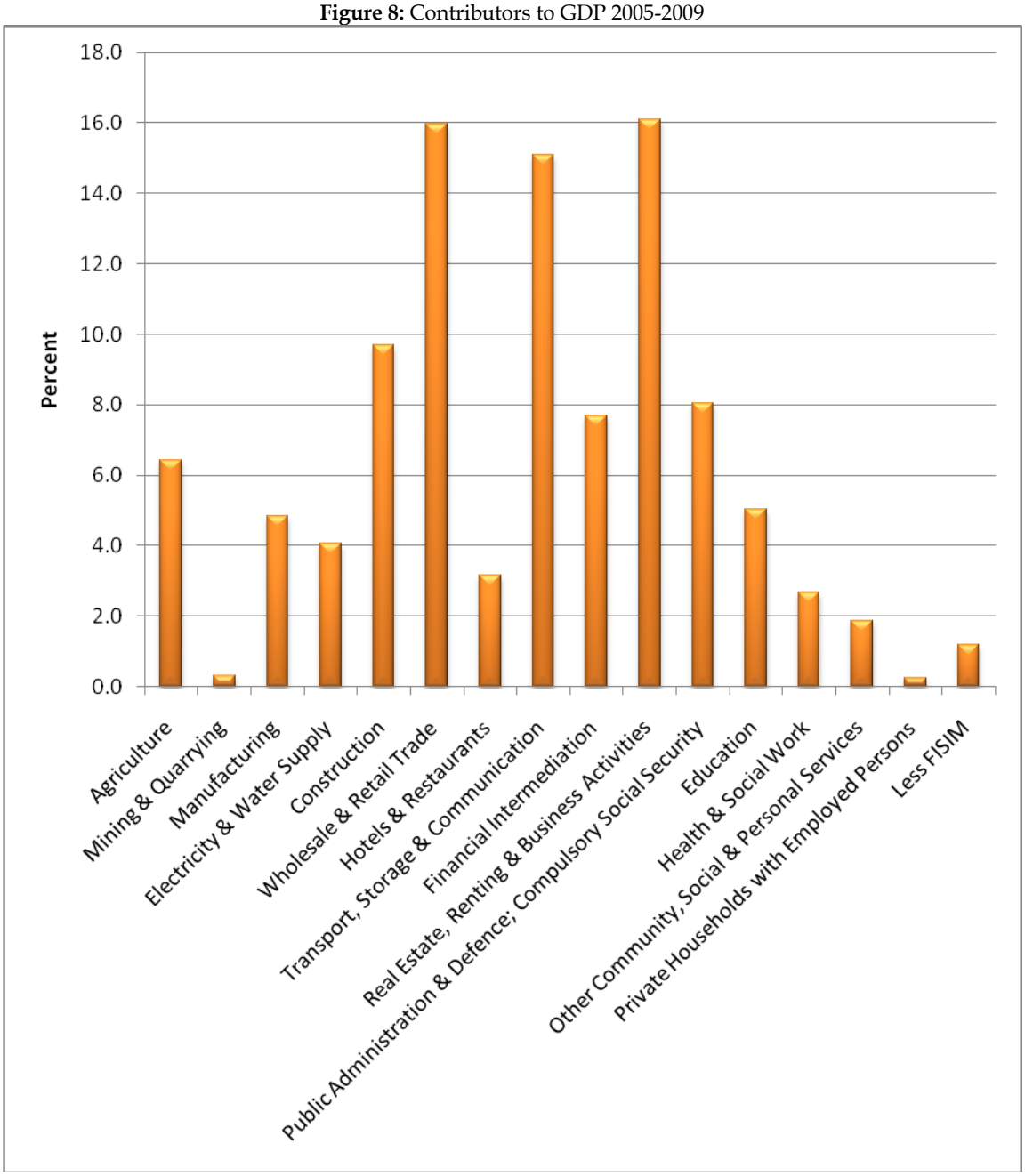
The graph above depicts Total Gross Domestic Product in Constant Prices for the period 2005 – 2009. The total GDP increased steadily from E.C$ 1,333.37M to E.C$ 1,460.13M in 2007. There was a 0.3 percent decline to E.C$ 1,455.90M in 2008, followed by a 0.6 percent decline to EC$1447.13M based on the preliminary estimates for 2009. Meanwhile, Retail Renting & Business Activities (16.1 percent), Wholesale and Retail Trade (16.0) and Transport, Storage and Communication (15.1 percent) were the largest contributors to GDP during the 2005-2009 period (*See figure 8*). Also, per Capita GDP increased by an average annual rate of 6 percent during the aforementioned period from EC$ 14,183.75 (US$5253.24) to EC$18,709.61 (US$ 6,929.49) in 2009 (*See figure 9*). This was amidst steady economic performances and a decline in the estimated population.

Figure 7: Sector's Contribution to GDP.

ECONOMIC ACTIVITY	2005	2006	2007	2008	2009 P
Agriculture	**83.97**	**86.92**	**96.44**	**92.26**	**98.16**
Crops	62.34	62.79	69.56	66.62	69.78
Bananas	16.11	12.98	13.99	12.61	13.77
Other Crops	46.23	49.81	55.57	54.01	56.01
Livestock	14.36	16.84	17.96	19.94	20.04
Forestry	0.9	0.91	0.93	0.91	0.89
Fishing	6.37	6.38	7.99	4.78	7.45
Mining & Quarrying	**3.98**	**4.18**	**4.76**	**5**	**4.6**
Manufacturing	**71.01**	**71.01**	**67.82**	**67.54**	**66.62**
Electricity & Water Supply	**55.49**	**56.78**	**59.03**	**58.1**	**58.37**
Electricity	40.82	41.38	43.71	42.7	41.57
Water	14.67	15.4	15.31	15.39	16.8
Construction	**127.09**	**137.99**	**155.9**	**139.73**	**128.72**
Wholesale & Retail Trade	**205.37**	**215.42**	**235.05**	**244.21**	**235.95**
Hotels & Restaurants	**39.56**	**49.45**	**49.33**	**46.44**	**39.24**
Accommodation	28.01	36.7	37.7	35.08	27.5
Restaurants	11.55	12.75	11.63	11.53	11.74
Transport, Storage & Communication	**197.57**	**218**	**217.12**	**220.42**	**220.91**
Road Transport	94.56	100.37	106	109.67	111.68
Sea Transport	13.39	15.96	18	16.51	16.92
Air Transport	2.13	2.4	2.08	2.07	1.86
Auxiliary Transport Activities & Storage	23.87	27.09	26.97	26.56	24.51
Communications	63.62	72.19	64.07	65.61	65.94
Financial Intermediation	**104.99**	**110.04**	**105.76**	**111.41**	**112.73**
Banks	76.11	79.16	76.18	81.08	82.24
Insurance	26.55	28.1	26.63	27.3	27.4
Auxiliary Financial Intermediation	2.33	2.78	2.94	3.04	3.1
Real Estate, Renting & Business Activities	**215.81**	**227.52**	**229.16**	**233.98**	**237.2**
Owner Occupied Dwellings	157.5	159.54	161.82	163.86	165.71
Real Estate Activities	26.9	27.21	27.55	27.86	28.13
Renting of Machinery & Equipment	6.9	7.52	8.89	8.99	9.17
Computer & Related Services	4.57	6.75	6.12	8.49	8.66
Business Services	19.93	26.5	24.79	24.78	25.53
Public Administration & Defence; Compulsory Social Security	**100.71**	**107.2**	**113.92**	**123.03**	**127.8**
Education	**80.31**	**78.18**	**76.06**	**60.58**	**61.11**
Public	55.9	55.23	55.64	57.94	58.46
Private	24.4	22.95	20.42	2.64	2.65
Health & Social Work	**36.26**	**36.68**	**38.49**	**38.68**	**40.08**
Public	30.08	31.02	32.92	32.36	33.66
Private	6.18	5.66	5.56	6.32	6.42
Other Community, Social & Personal Services	**22.61**	**26.1**	**24.87**	**29.42**	**30.28**
Private Households with Employed Persons	**3.28**	**3.35**	**3.06**	**3.35**	**3.45**
Less FISIM	**14.63**	**15.64**	**16.63**	**18.42**	**18.25**
GVA in Basic Prices (EC$ Millions)	**1,333.37**	**1,413.19**	**1,460.13**	**1,455.90**	**1,447.13**
Growth Rate (%)	**2.99**	**5.99**	**3.32**	**-0.29**	**-0.6**
GDP MARKET PRICES (EC$Millions)	**1,488.57**	**1,649.81**	**1,848.67**	**1,896.69**	**1,887.65**

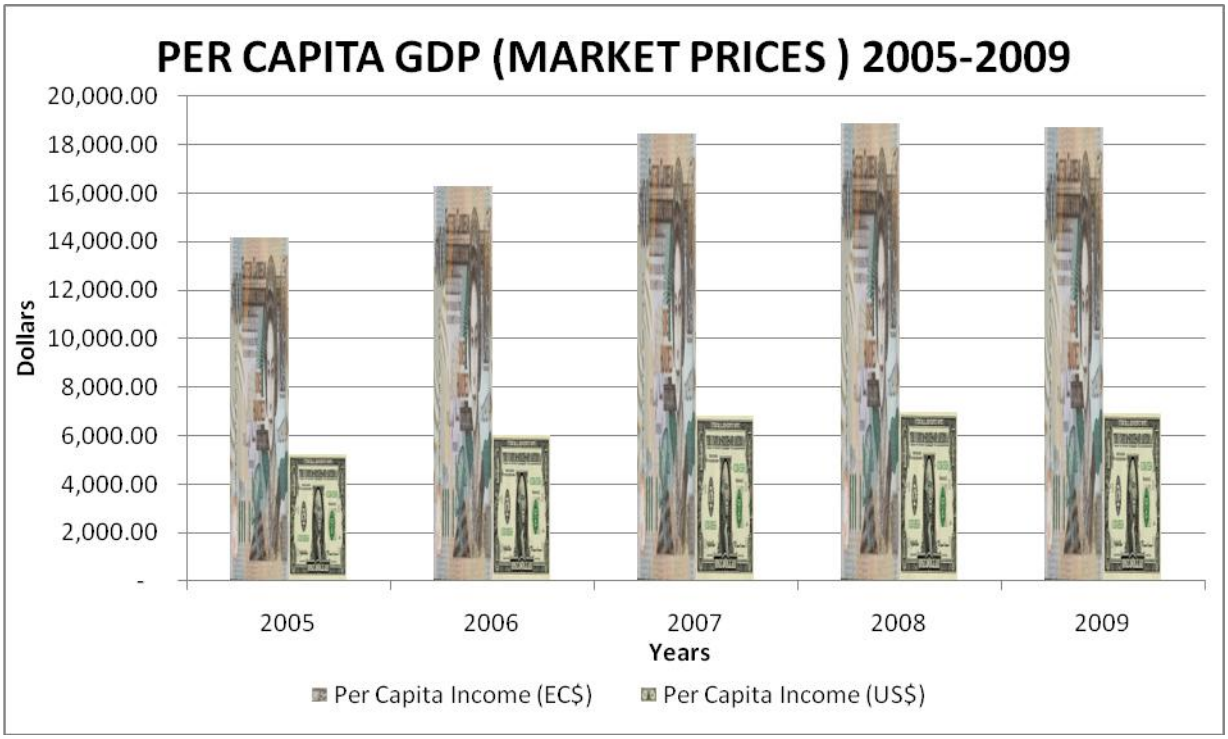
Source: Saint Vincent & the Grenadines Statistical Office /ECCB.

Figure 8: Contributors to GDP 2005-2009



Source: Saint Vincent & the Grenadines Statistical Office /ECCB.

Figure 9: Per Capita GDP 2005-2009

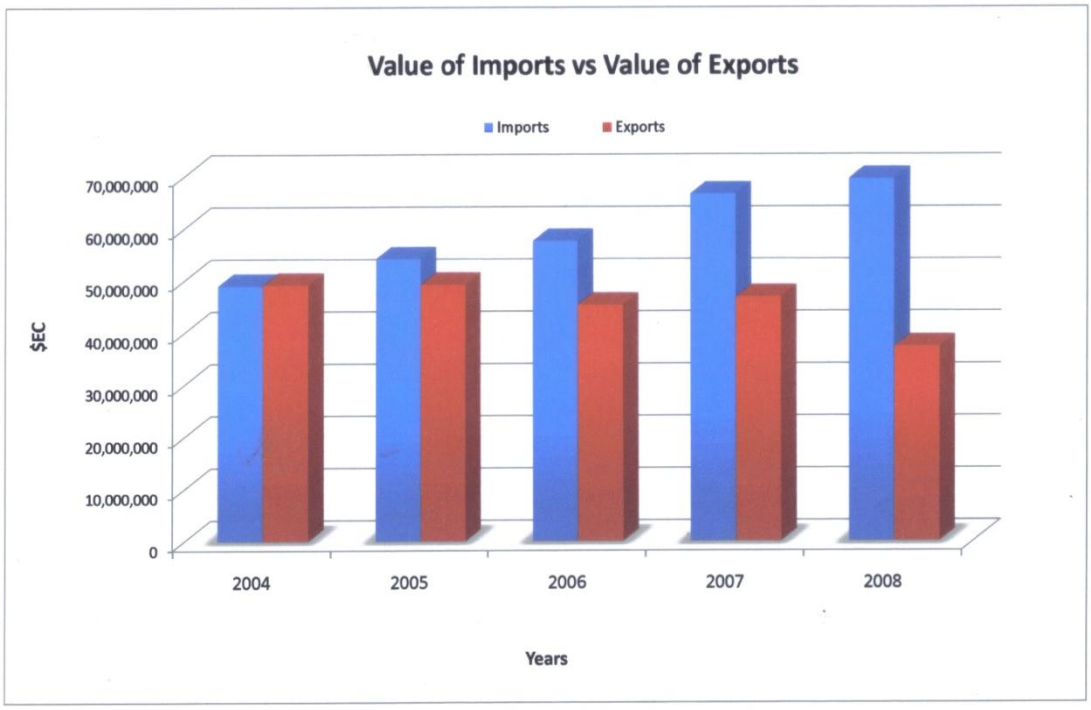


Source: Saint Vincent & the Grenadines Statistical Office /ECCB.

1.7 Agriculture

Agriculture in Saint Vincent and the Grenadines is largely practiced on the main island with some subsistence farming on the Grenadine islands. Throughout the eighteenth and nineteenth centuries, the economy of Saint Vincent was based largely on agriculture. During those periods, agricultural exports exceeded imports; however, this pattern has declined steadily since 2004. Bananas dominated the agricultural scene throughout the second half of the twentieth century until the loss of preferential trade in Europe and competition from the mega-producers in Central and South America caused its demise. This decline in the banana industry saw Saint Vincent move from being a net exporter of food crops to one of a net importer.

Figure 10: Value of Imports versus Export of Agricultural Products



Statistical Unit, Ministry of Agriculture, Forestry and Fisheries.

Agriculture and climate change: Given the geography, topography and current land use patterns in Saint Vincent, a climate change scenario that brings increased rainfall can devastate the agriculture sector through floods, landslides, accelerated loss of top soil, loss of crops and livestock, loss of agricultural infrastructure and even human lives. A scenario with decreased rainfall would be no less catastrophic, droughts will destroy the land, the animals and the vegetation cover.

Consequently, adapting to climate change or building resilience is therefore critical to the agricultural sector. The SPCR can assist by identifying and implementing adaptation options for the short medium and long-term survival of the sector.

1.8 Transport

Accessibility is seen as a major challenge to the development of Saint Vincent and the Grenadines. The transport system of the country is less than adequate to meet the current needs and demands of an expanding economy and society[9]. There are approximately 680 miles of vehicle road way and over 25,000 motor vehicles. As previously noted, the topography of Saint Vincent and the Grenadines has resulted in a large portion of the road network being located on the coastline, thus making it extremely vulnerable sea level rise and damage from passing storms and hurricanes.

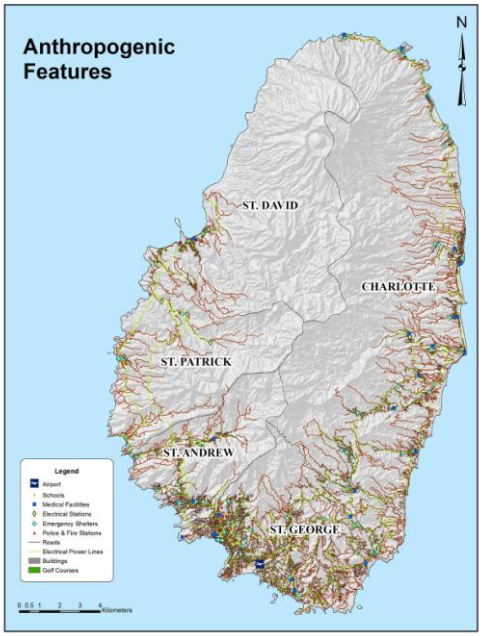
There are five marine terminals in the country including the main deep-water port at Kingstown. The terminal in Kingstown consist of a 900 feet long deep water pier, an 800 feet long cruise ship terminal, a 250 feet long schooner facility and a 250 feet pier that serves the ferries shuttling through the Grenadines. There is a container port at Campden Park with a storage capacity of 540 containers. There

[9] Saint Vincent and the Grenadines National Physical Development Plan 2001-2021

are also a number of smaller ports and jetties scattered around Saint Vincent and the Grenadines. The major ports are located on the located on the sheltered western or leeward side of the island.

The E.T. Joshua Airport is the main airport in Saint Vincent and the Grenadines. There are five other smaller airports on the Grenadine Islands of Bequia, Mustique, Canouan and Union. They are all vulnerable to the impacts of sea live rise as they are located on the coast and just a few meters above the high watermark.

Figure 11: Transportation System



1.9 Industry

Saint Vincent and the Grenadines does not have a major manufacturing industry. It includes activities relating to tourism, agriculture, housing, mining and manufacture. This industry is not projected to play a major role in the country's economy in the near future given the absence of minerals, the small population and market size and the high cost of energy. These factors along with the absence of an international airport have reduced the competitiveness of Saint Vincent and an investment destination. Despite these challenges, the Government has provided land for factory space, for lease or sale to private entrepreneurs, at the Campden Park Industrial Estate and the Diamond Industrial Estate.

Rice and wheat imported from Guyana and Canada respectively are milled and packaged at a small plant located on the Campden Park Estate while arrowroot rhizome are processed into starch at Bellevue, Mt. Bentick and Owia on the north eastern side of the island.

Saint Vincent is endowed with large quantities of volcanic deposits in the form of igneous rocks. A number of quarries are set up to extract (mine) these rocks for use in the construction industry. Another mining venture that supports local construction is the mining of beach sand. This practice renders the coast areas vulnerable to storm surge and exacerbates the damage which can be done to the environment and property located along the coast.

1.10 Energy

Electric power for Saint Vincent and the Grenadines is provided by the Saint Vincent Electrical Services Ltd (VINLEC), which operates diesel power stations on Saint Vincent, Bequia, Canouan, and Union Island and five hydro power stations on Saint Vincent located at Cumberland and South Rivers. Seventy five percent of the electrical energy generated in Saint Vincent and the Grenadines comes from fossil fuel. The other twenty five percent is renewable energy generated by hydro-electricity. All fossil fuels are imported meet the energy requirements of the nation.

Over the last five years, the electricity company, VINLEC, has reported reductions in its hydro-electricity supply during the dry season due to reduce stream flow. There has been, especially in 2009, longer periods of drought which as exacerbated the problem of reduced stream flow in Saint Vincent. This has prompted the upgrade of the diesel plants in order to meet demand. Government is currently reviewing its legislation governing energy to encourage private generation of renewable energy.

Installed generating capacity for Saint Vincent is 35KWH while peak demand is approximately 30 KWH. The main consumers of this electricity are the domestic sector (48.3%), commercial sector (41.1%), industry (8%) and street lighting (2.6%)[10]. Less than 0.1% of Vincentian homes use some form of renewable energy. Of the 100 kilotonnes of fossil fuel imported into the country in 2002, approximately 40%was delivered to the pump to service motor vehicle while the remainder went to service light aircrafts, small boats, the food industry (cooking) and the electricity company.

The main source of CO_2 emissions in Saint Vincent and the Grenadines occurs as a result of the use of fossil fuels in the energy sector. The largest amount of CO_2 emissions resulted from Gas/diesel oil used mainly in the energy industries sector (VINLEC) and Gasoline which is used in the transportation sector (vehicles). Studies conducted at La Soufriere suggest that there is good potential for geo-thermal exploitation but no serious work has been done in this regard.

1.11 Tourism

Saint Vincent and the Grenadines tourism industry is seen as the economic earner as a result of the downfall of the agricultural industry. The industry has proven to be a significant driver of economic activity, foreign exchange earner and employment creator. This sector contributed 2.23% to the country GDP in 2004[11]. Estimated earnings rose from EC$189.09 million (USmillion$70.8) in 1997 to EC$217.17 million (USmillion$81.3) in 2001. Latest figures indicate EC$259.3 million (USmillion$97.1) in earnings for 2008.

Saint Vincent and the Grenadines is currently in the process of diversifying its tourism product to branch into in the eco and sport tourism as well as to improve the accommodation sector. This is seen as a gateway to investments opportunities that in turn will create a stronger infrastructure system, which would support the tourism sector.

The diversification process will pay particular attention to promoting Saint Vincent and the Grenadines as a scuba diving destination. The government plans "to position Saint Vincent and the Grenadines as a diverse, globally competitive, destination"[12] through effective planning, management and sustainable use of the cultural and natural resources of the country, while facilitating the preservation of the local heritage.

[10] Source: VINLEC Report 2003.

[11] Saint Vincent and the Grenadines Ministry of Tourism and Culture, 2005.

[12] Saint Vincent and the Grenadines National Tourism Policy, 2003.

As a significant contributor to the Saint Vincent and the Grenadines economy[13], the tourism sector is also the most vulnerable, particularly vulnerable to the adverse impacts of climate-related hazards. As an industry, it raw materials are natural resources. Visitors come largely because of these natural resources. Clearly, there is good reason to place a high priority to building resilience in this sector. In the Grenadines for example, 16 of the 33 main hotels claim to be "on the beach"[14]. On the beach would mean being located close to water level, or certainly within the five meter "red zone"[15]. The percentage of fourty-five marine based facilities described in the Tourism Master Plan[16] is even higher, nearly 100%.

Economically, a disaster event can cripple a community in the short term; in a tourism-based economy those impacts and losses are likely to last far into the future. When tourism services are deemed unsafe or significantly affected by a disaster, visitors will quickly find another location, in as little as a few days. The Bali bombings in 2002 devastated the industry on the Bali, Indonesia Island, losing almost half its annual income that year, and the event was in October. There are countless examples of where the slightest sense of a lack of safety or security can be disastrous to the industry.

We know the extent of coral bleaching possible with only less than a half degree Celsius rise in sea surface temperature during La Nina and El Nino ENSO events. Changing rainfall patterns, changing intensity of tropical storms, even small temperature rises will change ecosystems upon which tourism depends. The resulting loss of beach sand, eroded coastline in the inter-tidal zone, loss of sea-grasses that anchor plants and animals critical to a healthy ocean floor: these are all consequences of a changing climate that is occurring right now.

Human (anthropogenic) impacts are another major contributor to the decline in health of the coastal environments in Saint Vincent and the Grenadines, not least of which are the recreational boaters. The 43,000 yacht visitors in 2008 are expected to almost double in the next ten years[17]. The current lack of environmental controls on this industry (e.g. discharging all liquid waste overboard, lack of anchoring controls, standards of practise, licensing etc.) is simply unsustainable. The priority target markets for the next decade are in three categories; four of the six top priority markets are marine-based[18].

For these and other reasons, it is critical that the tourism dependent communities in Saint Vincent and the Grenadines plan for minimising losses from the likely impacts of a changing climate. Specific recommended investments for many of these needs are addressed in the SPCR Investment Plan.

This will require at least the following:

i) **Knowledge and Awareness Building**
Knowing what climate change means for coastal communities, likely impacts short- and long-term, carrying capacities of the popular marine environments/anchorages, site management of land-based facilities;

[13] Estimated at 17.4%, Ministry of Finance and Economic Planning economist, 28 January 2010.

[14] *Ins & Outs of Saint Vincent and the Grenadines,* 2011 Anniversary Edition, SVG Hotel and Tourism Association, p. 140.

[15] The "red zone" is an area of low-lying coastline that lies between mean high water mark and a five-meter contour line along the coastal strip. See Section 2.8 Vulnerable Coastal Areas.

[16] *Saint Vincent and the Grenadines Tourism Master Plan 2010-2020*, Final Version October 2010, p.99.

[17] ibid, p.138.

[18] ibid p. 145.

ii) **Contingency Planning**

Developing preparedness strategies (safe storage of adequate fresh water, medical supplies, food, essential items), possible evacuation routes, means of transport, contingency plans for community needs, attention to the needs of women, children and the elderly, strengthening environmental standards for impact assessments of future developments;

iii) **Water and Waste Management**

Developing a range of options for low-cost rainwater harvesting, tax incentives for water efficient house construction, building code guidelines and legislative controls for water management (including waste water recycling, home gardening, water storage etc.), and the use of holding tanks on boats with the introduction of pump-out facilities and recycling plants, strengthening environmental standards for waste water and solid waste disposal for each of the Grenadines, including the prevention of discharge of untreated waste from residential resort developments and commercial and recreational boats.

iv) Protected Marine Environments

While progress has been made with the establishment of the Tobago Cays Marine Park, this is just a start. Protection of the marine environment must be a priority set of actions that are locally owned and implemented, with strong Government support. The Sustainable Grenadines Project[19]is seeking World Heritage Site listing under the UNESCO World Heritage Convention. Amongst numerous conditions to be satisfied for such listing, a comprehensive Plan of Management must be in place and operational. Such a Plan of Management could provide a firm basis of long-term protection from climate change impacts in the fragile ecosystems of the Grenadines, and for coastal Saint Vincent.

1.12 Forestry and Watershed Management

The Forest Resource Conservation Act, 1992 make provision for the conservation, management and proper use of the forest and watersheds. Sections under this act requires that the Director subject to certain conditions and he may specify, delegate any of his functions to any authorize officer. One such requirement is the preparation of a National Forest Resource Conservation Plan. This NFRCP shall include among other things, an estimate of the amount, condition and status of the elements necessary for integrated water resources management.

The FRCA also speaks of; the declaration of Forest Reserves, protected areas within forest reserves, demarcation of forest boundaries, forest management plans etc. The Forestry department through the Director is responsible for the enforcement of the provisions of the Act. In keeping within the mandate of the Act came the fashioning of the mission of the Forestry Department, which is, to conserve, protect and develop the national forest resources for the optimum benefit of the entire Vincentian communities.

The organisational structure of the Department encapsulates a combination of specialized program areas and general forest management on a whole which when looked at holistically, intrinsically is the practice of upper watershed management. Within the Department structure a unit was set up specifically to look at watershed management. This watershed unit is headed by a forestry supervisor and an assistant who performs more of a coordinating function.

[19] SusGreen: www.cavehill.uwi.edu/cremes/susgrenadines-index.html

Figure 12: The Watersheds of Saint Vincent

1.13 Biodiversity

In Saint Vincent, more than 1,150 species of flowering plants, 163 species of ferns, 4 species of amphibians, 16 species of reptiles, 111 species of birds, and 15 species of mammals have been identified. In terms of marine biodiversity, over 500 species have so far been identified. Among these are at least 450 species of fin-fish, 12 species of whales and dolphins, 4 species of turtles, 9 of gastropods, eleven seaweeds and thirty different coral species.

The principal ecosystems where these species live include, dry and humid tropical forests, wetlands and tidal flats, sandy and rocky beaches, coral reefs, sea grass beds, mangroves, offshore islets. The reefs, sea grass beds and mangrove systems are recognized as among the most productive in the world.

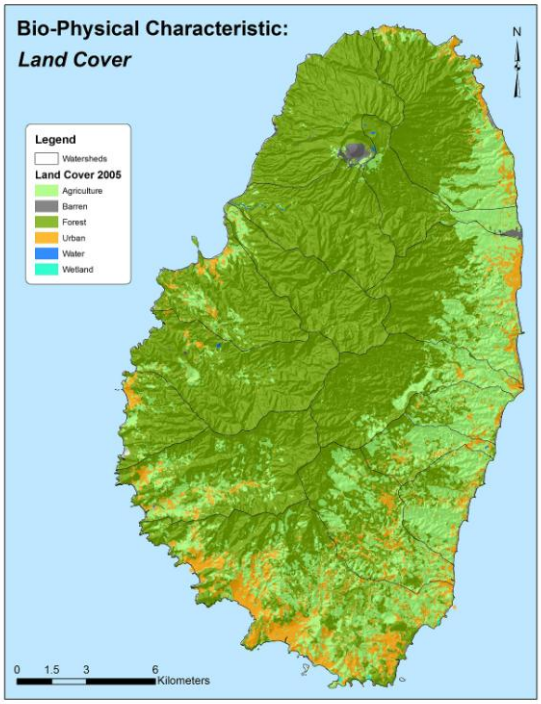
Consequently, climate change will affect the physical and biological characteristics of marine and coastal areas, modifying the structure and functioning of these fragile ecosystems. Their impairment will inevitably lead to losses in fisheries and coastal environment-dependent sectors such as tourism.

The vulnerability of the coastal zone must therefore be given particular attention given its importance to the Vincentian economy and the livelihoods of many persons in Saint Vincent and especially the Grenadines.

In Saint Vincent, more than 1,150 species of flowering plants, 163 species of ferns, 4 species of amphibians, 16 species of reptiles, 111 species of birds, and 15 species of mammals have been identified. In terms of marine biodiversity, over 500 species have so far been identified. Among these are at least 450 species of fin-fish, 12 species of whales and dolphins, 4 species of turtles, 9 of gastropods, 11 seaweeds and 30 different coral species. These species and the ecosystems which support them form the "natural infrastructure" upon which Vincentian society is built. The

establishment of nature reserves (terrestrial as well as marine) has therefore been identified as a viable option for arresting the decline in terrestrial, marine, and coastal biodiversity.

Figure 13: Land cover map of Saint Vincent



2. Development Context and Climate Risks

NOTE: A detailed description of climate risks, with diagrams and maps, has been moved to Annex 8. in the Resources Documents (ANNEXES) under separate cover. This Annex includes:

- Climate Risks in the Caribbean
- Climate Risks in Saint Vincent and the Grenadines
- Sea level rise
- Biodiversity and Climate Resilience in Saint Vincent and the Grenadines

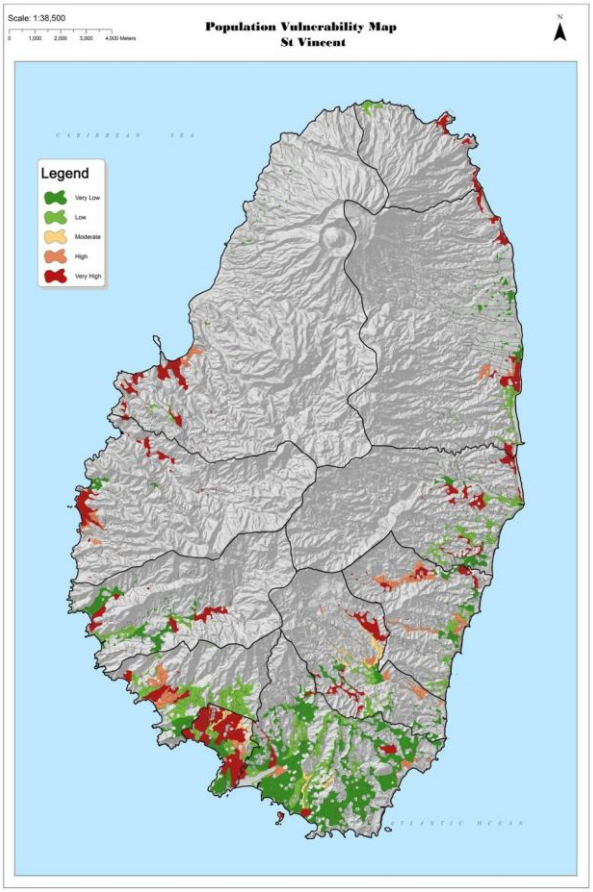
2.1 Vulnerability Context (climatic change and vulnerable sectors)

Climate change will affect the physical and biological characteristics of marine and coastal areas, modifying the structure and functioning of these fragile ecosystems. Their impairment will inevitably to losses in fisheries and coastal-dependent sectors such as tourism. Likewise, wetlands, including reefs, cays and mangroves are among those ecosystems considered to be most vulnerable to climate change because of their limited adaptive capacity. For example, coral reefs are expected to be impacted detrimentally if sea surface temperatures increase by more than one degree Celsius, above the seasonal maximum temperature. In addition, acidification of the ocean will affect the ability of reef plants and animals to calcify and thus reduce the ability of reefs to grow vertically and keep pace with rising sea levels.

Also, in near-shore marine and coastal areas, many wetlands and coastal forests will be affected by changes in sea level and storm surges. Mangroves and coastal lagoons are expected to undergo rapid change and perhaps be lost altogether as functioning ecosystems. Low-lying coastal areas and associated wetlands could also be displaced by salt water habitats, disrupting fresh-water based ecosystems. Such changes are likely to result in dislocation of migratory birds and aquatic species, not tolerant to increased salinity or flooding. The combined pressures of sea level rise and coastal development could also reduce the availability of inter-tidal areas, resulting in loss of feeding habitats to catastrophic declines in wintering shorebirds. Migratory and resident birds, mammals and fish may lose important staging, feeding and breeding grounds that are difficult to replace under competing demands for scarce land. All these may result in impacts to commercially important fish species and a pole-ward shift of marine production, seriously affecting the sustainability of fisheries.

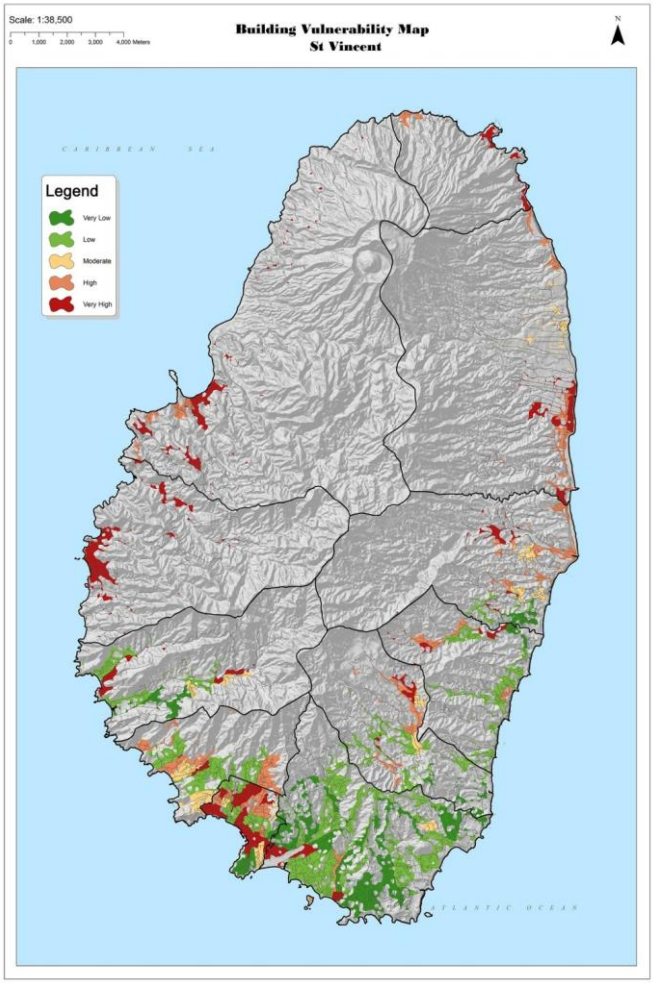
Clearly, Saint Vincent and the Grenadines is highly dependent on the degree of resilience of the natural resource base that supports the key economic sector and activities (especially the tourism, agriculture and fisheries sectors) to the impacts of climate change, climate variability and land degradation land degradation. It is therefore imperative for us to aggressively pursue an integrated development approach that inter alia takes full account of the predicted and actual impacts of global climate change, climate variability and the impacts on biodiversity and land degradation.

Figure 14: Population vulnerability



Population Density per hectare	Vulnerability level	SVG (HA)
0 - 17	Very Low	1424.7
17 - 35	Low	1645.9
35 - 55	Moderate	532.0
55 - 95	High	174.6
95 - 444	Very High	59.2
		3836.4

Figure 15: Buildings Vulnerability



Areal Building Density by ED per hectare	Vulnerability level	SVG (HA)
7.0 -12	Very Low	1569.4
12.0 -18	Low	1417.8
18 - 28	Moderate	624.7
28 - 45	High	133.2
45 - 99	Very High	91.6
		3836.6

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Compounding the potential impact of these physical risks, are a number of efficiencies that need substantive capacity-building, not least of which is the Meteorological Office. The Meteorological Office of Saint Vincent and the Grenadines receives forecasting information from the Barbados Meteorological Office. The primary role of the Meteorological Office is to give advice and provide information. There is one qualified forecaster and Saint Vincent and the Grenadines is not a WMO member. There is no direct linkages to key international warning agencies (hurricane warnings are transmitted from Barbados to the Saint Vincent and the Grenadines Met office, at their convenience).

Prior to Hurricane Tomas passing directly between Saint Vincent and the Grenadines and Saint Lucia, the warning of impending Category 2 Hurricane conditions was only issued a little over 24 hours ahead of time.

Saint Vincent and the Grenadines, together with OECS countries have committed to adopting the ecosystem approach in the form of *Island Systems Management*, as outlined in the Saint Georges Declaration of Principles for Environmental Sustainability. The Declaration defines Island Systems Management as an integrated process of information gathering, planning, decision-making, allocation of resources, actions and formulation and enforcement of regulations related to the linkages in small island states between ecological systems and between these systems and human activities and incorporates terrestrial, aquatic and atmospheric environments.

Systematic evaluation of plans, programmes, policies and projects for their impact on biodiversity and ecosystem services would ensure not only that biodiversity was better protected, but that climate change itself was more effectively addressed. Conservation of biodiversity and, where necessary restoration of ecosystems, can be cost-effective interventions for both mitigation of and adaptation to climate change, often with substantial co-benefits.

None of the current national plans or policies in Saint Vincent has adopted an ecosystem approach. Future operational guidance on how such an approach might be implemented should be undertaken by a collaboration of the appropriate line ministries.

Some tradeoffs between conservation and development are inevitable, and it is important that decisions are informed by the best available information and that tradeoffs are clearly recognized upfront. Therefore, part of "climate proofing" national development will necessarily involve strengthening of systems to monitor the condition of our "natural infrastructure" and to predict whether certain development actions/ decisions are likely to increase or decrease their resilience to climate change.

The table on the following two pages lists the potential climate impacts and possible resilience and adaptation strategies, most of which have been incorporated into the Phase Two implementation. This has been adapted from the Draft Second National Communication for Saint Vincent and the Grenadines, prepared with assistance from the Global Environment Facility (GEF) 2010). The table presents a comprehensive coverage of resilience issues identified by the extensive consultations and investigations necessary to the preparations of the Second National Communications. This is a follow up to the First National Communications submitted in 2002, and is currently in draft form with three chapters completed to date.

Although there is much climatic variation between localities, some factors and characteristics are common to most small islands-mainly as a result of their insular natures and tropical locations. In the tropical of islands in the Caribbean Sea, most islands are strongly influenced by the ENSO phenomenon and associated high inter-annual variations in rainfall and sea level[20]. The ENSO phenomenon has a strong influence on the weather and climate[21] in the Caribbean. ENSO events already have been associated with extensive coral bleaching in the Caribbean in the early 1990s.

Changing rainfall patterns, sea level rise, increasing temperatures and extreme weather events are some of the adverse impacts of climate change and climate variability that will have serious

[20] Hay et al., 1993, *Climatological Sea-saws in the Southwest Pacific,* Weather and Climate **13**, 9-21.

[21] Centella et al., 1996, *Variations and Climate Change in Cuba*, National Climate Centre, Havana Cuba, 58pp.

environmental, social and economic consequences in Saint Vincent and the Grenadines. As a result, several sectors are vulnerable. The vulnerable sectors include:

- Water;
- Tourism;
- Health;
- Agriculture;
- Coastal Zone;
- Fisheries;
- Energy; and
- Critical Infrastructure.

It should be noted that the Phase One investigations found a number of opportunities where gender-specific considerations needed to be included in the detailed descriptions of investment initiatives (see Investment Programme – detailed Investment Project activities).

Figure 16: Potential Climate Impacts as possible resilience and Adaptation strategies.

Sector	Existing Legislative Controls	Climate Change Impacts	Resilience/Adaptation Strategies	Existing Responsible Agencies
Coastal Zone Management	Beaches Protection Act Fisheries Act, Maritime Areas Act	▪ coastal flooding ▪ coastal erosion (beach loss) ▪ aquifer pollution from saline intrusion (Grenadines) ▪ damage and ongoing threats to coastal infrastructure ▪ loss and damage to fisheries resources ▪ patterns of tropical storms increasing in severity	▪ coastal zone Plan of Management – i) Saint Vincent, and ii) the Grenadines ▪ coastal controls in legislation to guide land-use planning along the coast (setbacks, development standards, waste water disposal on the coastline, drainage plans etc.) ▪ aquifer protection from saline intrusion (Grenadines), water management plans and guidelines for communities ▪ beach and coastal management strategies to minimise loss of sand and amenity in general (dune stabilization, vegetation replanting etc.)	Fisheries, National Parks
Watershed Management	Central Water and Sewage Authority Act, Forest Resource Conservation Act	▪ diminished dry season volume in streams ▪ changes in seasonal rainfall patterns and drying streams ▪ aquifer pollution from saline intrusion (Grenadines) ▪ damage and ongoing threats to water storage (reservoir) infrastructure ▪ loss and damage to agricultural resources and coastal flooding ▪ rapid evapo-transpiration and drying trends ▪ expected increase in hurricane activity ▪ possible increase in el Niño effects	▪ watershed Plan of Management – i) Saint Vincent, and ii) the Grenadines ▪ development or rainwater harvesting systems, water storage, water conservation, water recycling, knowledge management– i) Saint Vincent, and ii) the Grenadines (see CEHI and FAO projects?) ▪ investigation of the need for watershed rehabilitation, stabilization and conservation ▪ feasibility studies of potable water systems (desalination, groundwater, rainfall catchment)	CWSA, Forestry, National Parks
Agriculture	Crown Lands Act, Plant Protection Act, Customs Act	▪ diminished yields – increased food importation ▪ spread of plant pathogens ▪ decline in soil fertility ▪ change in diet and accompanying health and economic challenges ▪ need for increased irrigation	sustainable water management for agriculture (irrigation) integrated pest management strategies diagnostic lab for agricultural testing and monitoring (inclusive of water quality monitoring) linkages to breeding programmes for farm animals elsewhere in OECS	Agriculture, Customs

		i) Saint Vincent, and ii) the Grenadines	cooperative research into economically feasible crops (germplasm research) investigations into alternative cropping, products and techniques (Permaculture) for local consumption and possible export	
Tourism	Tourist Board Act, National Parks Act, Marine Parks Act, Tobago Cays Regulations, Port Authority Act	▪ continued loss of beach (size, quality, amenity) and coastal flora and fauna ▪ decreased regeneration of corals and marine ecosystems ▪ loss of biodiversity and deterioration of natural sites (land-based) from lower rainfall, increased extreme weather ▪ Fear of safety and security from increased hurricane intensity ▪ possible tourist decline due to increased temperatures ▪ patterns of tropical storms increasing in severity (tourism inmpacts)	▪ intensive physical beach conservation actions ▪ public education for beach visitors (signage, info brochures) on beach conservation ▪ strict controls on recreational boating for anchoring, discharge, solid waste disposal etc. (both incentive and regulatory controls) ▪ knowledge and information available to tourists during hurricane season (most vulnerable persons of all) ▪ further development of National Parks and Marine Parks to protect valuable natural areas	Ministry of Tourism, Tourism Authority, National Parks, Port Authority
Health and Social issues	Environmental Health Services Act, Litter Act, Wildlife Protection Act	▪ Vector borne diseases likely to increase ▪ Possible health and sanitation dangers as a result of decreased rainfall and water availability ▪ Potential dangers to elderly and home-bound women from heat exhaustion from increased temperatures ▪ Decrease in food security ▪ Economic decline from falling farm and agricultural production ▪ Increased food bills and possible unemployment	▪ Knowledge base and mitigative measures for dengue fever and other vector diseases ▪ Refurbish hurricane shelters to accommodate basic health facilities ▪ Strengthening of roving clinics ▪ Proactive disease control measures	Health Wellness and Environment, National Parks
Cross-sectoral Issues	various	▪ Weather information services not providing adequate and timely information ▪ Disaster risk reduction not adequately addressing climate change	▪ Support to Met Office ▪ Support to NEMO ▪ Climate change awareness and capacity building in most Ministries	all

		▪ patterns of tropical storms increasing in severity (impacts on all sectors of the economy)		

Source: Adapted from the Draft Second National Communications, Saint Vincent and the Grenadines, for Global Environment Facility (GEF) 2010)

2.2 Vulnerable Coastal Areas

Coral reefs are significant contributors to the economic resource base of Saint Vincent and the Grenadines. They represent one of the most important resources of tropical islands in the Caribbean. They supply sand to beaches and form and maintain reef islands such as many of the Grenadines; they are marine habitats; and are spawning and nursery grounds for fish. Reefs also provide protective barriers for beaches and coasts by reducing incident wave energy. Therefore, as reefs have deteriorated in Saint Vincent and the Grenadines (negative forces including elevated seawater temperature and anthropogenic stresses), so have the nearby coastal (natural) resources.

Given current projected rates of increase, sea-level rise per se is not expected to have widespread adverse effects on coral reefs. The climate change effect of greatest potential significance to coral reefs is likely to be an increase in seawater temperature. As patterns of tropical storms are increasing in severity, reef ecosystems will be severely affected. Preparedness for hurricanes is therefore a priority for residents and businesses (including farming) in both coastal and inland areas. The Red Zone maps to follow indicate these specifically vulnerable coastal areas.

A recent vulnerability assessment (2007) for the coastal sector suggests vulnerability levels for the following sectors:

- hotels and restaurants - high;
- marinas - high;
- human settlements - medium to high;
- coastal protection structures and sea defences high;
- ports - medium to high;
- fisheries infrastructure - medium;
- fisheries – high;
- coastal ecosystems - medium.

Although groundwater is not a major source of fresh water in the Grenadines, the coral islands and atolls are particularly sensitive to changes in groundwater recharge (and salination) where groundwater sources are utilised as a fresh water source (Bequia, Union).

Sea-level rise may precipitate the intrusion of saltwater into the freshwater lens, reducing the quality and quantity of potable water, if the recharge rate or the width of the island is reduced. Various options have been suggested for minimizing the effects of climate change on water resources in small islands[22] such as the Grenadines.

The capacity of mangrove forests (small pockets only remaining in the Grenadines) to cope with sea-level rise is higher where the rate of sedimentation approximates or exceeds the rate of local sea-level rise. Snedaker[23] (1993) argues that mangroves in the Caribbean are more likely to be affected by changes in precipitation than by higher temperatures and rising sea levels because they require large amounts of fresh water to reach full growth potential.

The biodiversity of islands also could be adversely affected by climate change including; alterations in population size, species distribution, species composition, the geographical extent of habitats and ecosystems, and a likely increase in the rate of species extinction.

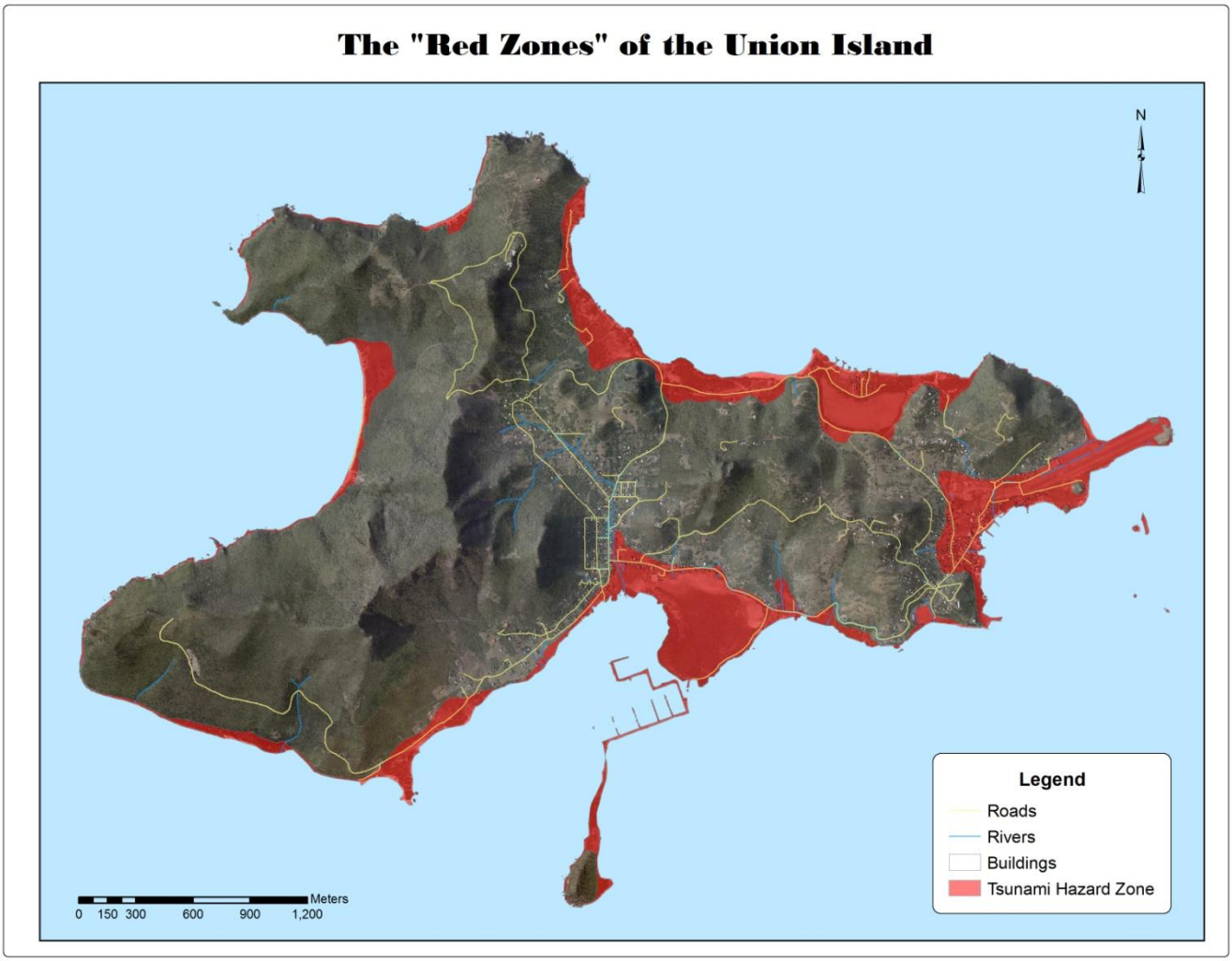
Evidence has indicated that the sea grass meadows in the shallow, intertidal coastal environments, are the ecosystems most likely to be negatively affected by climate change impacts. In Saint Vincent and

[22] IPCC 1996, WG II, Section 12.5.5.

[23] Snedaker (1993) in *Regional Impacts of Climate Change: An Assessment of Vulnerability,* IPCC, 1998.

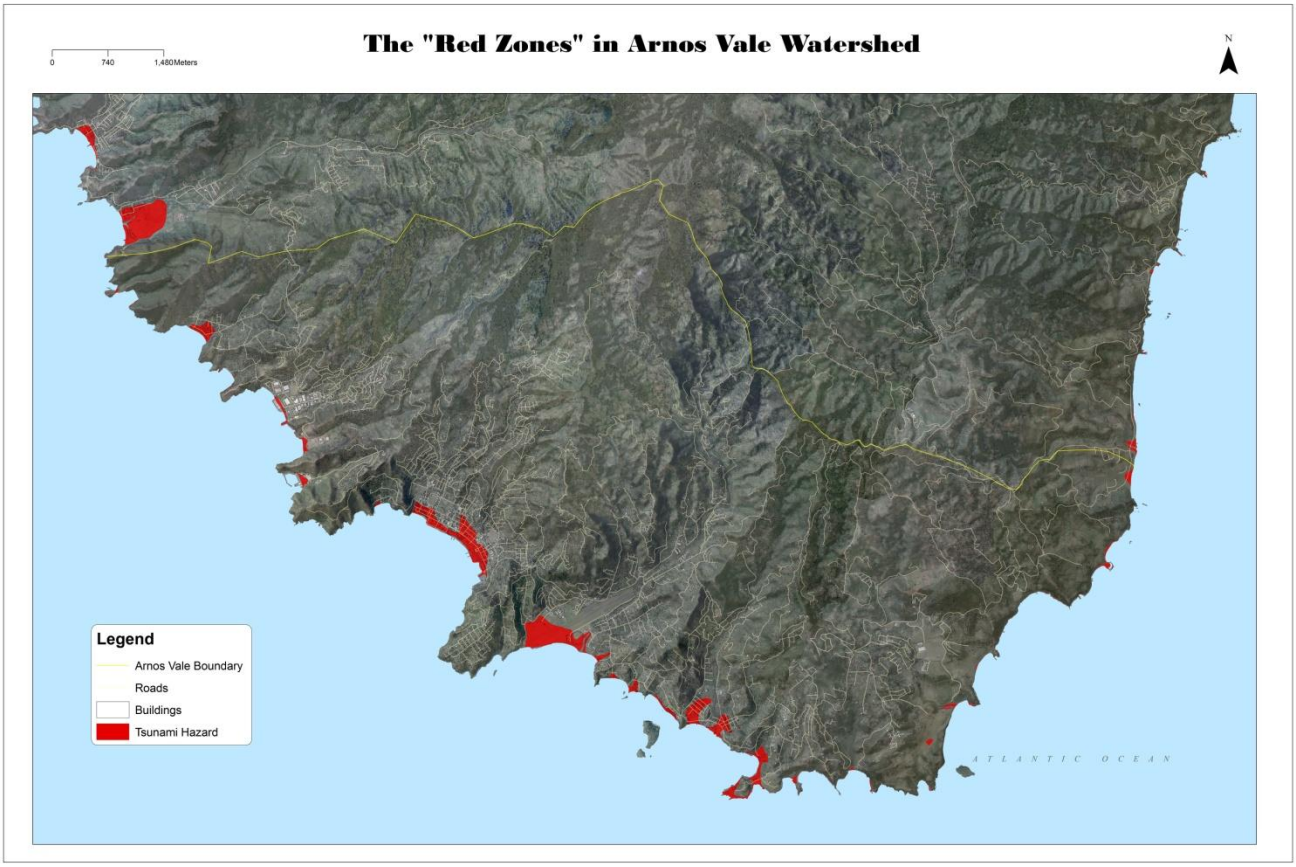
the Grenadines, the main threats to sea grasses in the future are likely to come not from the effects of climate change but from anthropogenic disturbances-such as dredging, sand mining, overfishing, water pollution, recreational boating and land reclamation. The combined effect is therefore significant.

Figure 17: The Red Zones in Union Island



Facilities	No. at Risk
No. of Schools	3
No. of Building	1796
Total Length of Roads (km)	28

Figure 18: The "Red Zone" in Arnos Vale



Facilities	No. of assets at risk
No. of Schools	4
No. of Shelters	6
No. of Medical Facilities	2
No. of Building	1450
Total Length of Roads (km)	20.9

Figure 19: The "Red Zone" in Georgetown

Facilities	No. of Assets at Risk
No. of Schools	1
No. of Shelters	1
No. of Medical Facilities	1
No. of Building	663
Total Length of Roads (km)	7

2.3 Inland Areas

The tropical inland forests are likely to be affected more by changes in soil water availability (caused by the combined effects of changes in temperature and rainfall) than by changes in temperature alone. It is possible that tropical forests will be affected more by anthropogenic forces than by climate change. Increasing temperature and extreme events (hurricanes, high wind conditions, landslides) also may increase the incidence of pests and pathogens, as well as the frequency and intensity of fires[24].

[24] On the other hand, increasing amounts of CO2 may enable some forest species to use water and nutrients more efficiently (IPCC 1996, WG II, Section 1.3.7).

Biodiversity

A large number of species of flowering plants, ferns, amphibians, reptiles, birds, and mammals have been identified in the country.

Figure 20: The Saint Vincent parrot, *Amazonia guildingii*

The national bird, the Saint Vincent Parrot *Amazona guildingii* is protected through the designation of a parrot reserve - an area of close to 4452 ha in the upper watersheds of the Buccament, Colonarie, Richmond, and Cumberland Rivers in the central mountains. Populations of agouti *Dasyprocta agouti*, iguana *Iguana iguana*, opossum *Didelphis marsupialis* and armadillo *Dasypus novemcinctus* provide a base for recreational hunting during the open season (October 1 to January 31). Twenty-three (23) Wildlife Reserves have been declared throughout the country under the Wildlife Protection Act no. 16 of 1987. The Legislation also affords various degrees of protection to wildlife on an annual basis.

Natural vegetation

Most of the natural forest is found in the central mountain areas of Saint Vincent. According to the National Forest Inventory completed in 1993, the total forestland area in 1992/1993 was approximately 12,683 ha and consisted of Primary rainforest (4,306 ha), Secondary rainforest (3,450 ha), Dry Scrub Woodlands (2,178 ha), Palm Brake forest (518 ha), Elfin Woodland (457 ha), Regenerated areas (1,775 ha). The King's Hill Forest Reserve, established in 1791, is the only other significant area of natural forest in the country.

In the Grenadines there are few areas of natural forest cover, as unrestricted grazing has resulted in widespread loss of vegetative cover (Delegation of the European Commission in Barbados and the Eastern Caribbean, 2004). Littoral Woodland covers small areas of the islands.

Agriculture

The agricultural sector and, in particular, the banana industry has contributed immensely to the economic development of Saint Vincent and the Grenadines in the last three decades. It provides income, employment and improved welfare for the Vincentian society. During the last decade however, the sector's relative contribution to GDP has declined.

This decline in the agricultural sector's contribution to GDP is closely linked to a decline in the productivity of the banana industry. Since 1993, the banana industry has struggled to adjust to ever-changing market conditions in Europe, including more stringent quality standards, greater competition and lower prices (see Interim Poverty Reduction Strategy Paper, 2003).

Agriculture however remains the largest employer and contributes 10% of GDP[25] in Saint Vincent and the Grenadines. As the economy diversifies and as trade liberalisation globally undercuts agricultural exports (especially bananas), the sector's share of GDP and its contribution to employment have been falling over the years. For instance, in 1992, the last year before the commencement of the erosion of the trade preferences for bananas, Saint Vincent and the Grenadines exported 79,000 tons of bananas with a value of EC $ 120 million, from which 8,000 farmers benefited. By 1995, the export volume had fallen to 50,000 tons produced by 5,000 farmers at a value of EC$ 50 million (USmillion$18.7) . In 2004, the export volume was projected to be 28,000 tons, produced by 2,500 farmers at a value of roughly EC$ 30 million (USmillion$11.2).

Landslides and erosion

Although the total annual rainfall for Saint Vincent and the Grenadines has shown little change over the last twenty-five (25) years, the pattern has changed significantly. Instead of six months of almost evenly distributed rainfall, the country now experiences short periods of torrential downpours followed by seven to nine months of little or no precipitation. The resulting heavy run-off causes much erosion because due to extensive clearing for agriculture and housing.

Landslides occur throughout the mainland mainly during the rainy season because of the mountainous topography and the instability of slopes. The Grenadines are affected to a lesser extent by landslides because of their gentler topography and less intensive rainfall.

On mainland Saint Vincent, the immediate issue is not water shortage but over exploitation or inappropriate use of land. In this regard, farming on steep slopes (e.g. La Soufriere and Mount Saint Andrews) has resulted in serious soil erosion and fertility loss.

Figure 21: Landslide at falls of Baleine

2.4 Water: a future risk

It is highly probable that the effects of climate change will lead to adjustments in the global hydrological cycle, which could affect the distribution and availability of regional water resources.

[25] See Section 1.7 on Agriculture also.

Temperature variations can result in changes in evapotranspiration, soil moisture, and infiltration rates[26].

Options to mitigate future risk (including planned adaptation) of dwindling fresh water supplies that the PPCR Phase II will evaluate, include the harvesting of rainwater, more efficient and extensive use of surface water, artificial recharge of aquifers with rainwater or treated wastewater, and more efficient management of existing supplies and associated infrastructure (e.g., use of various water-saving devices, reduction of leaks, replacement of worn pipes, and recycling).

Adaptation options may include: reducing water pipeline leakage; active and effective rainwater harvesting, water conservation in the home and for businesses; needs assessment for water storage facilities; evaluate the costs of water supply; restoration of riverbanks and wetlands water conservation; public awareness; improved management of forest resources including private forests; strengthening data collection; and, the possible development of a national water management plan for Saint Vincent and the Grenadines.

The water resources sector is faced with some key threats such as:

- Inadequate ground water data and analysis
- Lack of a systematic rover or ground water quality monitoring program
- Inadequate density of hydro-meteorology, climatic and agro-climatic stations

As a result, the three main challenges of water resources management can be categorized as:

I. Ensuring that the water resources are managed so as to maximize the contribution that these natural resources can make to increase the productivity of the economies of the nation
II. Managing the water resources so as to maximize their contribution to the elimination of poverty and to raising the quality of life, and
III. Ensuring that water resources are managed so as to minimize the impact of water-using economic activities on the quality of the environment

Therefore, there is the need to manage water resources to:

- Safeguard existing water rights
- Improve knowledge of availability and reliability (quality and quantity) of water
- Safeguard environmental aspects
- Prevent conflict between competing users
- Prevent over-exploitation

At present there are a number of institutions with some responsibility for water resources investigation and protection, and there are some overlaps and omissions in the attendant legislation. Furthermore, owing to financial and other resource constraints vis-à-vis the wide range of responsibilities to be addressed by an institution, most of them are limited in the extent to which they can fulfill existing mandates for water-resources-related tasks. For example:

Forestry Department: Unable to properly execute its mandate regarding the protection and preservation of water resources in forest reserves. There has been however a number of relevant projects and initiatives in the forestry and watershed management sectors in Saint Vincent and the Grenadines over recent years. The SPCR proposed investment projects build on these initiatives to make best use of these resources.

[26] IPCC 1996, WG II, Sections 10.1, 10.3, 10.4.

Environmental Health Division (Ministry of Health): Only handles "certificates of approval" for the discharge of liquid wastes from animal farms, not domestic or industrial premises

CWSA: Has not fully activated its mandate regarding investigation of water resources

National Parks, Beaches and Rivers Authority: Is not equipped to exercise "power and control over all rivers, streams, etc.;"

Physical Planning and Development Board Has difficulty following up and enforcing planning legislation, especially regarding design and sizing of domestic septic tanks and soakaways;

There is clearly a need to review these tasks to see if a particular institution should be strengthened to properly meet its responsibilities, or alternatively, to consider whether or not some tasks should be transferred to another agency.

2.5 Gender and the Impacts of Climate Change

According to the Millennium Development Goals Report by ECLAC (2009) 68% of female heads of households have never been married, and 18% of them are previously married or separated. Coupled with higher unemployment rates among women, these households are most vulnerable to climate change. These suffer the most during any kind of natural disaster, particularly in cases of lack of access to resources and lack of adequate finances to procure food, medical attention and water (CIDA, 2005).

Climate change does not affect men and women in the same way and is likely to have a differentiated impact also in St. Vincent and the Grenadines. Therefore, all aspects related to climate change need the inclusion of gender perspective. Gender-specific implications of climate change outcomes on human, food, biomass energy and livelihood security, are well documented. Due to climate induced events like food, drought, hurricane, volcanic activities, heat wave, etc. women and children will suffer earliest and most. It is also believed that increase in climate induced natural disasters is likely to affect women more than men. In addition, there are some specific gender attributes, which increase women's vulnerability in some respects.

Women tend to be disproportionately affected during post disaster period. This includes food and drought induced food insecurity, collection of safe drinking water, sanitation problem, energy insecurity, reproductive and maternal health problems, mental and physical trauma, sexual harassment, etc. Moreover, there is need to more amply incorporate gender sensitivity into climate change programming in St. Vincent and the Grenadines. In light of the above situation, several areas required specific attention, which are: gender-specific effects of climate change; climate vulnerability related to gender aspect; women's capacity to adapt with climate induced natural disasters and extreme events; gender and decision-making on climate change; and gender-specific role in adaptation and mitigation.

Poverty:

The level of poverty in Saint Vincent and the Grenadines would present significant problems for climate resilience. In accordance with the approach employed by the World Bank, a National Survey conducted in the 1990's (Poverty Assessment Report, Saint Vincent and the Grenadines" Kari Consultants 1996), estimated that 35% of households in Saint Vincent and the Grenadines could be categorized as poor. This figure is also adopted in a 2003 report (see Interim Poverty Reduction Strategy Paper, National Economic and Social Development Council, 2003).

A recent (February 2011) Damage and Loss Assessment (DALA) report by a consortium of Multilateral Development Agencies (UNDP, UNECLAC and Others) did some post Hurricane Tomás evaluation. Among other things, the report shows that there is a positive correlation between the extent of poverty and the extent of damage or loss. The poorer areas were the areas most adversely affected by the Hurricane. Although geographic location in the country has some bearing (the eye of the storm passed closer to the north which incidentally are the poorer areas) The size of the storm meant that the entire mainland received strong winds and rain but were more resilient.

People living in poverty contribute least to climate change but they are likely to suffer its worst consequences with few resources to adapt and respond. The effects of climate change – increasingly limited access to water, reduced crop yields, more widespread diseases, increased frequency of natural disasters are making the lives of poor people even more precarious. High levels of poverty and low levels of human development limit the capacity of poor households to manage climate risk. With limited access to formal insurance, low incomes and meager assets, poor households have to deal with climate related shocks under highly constrained conditions. Adaptation to climate change will only be effective if it bu8ilds upon an understanding of the multidimensional nature of poverty and vulnerability. Adaptation to climate change must be considered as part of the development process and not separated from it so it will therefore have to be integrated into national economic planning and poverty eradication.

In the St. Vincent and the Grenadines Country Poverty Assessment 2006 (Kairi Consultants) it was revealed that 30.2 percent of the population is poor: this is the percentage of the population that did meet the minimum annual consumption expenditure of $EC5,23, required to satisfy the basic food, as well as non-food requirements. In terms of geographical distribution of poverty, the census divisions of Georgetown and Sandy Bay which together comprised 9.0 percent of the population accounted for as much as 16.5 percent of the poor.

The Country Poverty Assessment 2008 indicated the following:

- 30.2 percent of the population was deemed to be poor in 2008, and 2.9 percent was deemed to be indigent.
- An additional 18 percent, though not poor were vulnerable (defined as being at risk of falling into poverty in face of economic shock, or other **disaster):** altogether 48.2 percent of the population was under the vulnerability line.
- The highest incidence of poverty was found in Georgetown/Sandy Bay area- 55.6 percent of residents in this district were deemed to be poor.

St. Vincent and the Grenadines will need the assistance of international community in continuing its efforts at poverty reduction. The Government, through its agencies, has mounted a vigorous programme of poverty reduction the fundament of which is to stimulate the growth of competitive industry and of new export activity. There are a number of agencies in the NGO community that have also been engaged in major programmes, to the extent that their resources allow it. In St. Vincent and the Grenadines it will be necessary to promote and facilitate public awareness programmes on climate change. Further greater public access will be needed on information on climate change and its effects.

2.6 The Economic Rationale of Adaptation

There is a shared and global concern that the overall costs of adaptation measures such as infrastructure protection will be beyond the financial means of any island nation, Saint Vincent and the

Grenadines included. Vulnerability studies conducted in Saint Vincent and the Grenadines suggest that the costs of coastal protection ("hard" options) would be a significant proportion of GNP[27].

The costs of protecting the shoreline and other infrastructure will vary, depending on the kind of protection needed, the length of area to be protected, design specifications to be adopted, and the availability of construction materials.

The Caribbean region suffered considerable damage from severe hurricanes (e.g., David, Hugo, Gilbert, Gabrielle, Luis, Marilyn) in the 1980s and 1990s. As a direct result, many insurance and reinsurance companies withdrew from the market. Those companies that stayed in the market (primary insurers in particular) imposed burdensome conditions for coverage such as higher deductibles; increased rates for windstorms; and insertion of an "average" clause to eliminate the possibility of underinsurance[28].

The cost of insurance is therefore an important factor to take into consideration in any assessment of climate change impacts on infrastructure. Property insurance is extremely sensitive to the effects of catastrophic events such as hurricanes, floods, and earthquakes with high-risk locations demanding higher and higher insurance premiums. In Saint Vincent and the Grenadines, the primary insurers need to be brought into the conversation on climate change and given the opportunity to work alongside policymakers to reduce the potential future losses from the impacts of a changing climate. This process has commenced with the recent initiative of the Ministry of Health and Environment staging a conference on the topic in early February 2011.

The major costs of adaptation in Saint Vincent and the Grenadines are associated with upgrading of critical infrastructure. Roads, bridges, culverts, embankment stabilization, coastal and river defences and relocation of buildings and infrastructure: these are the hard costs. The softer costs are what will contribute most significantly to building and sustaining climate resilience. This includes the development of awareness, knowledge and understanding amongst businesses, families and communities living and working in vulnerable areas. Knowledge management is probably the investment that will provide the greatest return. Curriculum development for schools (high schools at the outset) is a wise investment, recognized as a necessary addition to the National Three Year Programme to build climate change and resilience knowledge and awareness.

The PPCR has taken a comprehensive approach by including some necessary hard costs (around fourty percent of the budget) that is supported by a range of training, capacity building, data management, knowledge management and policy support activities. The softer costs included in the PPCR will contribute directly to the sustainability of the investments made under the Disaster Vulnerability Reduction Project (see Annexes). In all, the total costs of all measures and investments proposed in the PPCR, will make a significant start to the transformation of Saint Vincent and the Grenadines into a climate resilient population, an example to all of the Caribbean and indeed, small island states around the world. This is the vision and this is a leap forward in achieving that vision.

[27] See also projected costs for other SIDs in IPCC 1996, WG II, Table 9-3.

[28] See Murray, 1993; Saunders, 1993.

3. Linkages to National Development Plans and Past Projects/Programs

3.1 Links to the PPCR Regional Track

In May 2009, the Caribbean agreed to be one of two Regional Track pilot programs. The Regional approach addresses i) country investments in six vulnerable nations, and ii) region-wide activities addressing climate risks and vulnerabilities common to all Caribbean countries.

Stakeholders came together late 2009 and agree on five regional actions to focus on:

1. Monitoring and climate modelling
2. Policy and institutional framework
3. Up-streaming sustainable land management
4. Capacity building
5. Mainstreaming to integrate climate change

The PPCR Regional Track Phase I proposal is still under preparation. This will be overseen by the IDB. There are clearly a number of 'commonalities' that will be shared by the National SPCRs, and the Regional PPCR. This would include, but not limited to the following:

Climate Risk Analysis
The analysis of the regional potential and existing impacts of climate change will most certainly be share and similar for the OECS countries and in fact all Caribbean countries. Similarly, the National analysis of climate risks (the climate science especially) will be also largely common to the OECS countries.

GIS data sharing
It may be of significant (regional) value to share the respective GIS and data management needs/gap analyses undertaken by all regional participating countries. This should indicate likely actions best undertaken collectively (regional) and those that are country-specific (national).

Legislative review
Amongst many of the English-speaking countries of the Caribbean, there is a common basis of legislative instruments and controls. Investigations and review could therefore be undertaken for all those countries simultaneously.

Tourism
Indeed, issues regarding climate change impacts on tourism, tourism locations and tourists' behaviour (e.g. arrivals forecasting), and the need to build resilience in this significant economic sector are also likely very similar between the Caribbean countries. There is an opportunity to streamline this sector analysis to share amongst all PPCR countries.

Consultation processes
The strategy for how to achieve an acceptable level of consultation and participation of stakeholders (public and private) in the PPCR planning and development process, could be shared amongst all countries for example.

Private Sector
The opportunities for actively and meaningfully engaging the private sector should also be shared amongst all countries.

In addition, the identification of priority hazard maps, and indeed all relevant climate an disaster data sets need to be made available to the Regional Track. Proposed training activities included in the investment programmes should also be shared and indeed, be the basis of the Regional Track training strategy. It would simply make good business sense to conduct collective trainings to build intra-regional cooperation amongst all SPCR countries.

The following list, drawn from the Saint Vincent and the Grenadines Phase One Proposal (November 2010), summarises those regional activities already identified. It should be noted that many of these suggested initiatives have been included in the Investment Programme (see specific reference to OECS Education Reform Unit, CDEMA, CDC, PAHO, UWI, CIMH, Barbados Coastal Zone Management Unit, 5C's and other organizations in Components One through Four).

1. Monitoring and climate modeling activities

1.1 Strengthening climate change modeling and monitoring capacity of regional organizations or regional group – e.g. strengthen the modeling group of CCCCC/UWI/ISMNET.

1.2 Development of standards/protocols for collecting and managing data – this would also include improving the human and institutional capacity to collect and manage data. Development/implementation of Disaster Risk Management and Climate Change adaptation indicators in key economic sectors. Within this context, there could be the development of standards/protocols related to monitoring, evaluation and reporting of these indicators.

1.3 Strengthening monitoring capacity by increasing the number of monitoring stations in the Caribbean especially in those countries with very limited resources e.g. Haiti. Provide pertinent training of maintenance, data collection and analysis.

1.4 Strengthen linkages between regional modeling and monitoring networks with the PPCR pilot countries.

2. Enabling environment (policy and institutional framework)

2.1 Expansion of the Comprehensive Disaster Risk Management program in the Caribbean; Insure greater integration of DRM approaches with measures to integrate resilience to climate change (including measures to manage the impacts of climate change over the medium and longer-term) in the Caribbean, consider using pilot countries of the PPCR as case studies.

2.2 There is an opportunity for the expansion of policy/legal framework to deal with issues related to climate change e.g. revamping of the land use or spatial planning legislation in the Caribbean to incorporate climate change resilience; development of new land codes/practices and guidelines.

3. Raising the Political Profile of the Importance of Factoring in Climate Risks into Sustainable land-use management and Spatial Planning

3.1 What are the outreach opportunities or options for "upstreaming" the issues to the political level?

3.2 What is the role of regional organizations to facilitate awareness raising at the political levels?

4. Capacity building and awareness raising aimed at different levels, including sectors and policy makers)

4.1 Development and/or expansion of a platform for sharing information/data/best practices/case studies to all members states (in all major languages used in the Caribbean – English, French, Spanish and Dutch). Is there an existing platform that can be used for these purposes?

4.2 Development of practical/user-friendly climate change training packages for:

- Policy/decision makers of key vulnerable economic sectors
- High level politicians
- Public awareness and communities

4.3 Provide training on climate change modeling to scientists in the Caribbean (particularly those who are not part of the Caribbean climate modeling group and may have less capacity).

4.4 Provision of "adequate information" on climate change and the impact of climate change in selected productive sectors.

4.5 Strengthening regional coordination, planning and active participation in the UNFCCC.

5. How to integrate climate change into development and budget planning

5.1 Enable dialogues at the regional level with policy makers from different sectors – Planning, Finance, Agriculture, Education, Water, etc.)

5.2 Need for innovative financial mechanisms to support the implementation of adaptation measures in the different sectors e.g. explore use of carbon taxes/levies and how PPCR can provide seed funding to support piloting and/or scaling-up of such financial mechanisms.

Following recent discussions with the Lead Consultant for the Regional Track (as this process is just coming on line at the time of writing this document), several opportunities were identified where the Regional Track could "add value" to the on-going National SPCR preparations.

Needless to say, the Regional Track will need to thoroughly consider the specific needs of the nations that make up the pilot countries to which the regional initiatives will serve and respond, as indicated in the summary below[29]:

The Regional PPCR is intended to:

- *Pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning;*
- *Strengthen capacities at the national levels to integrate climate resilience into development planning;*
- *Scale up and leverage climate resilient investment, building upon other ongoing initiatives;*
- *Enable learning by doing and lesson sharing at the country, regional and global levels;*

Strengthen cooperation and capacity at the regional level to:

- *integrate climate resilience in national and appropriate regional development planning and processes.*

Three modules of Phase I Regional Track activities are approved for the regional programme as follows:

Module 1: Capacity Development and Information Sharing

1. *Support for Strengthening of data management capacity.*
    a. *Evaluation of data collection and management systems and processes;*
    b. *Workshop on climate modeling and monitoring systems.*
2. *Identification of Data Needs.*
3. *Information sharing and exchange of best practices.*
    a. *Assessment of need for additional functionality of the information clearing house.*

Module II: Advocacy and policy development

[29] Pilot Programme for Climate Resilience, Caribbean Regional Track First Progress Report, Prepared by Patricia Mendoza, PPCR Regional Coordinator, Submitted to Gerard Alleng, Copied to Dr. Neville Trotz, IDB PPCR Caribbean Coordinator, Caribbean Community Climate Change Centre Inter-American Development Bank, Washington, D.C., February 7th, 2010.

1. *Regional Policy Dialogue.*
2. *Stakeholder consultations.*
3. *Development and piloting of climate risk screening toolkit*
    a. *Piloting of screening tool.*
    b. *Formulation of toolkit.*

Module III: Coordination, scoping and SPCR preparation

1. *Coordination and national programs interface*
    a. *Participation in joint missions.*
    b. *Support to the development of regional results framework.*
    c. *PPCR Phase I coordination and transition to PPCR Phase II.*
2. *Gap Analysis of climate resilient systems, capacities and practices in the PPCR pilot countries.*

As the Regional Track gathers momentum, opportunities to provide practical measures to guide these modules into actions will emerge from the specific needs and demand from the countries that form this regional group. There is a significant potential cost saving and economy of scale advantage to undertaking certain activities that each of the National SPCRs have identified as having a regional component. The networking and exchange should begin immediately and the added value of the Regional Track provided to the National SPCRs as soon as practicable.

3.2 Participation in International Discussions and Agreements

The Government of Saint Vincent and the Grenadines has taken several credible initiatives particularly for adaptation and has managed to draw international attention and cooperation to address climate change adaptation in Saint Vincent and the Grenadines. The country acceded to the United Nations framework Convention on Climate Change (UNFCCC) in 1996. The county ratified the Kyoto Protocol which was signed on 19th March 1998 and ratified on December 2004. Government of Saint Vincent and the Grenadines has submitted the Initial National Communication to UNFCCC in 2000 and is now preparing its second national communication, which will is likely to be completed by this year (2011).

Saint Vincent and the Grenadines has been a participant in the International discussions on climate change. For example, Saint Vincent and the Grenadines actively took part in climate change talks in COP 14 in Poznan in December 2008 and COP 15 in Copenhagen in December 2009 and made submission for negotiations that has entered a critical phase now. The Government is firmly committed to implementing of an integrated policy and plan to protect the country from the adverse effects of global warming as well as to ensure food for all, eradicate poverty, create enabling environment for increased employment, and guarantee access to energy and power. The Government's strategy is to integrate climate change challenges and opportunities in the overall development plan and programs involving all sectors and processes for economic and social development.

The initial National Communication submitted in 2000 (and the DRAFT Second National Communication) on climate change are reports which are submitted to the UNFCCC to provide information on the progress made on the implementation of the Convention at the national level, the vulnerable sectors have been identified in these documents. The PPCR builds on the vulnerability and adaptation assessments and identifies areas within the different sectors where possible concrete adaptation measures can be undertaken.

St Vincent and the Grenadines has signed unto and have ratified many conventions, protocols and agreements in support of climate combating the effects of and building resilience to climate change and disaster risk reduction. Inter alia, St Vincent and The Grenadines acceded to the United Nations Framework Convention on Climate Change in 1996. The matrix below represents a compendium of

conventions, protocols and agreements that the country has signed/ratified. It must be noted that the development of the PPCR was guided by the mandates and imperatives of these international discussions and agreements.

Convention/Protocol/ Agreement	Purpose	Date of Signature/ Ratification
UN Framework Convention on Climate Change	Convention on adaptation measures that may be taken to reduce the potential impacts of climate change and climate variability. This convention and its protocol seek to control the emission of greenhouse gases. The Government of SVG and the private sector are taking measures to reduce greenhouse-gas emissions.	1996
Hyogo Framework of Agreement (HFA)	Global Disaster Risk Reduction	2002
The *Basel Convention on the Control of Transboundary Movement of Hazardous Waste.*	*Control of Transboundary Movement of Hazardous Waste and their Disposal (1989).*	1989
The *United Nations Convention on Biological Diversity (CBD).*	This convention seeks to protect flora and fauna and their habitats from destruction by man. The Government of SAINT VINCENT AND THE GRENADINES is currently preparing its report on biological diversity as part of this convention.	1989
The ***Vienna Convention on the Protection of the Ozone Layer***	Protection of the ozone layer will reduce ultraviolet radiation. SVG has in place a programme to phase out the use of ozone-depleting substances under this convention.	1985
The ***United Nations Convention on the Law of the Sea (UNCLOS)***	This convention prescribes jurisdictional rule for the protection of the marine environment. UNCLOS obligates coastal member states to "protect and preserve the marine environment". This convention provides the framework for the Exclusive Economic Zone.	1982
The ***International Convention for the Prevention of Pollution from Ships (MARPOL).***	Enforcement of this convention will protect aspects of coastal resources against marine pollution.	1973

Figure 22: Conventions, Protocols and International Agreements for Saint Vincent and the Grenadines

3.2a CARICOM and OECS Participation

The Liliendaal Declaration was issued by the Heads of State of Government of the Caribbean Community (CARICOM) at the thirteenth meeting of the conference in Liliendaal, Guyana from 2-5th July 2009. The declaration recalled the objective, principles and commitments of the UNFCCC and its Kyoto protocol. It emphasized that dangerous climate change is already occurring in all SIDS (small islands and low-lying coastal developing states) and that many SIDS will cease to exist without urgent, ambitious and decisive action by the international community to reduce global greenhouse gas

emissions significantly and to support SIDS in their efforts to adapt to the adverse impacts of climate change, including through the provision of increased levels of financial and technical resources.

The Declaration also indicated that the estimated total annual impact of potential climate change on all CARICOM countries is estimated at US$ 9.9 billion in the total gross domestic product (GDP) in 2007 US$ prices or about 11.3% of the total annual GDP of all 20 CARICOM Countries (member states and associate member states) according to the World Bank estimates.

It is against this backdrop that the CARICOM heads declared, inter alia, to strengthen educational institutions to provide training, education, research and development programs in climate change and disaster risk management particularly in renewable and other forms of alternative energy, forestry, agriculture, tourism, health coastal zone management and water resource management to increase the regions' capacity to build resilience and adapt to climate change.

Regional initiatives to build capacity for climate change adaptation in the Caribbean commenced in the nineties. Overseen by the World Bank and CARICOM, the Adaptation to Climate Change in the Caribbean (ACCC) Project (2001-2004) was designed to sustain activities commenced earlier under the Caribbean Planning for Adaptation to Climate Change (CPACC) project.

The Adaptation to Climate Change in the Caribbean (ACCC) Project is mentioned here because the nine components of the project have a distinct similarity between its regional activities ten years ago, the national efforts under the PPCR here in Saint Vincent and the Grenadines today. Those components were as follows:

1. Project design and business plan development for a regional climate change centre;
2. Public education and outreach;
3. Integration of climate change into a physical planning process using a risk management approach to adaptation to climate change;
4. Strengthening of regional technical capacity, and partnerships including the association between Caribbean and South Pacific small island States;
5. Integration of adaptation planning in environmental assessments for national and regional development projects;
6. Implementation strategies for adaptation in the water sector;
7. Formulation of adaptation strategies to protect human health;
8. Adaptation strategies for agriculture and food; and
9. Fostering of collaboration/cooperation with non-CARICOM countries.

The outcomes of ACCC included the establishment of the financially self-sustainable Caribbean Community Climate Change Centre (CCCCC or the Five C's); a guide to assist environmental impact assessment (EIA) practitioners in CARICOM; a draft regional public education and outreach (PEO) strategy; and implementation of pilot projects on adaptation studies in the water health and agricultural sectors. During ACCC's tenure, negotiations took place for a third project, the Mainstreaming Adaptation to Climate Change (MACC) project.

3.3 Saint George's Declaration and the National Environmental Management Strategy

The Saint George's Declaration (SGD) of Principles for Environmental Sustainability in the OECS was signed by the OECS Ministers of the Environment in April 2001. The Declaration sets out the broad

framework to be pursued for environmental management in the OECS region. The SGD has 21 principles, and principle 8 aimed at addressing the causes and impacts of climate change.

Saint George's Declaration of Principles for Environmental Sustainability in the OECS[30] (revised 2006) has as its overall aim to foster equitable and sustainable improvement in the quality of life in the OECS region. There are four main goals: i) to build capacity for sustainable development; ii) involve a wide range of people in environmental management; iii) achieve long term protection of ecosystems, and iv) ensure natural resources contribute equitably to development.

The National Environment Management Strategy (NEMS) is the mechanism by which the SGD is implemented. The NEMS for Saint Vincent and the Grenadines contains two broad strategies (27 and 28) which give effect to principle 8 of the SGD. Strategy 27 speaks to establishing appropriate and relevant integrated strategies, plans and policies to adapt and respond adequately and in a timely fashion to the causes and impacts of climate change while Strategy 28 allows for collaboration at the regional and international levels, in the implementation of obligations under the United Nations Framework Convention on Climate Change.

Saint Vincent and the Grenadines is signatory to the Principles for Environmental Sustainability in the Organization of the Eastern Caribbean States (OECS) as are laid down in the Saint George's Declaration (SGD) of 2001. The 21 principles contained in the SGD place environmental management as a cornerstone of sustainable development, and OECS Member States have agreed to utilize these principles in the governance of national affairs. Most of these principles are directly relevant to the operations of many of the Ministries in Saint Vincent and the Grenadines. The development of a National Environmental Management Strategy and Action Plan (NEMS) is the mechanism for national expression of environmental programming in support of those sustainable development strategies.

The NEMS 2004 for Saint Vincent and the Grenadines was completed in 2004 through a process of district and sectoral consultations and after a review of key policies and programmes and feedback from a National Consultation on the draft NEMS. The overall process was coordinated by the then Environmental Services Unit (ESU), especially local publicity on the NEMS and community consultations, with inputs from the National Environmental Advisory Board. An update of the NEMS is currently underway.

3.4 National Economic and Social Development Plan

The National Economic and Social Development Plan (2011-2025) (NESDP) contains eight key elements: Culture, Identity and National Pride, Economic Sector Considerations, Social Capital, Governance, National Security, Energy, Disaster Management and the Environment, Physical Infrastructure, Education, Telecommunication, Science and Technology.

NESDP recognizes that the factors inhibit the global competitiveness of Saint Vincent and the Grenadines. The factors include: environmental/ecological vulnerability, particularly high exposure to natural hazards, hurricanes, storms and climate change and its attendant problems. These matters have been a major inhibiting factor in the economic growth and potential of Saint Vincent and the Grenadines. NESDP recognizes the need for a range of strategic inventions such as (1) development of a comprehensive system for sustainable land management, (2) development of land use policies and land area zoning plans (3) preservation of critical forests (4) a legislative framework to manage land use.

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NESDP also identifies the need to enhance the capability of Saint Vincent and the Grenadines to effectively prepare for and mitigate disasters. This involves enhancing disaster preparedness and mitigation mechanisms as well as strengthening the national capacity to respond to, as well as mitigate disasters, enforcement of Building Codes, the development of a Disaster Emergency Management Plan, building resilience at the community level, the reduction in hazardous land occupancy, enhanced public health systems that can adequately respond to major emergency, and commitment to a comprehensive coastal management program that preserves natural buffers to climate compacts. The Project responds to many of these key issues. The three pilot projects will each address the building of community resilience at the community level. The PPCR also has a project for the preparation of a comprehensive disaster management plan. In addition, the three pilot projects will each seek to strengthen the requirements for ensuring compliance with the Building Code including setback requirements.

The development of a Coastal Zone Management Plan as well as strengthening the existing legal and institutional framework to prevent or reduce environmental degradation will result in the alignment of many aspects of the Project with the objectives of NESDP. The PPCR will also contribute to a number of key NES0P objectives. The improved data collection mechanisms will facilitate the development of a comprehensive plan for the sustainable management of land resources, as well as, the development of land use policies.

The NESDP addresses the using of a access to safe drinking water and focuses attention on a number of strategic interventions. This includes improving the protection and management of water resources and the development of water conservation quality of portable water. The PPCR does address a number of these issues. These include projects to assess and prepare management plans for fresh, portable and sustainable solution for the need of the Grenadines including rain water harvesting practices. The Plan will result in strengthen the implementation of NESDP as a result of following the guidance set out in NESDP. In addition, the Projects include the necessary investments for implementing aspects of the Plan.

There are some gaps in NESDP that are addressed in the PPCR in order to achieve effective implementation of climate change resilience in Saint Vincent and the Grenadines. Critical areas such as comprehensive coastal zone management, community based disaster risk management, gender sensitive approaches to disaster management, the protection of the marine environment, the control of sand mining and its impacts, the dire need for water in the Grenadines are not addressed in the NESDP. However, the PPCR does address all of these issues and some amendments to the NESDP will be needed to bring it in line with some of these critical issues facing SVG which will be increasingly become more important as part of the strategy for climate resilience. Given the urgency to revise, update and finalize the NESDP it will be necessary to secure project preparatory funding in support of a detailed revision and finalization of the Plan.

3.5 National Disaster Management Plan

The responsible agency for disaster management is the National Emergency Management Organization (NEMO). It is part of the National Security department in the Prime Minister's Office and employs a staff of 11, of whom three are professionals. The organization has developed a Disaster Management Plan for 2010-2012 that addresses all related topics on institutional objectives and action lines that fall under disaster risk management. The Plan was formulated and developed with technical assistance from the Caribbean Disaster Emergency Management Agency (CDEMA). Funding for operational aspects is channelled directly through the national budget. Currently, the focus is on addressing

recurring hazards such as forest fires, water shortages, etc. It also provides support to education projects aimed at training teachers in risk prevention.

The draft National Disaster Management Plan highlights priorities for disaster risk reduction and adaptation through assessment of climate change risk, public awareness, integrates strategy of combining structural and non-structural measures, modern communication facilities, strengthening emergency response systems, and international cooperation for overall disaster management, etc. This Plan needs to be amended to clearly integrate disaster management issues and climate change adaptation in all development plans, as well as community based programs for risk reduction and climate resilience programs and policies. Saint Vincent and the Grenadines.

The National Emergency and Disaster Management Risk Management Plan was established in 2005. This plan created a framework to cater for disaster preparedness and response. The plan however does not address the broad functions of disaster risk reduction in a holistic and systematic way. Nor does it contain adequate measures for adaptation to climate change.

In 2010, a process of drafting a new National Disaster Management Plan was commissioned by the Government of Saint Vincent and the Grenadines. The new draft National Disaster Risk Management Plan highlights priorities for disaster risk reduction and adaptation through assessment of climate change risk, public awareness, integrates strategy of combining structural and non-structural measures, modern communication facilities, strengthening emergency response systems, and international cooperation for overall disaster management, etc.

The Plan however needs to be varied to clearly integrate disaster management issues and climate change adaptation in all development plans, as well as community based programs for risk reduction and climate resilience programs and policies. Saint Vincent and the Grenadines, National Environmental Profile seeks the harmonization of plans with respect to waste management, pollution and climate change. It is also specifically calls for the establishing of appropriate and relevant integrated strategies, plans and policies to adopt and respond adequately and in a timely fashion to the causes and impact of climate change. It also calls for the establishment at the community and national levels, appropriate and relevant integrated frameworks to prevent, prepare for and respond to recover from, and mitigate the causes and impacts of natural phenomena on the environment and to prevent manmade disasters.

3.6 National Climate Change Adaptation Strategy

The draft National Climate Change Adaptation Strategy highlights the potential impacts of climate change on various sectors such as coastal and marine, agriculture and forestry, water resources, human settlement, socio-economic development, tourism and human health. It is also an attempt to integrate climate change concerns into the development plans of relevant sectors/ministries. Consequently, the appropriate adaptation measures may be taken to reduce the potential impacts of climate change and climate variability on Saint Vincent and the Grenadines.

This draft Strategy seeks to develop management strategies that address a range of key issues. These include increased public awareness to climate change issues, the reduction or avoidance of damage to settlements and infrastructure caused by climate change and sea level rise, minimizing damage to beach and shoreline integrity and marine ecosystems caused by climate change and the avoidance or minimization of negative impacts of climate change on human health. It also seeks to develop economic incentives to encourage investment in public and private sector adaptation measures.

It also provides a good basis for the discussions on the sectors that are vulnerable and the interventions that can be made to reduce vulnerability. Additionally, the NEMS has principle 8, which addresses the

causes and impacts of climate change and therefore the PPCR's projects will assist in the implementation of the strategies and activities associated with this principle. The PPCR and the National Climate Adaptation strategy have mutual objectives and the PPCR therefore fully supports the broad based implementation of the Policy. Finally, the Strategy seeks to develop an appropriate legislative and regulatory framework for proper environmental management and institutional systems for planning and responding to climate change.

The National Climate Change Adaptation Strategy is only a draft document and therefore not implemented and not monitored. As part of the PPCR process the draft will be reviewed, revised and finalized.

The three pilot projects of the PPCR will build climate resilience at the local and community level. The pilot projects will also assist in the operationalization of the Building Code and the reduction of hazardous land occupancy. Aspects of the pilot projects will seek to expand the water supply and distribution system particularly in the Grenadines. For example, the pilot project for Union Island will include among its objectives addressing water supply needs in Union Island.

The PPCR will also contribute to an improved national water management system and will also address the preparation of a coastal zone management plan. Generally the PPCR will provide support for enhanced and supportive legal and regulatory frameworks.

Despite the prognosis presented by climate change, St Vincent and the Grenadines has identified many opportunities to respond to the multiplicity of challenges poses by climate change. The National Climate Change Adaptation Policy identifies and groups many of these challenges and presented nominal solutions. In the matrix presented below, the challenges and nominal solutions within the National climate change Adaptation Policy are summarised with a new column added to shows synergies between the PPRC and the Government proposed plans to deal with some of the challenges outlined.

Sector	**Impact**	**Adaptation Measures**	**PPRC Projects**
Coastal and Marine Resources	Destruction of reefs, increased erosion of beaches, damage to low-lying and coastal areas, towns, roads and property infrastructure as a result of increased frequency, and intensity of hurricanes.	* Undertake Public awareness campaign to educate the population about the potential impact of climate change and climate variability on the coastal and marine environment. * Identify cost effective measures to protect and or reduce the damage to the coastal environment, including coastal infrastructure and coastal near shore ecosystems.	1.1.4, 3.2, 3.5.3.6, 4.1, 4,1a, 4.8, 4.9., 4.12 All of comp. 2
Agriculture and Forestry	Reduced production and decrease in soil productivity as a result of less rain and drought.	* Undertake Public awareness campaign to educate the population about the potential impact of climate change and climate variability on Agriculture and Forestry. * Identify and adopt appropriate Methods of technology to facilitate the introduction of drought resistant crops. * Promote the maintenance of forested and green areas as a buffer to the negative effects of climate change.	1.1.4, 1.2.4, 1.3.1 4.11,
Water Resources	Negative impact on the generation of hydroelectricity and potable water as a result of	* Undertake comprehensive inventory of all water resources including surface and ground water.	1.2.4, 1.3.1, 1.1.4.

	deforestation, landslides and increased soil erosion.	* Identify cost effective methods to increase water recovery.	2.1, 2.2, 2.3

Human Settlement	Impact on settlement patterns and building design.	* Develop a comprehensive land use planning and management plan * Develop a disaster management plan	1.3.2, All of comp, 2 3.2, 3.4, 3.7
Socio/Economic Development	Increased costs to the financial sector including the banking and insurance sector.	* Facilitate the availability of cost effective insurance and reinsurance to aid affected areas, in order to rebuild and restore infrastructure. * Adopt "risk management" techniques as a tool that can be applied in the design and selection of strategies for coping with uncertain climate change.	1.1.2, 1.1.1, 1.3.3, All of component 2
Tourism	Damage to tourism infrastructure located in coastal areas and coastal ecosystems such as coral reefs, as a result of storm surges.	* Undertake public awareness campaign to sensitize individuals about the potential impact of climate change and climate variability on Tourism. * Adopt appropriate technologies and develop policies to promote water conservation, the use of renewable energy and the management of both solid and liquid wastes in the Tourism Industry.	4.1 All of component 2 1.1.2, 1.2.6, 1.1
Human Health	* Increased incidence of heat stress and related injuries. * Increase in vector and water borne diseases as a result of increased temperature and precipitation.	Undertake public education and training programme to increase awareness about the potential impact of climate change and climate variability on health.	4.1

Figure 23: Impacts, Adaptation Measures and Proposed SPCR Initiatives.

All of the recommendations[31] below (from the National climate change Adaptation Policy) were used to develop detailed projects to fill the identified gaps. The Adaptation Policy prescribed the following:

> ***...****to address the impacts of climate change on Social/Economic Development the Government of Saint Vincent and the Grenadines through the relevant ministries will:*
>
> 1. *Undertake a Public Education and Training Programme to increase awareness of individuals and the general public on issues relating to climate change and Social And Economic Development of Saint Vincent and the Grenadines.*
> 2. *Enforce proper building design and building codes, zoning and land use planning legislation to reduce the damage to infrastructure during climatic events such as hurricanes.*
> 3. *Facilitate the availability of cost effective insurance and reinsurance to aid affected areas in the rebuilding and restoration of infrastructure*[32]*.*

[31] This was done as part of a project and it can be considered as what has been attempted before with regards to mainstreaming climate change in SVG. This plan along with the NESDP are examples of where mainstreaming has occurred.

[32] Draft Climate Adaptation Policy, Environmental Unit, Ministry of Health and Environment, 2002.

3.7 Disaster Vulnerability Reduction Project Summary (DVRP)

Developed during 2010 and finalized in February 2011, the DVRP is a World Bank funded regional program with national projects in Grenada, Saint Lucia and Saint Vincent and the Grenadines. By design, the project in Saint Vincent and the Grenadines will be financed by both direct funds from the CIF as well as co-financing from other sources (i.e. IDA and GFDRR). The CIF funding will support climate change adaptation activities, while the co-financed portions will primarily focus on current disaster risk management needs – but will support overall resilience to adverse natural events which are expected to be more extreme with climate change. In order to achieve this, the project proposes two mutually reinforcing components, namely: 1) Prevention and Adaptation Investments; and 2) Capacity Building for Hazard and Risk Evaluation, and Applications for Improved Decision Making.

While there are separate financing mechanisms for the DVRP (IDA) and the PPCR (CIF), there are clear commonalities between the PPCR and the DVRP. There are also clear distinctions between the objectives and projected outcomes. The projects are complementary and have therefore been combined and brought forward as a single package. The DVRP has a greater emphasis on physical works. The PPCR has a broader approach, looking more comprehensively at the causes of vulnerability, the need for awareness and knowledge management, the impacts of climate change on business and communities and the need for strengthened policy and institutions.

The proposed investment plan for the Saint Vincent and the Grenadines DVRP has been developed through a consultative process with a number of agencies and departments, including the Ministries of Health, Education, Agriculture, the Meteorological Office, Transport and Works, Housing, Physical Planning, Land and Surveys and NEMO.

The process commenced in February of 2010 with presentation of the project objectives to these agencies and an invitation to submit activities that could potentially be financed under the Project. The aim at this point was to secure from the agencies as large an investment plan as possible, consisting of enough activities that could be appraised and possibly proposed to funding agencies including the World Bank. These activities were prioritized at the agency level and then further prioritized at the national level by the Ministry of Finance and Economic Planning in line with the overall developmental objectives. This reprioritized list was then submitted to the World Bank in July 2010. Following this, the process of further developing the activities in terms of the estimated cost and defining the work to be undertaken commenced. Several follow up meetings were held with the agencies and many of the proposed sites were visited.

As part of the project preparation requirement an Environmental Assessment (EA) was undertaken. The EA was completed and findings were published on the Government's official website in February 2011. In addition, work is ongoing on a Social Assessment and Resettlement Policy Framework for the Project.

In October 2010 during the preparation stage, Saint Vincent and the Grenadines was hit by hurricane Tomas and some of the activities to be addressed under the DVRP were further damaged by this storm. Accordingly, the Government moved to prepared an Emergency Recovery Project for submission to the World Bank, which was approved in January 2011.

Project Objective

The DVRP aims at measurably reducing vulnerability to natural hazards and the adverse impacts of climate change in Saint Vincent and the Grenadines.

Major Outcomes Expected from the Project: The major outcomes expected from the project include: (i) Capacity built to identify and monitor climate risk at the national level; (ii) Reduced vulnerability of

public infrastructure and emergency communications: (iii) Strengthened emergency management capacity and improved effectiveness of risk reduction investments; and (iv) Strengthened institutional capacity for disaster risk management.

Project Components

Component 1 - Prevention and Adaptation Investments. This component would include a broad set of investments, such as drainage improvement measures, improved water storage capacity, risk reduction, rehabilitation of critical infrastructure (ports, bridges, and some roads), retrofitting of critical public buildings (including schools and health centers), investments in satellite emergency centers, etc. Civil works would be built to internationally recognized standards for hazard and climate resilience.

Projects activities would fund supporting studies required for the development of works packages such as hydrologic/hydraulic studies, geotechnical studies, and associated pre-engineering and engineering supervision activities required to support engineering design and safeguard compliance.

Component 2 - Capacity Building for Hazard and Risk Evaluation, and Applications for Improved Decision Making. The project would support the strengthening of national capacity to integrate natural hazard and climate change impact information into the national development policies and the decision-making process.

Under this component, two technical assistance projects supporting the integration of climate risk information in decision making would be piloted. This would be done through building open-source models for risk evaluation and capacity at the regional level to work with such models. The methodology used would allow for a horizontal transfer of experiences among the participating countries. The program would build on data and models generated by the Caribbean Catastrophe Risk Insurance Facility (CCRIF), models generated by the Central American Probabilistic Risk Assessment (CAPRA) initiative, and complement current work financed through a GFDRR grant to build capacity for risk evaluation at the University of the West Indies.

The project would finance a national level data collection of geo-spatial data using an aerial platform with multiple instruments for the data collection of detailed bathymetry, topography, and hyper-spectral information. It would also support the capture of existing geo-spatial data currently spread among national institutions in the participating countries. The program may also finance procurement of data collection equipment and instruments as well as computers, servers, and software as needed.

To improve data management and sharing capacity activities would include the transfer and capacity building in use of open-source software for geospatial information (GeoNode) to at least one national institution. This software would also be installed at a selected number of regional technical agencies (initially the following three regional technical agencies have expressed interest: the OECS Secretariat, the Disaster Risk Reduction Center at the University of the West Indies, and the Caribbean Community Climate Change Center) to facilitate the collaboration on data between countries and regional technical agencies.

Component 3 – Emergency Response Contingent Credit. Following an adverse natural event, or immediately before the occurrence of an adverse natural event, and subject to a Government's declaration of a national emergency in accordance with national law, a Government may request the World Bank to re-categorize financing or add contingent financing to cover early recovery and rehabilitation costs.

This component could disburse to cover any or all of the following sub-components:

(i) Purchase of goods, works, and consultant services (including audit costs) for emergency response and recovery; and
(ii) Cash support for the respective Ministries of Finance, by disbursing against a positive list of imported and locally-manufactured goods (up to US$2 million).

Component 4 - Project Management and Implementation Support. Activities under this component relate to the institutional support and capacity development for project management and implementation. Activities include training, staffing, and development activities associated with project execution, such as consulting services and support for:

(a) Preparation of designs and tender documents for execution and supervision of works, purchase of goods, and contracting of training activities;
(b) Preparation of project reporting;
(c) Processing of contracts including the evaluation of tenders, preparation of evaluation reports, selection of contractors, and negotiation and supervision of contracts;
(d) Liaising activities among the participating line ministries during project execution;
(e) Supervision of the quality of works;
(f) Specific training of staff in project management and execution; and
(g) Capacity building for accreditation from the UNFCCC Climate Adaptation Fund.

3.8 Draft Water Policy

The Draft Water Policy has been framed to guide the Government of Saint Vincent and the Grenadines in management of the country's inland waters. It is based on the recognition that water is a precious natural resource and heritage, vital to all aspects of social, economic and environmental well-being.

The purpose of this water policy recommendation is to ensure the use of water resources in an effective and equitable manner, consistent with the social, economic and environmental needs of present and future generations.

The recommendations adopt an "integrated" approach, which recognizes natural linkages. Emphasis is placed on water resource management considering the river basin as the fundamental unit, involving both upstream and downstream water users, government and other stakeholders. Surface and groundwater are seen as two forms of the same resource, often with close linkages. Water quality and quantity are also linked features and should be planned and managed in a coordinated manner.

The Policy is also "comprehensive" in terms of water-using sectors; it addresses water resources from a broad, multi-sector perspective while recognizing the responsibility of those sectors to play their part in meeting the Policy's objectives. The Policy considers consumptive water uses, such as irrigation, domestic and industrial, and non-consumptive uses, such as hydropower, recreation and amenity. It also brings the environmental and ecological needs for water to the forefront.

3.9 Linkages with other National Legislative Instruments

The key focus of climate change response in Saint Vincent and the Grenadines is building resilience or the ability to cope. Central to this task is the issue of governance, which involves a number of key considerations including an effective legal and institutional framework in order to facilitate accountability, enhanced systems for coordination, capacity building and monitoring; integrating vulnerability information and mitigation into development planning, administrative management, decision making in the public and private sectors.

In order to effectively implement climate change resilience strategies, there will have to be a number of changes to the existing policies or the preparations of new policies. Saint Vincent and the Grenadines has several statutes, which address disaster management, coastal zone issues, environmental protection and physical planning. These include the Town and Country Planning Act, National Parks Act, Waste Management Act, Forest Resource Conservation Act, Fisheries Act, Beach Protection Act, the Central Water and Sewage Authority Act, the Environmental Health Services Act, National Emergency and Disaster Management Act and the National Parks Act. However, many of these statutes are outdated or need revision and therefore the development of a strategic program for climate resilience will require a comprehensive review of existing Legislation as well as new regulations, new legislation and amendments to the existing statutes.

In addition, legislative changes will be needed in a number of key priority sectors e.g. environment, coastal zone management, water, development planning, disaster planning and resource management. Institutional strengthening will also be necessary for key ministries and agencies such as NEMO, Ministry of Finance, Ministry of Works, Physical Planning, National Parks, River and Beaches Authority.

There are some major gaps in the legislative framework these include an Environmental Management Act (though one exists in draft and could be revised where necessary and enacted), Environmental Impact Assessment Regulations and a Coastal Zone Management Plan. Although the Town and Country Planning Act refers to a coastal zone management plan no such plan has been promulgated neither are there any statutory provision for developing such a plan. This issue is of central importance to Saint Vincent and the Grenadines as more than 90% of its infrastructural development lies on a narrow coastal belt less than eight meters above sea level. These include the island's main communication and response structures – roads, airports, telecommunication centres, financial centres and technical support centres. A major focus of the PPCR is the collection of data related to the coastal zone, the preparation of a coastal zone management policy and plan and strengthening the Town and Country Planning Act in relation to the declaration of a Coastal Zone Management Plan.

3.10 Collectively Managing Forests

The Forestry Department is responsible for the Protection, Conservation and Development of the Forest resources of Saint Vincent and the Grenadines which covers all the watersheds. Which are critical for the production and sustainability of the water supply? Numerous ongoing activities are implemented within each of the following program areas.

- Plantation Management
- Forest Mapping and Inventory
- Forest Utilization
- Law Enforcement & Compliance
- Environmental Education
- Wildlife Management
- Ecological Research
- Watershed Management
- Nursery management

Forest and woodlands cover around one third of the land area of Saint Vincent and the Grenadines. A changing climate generates an autonomous change in forest ecosystems. Given the extent of deforestation and the subsequent negative impacts on water supply and environmental quality, there exists an urgent need to sustain and enhance the contribution of forest resources to social and economic development.

The Government of Saint Vincent and the Grenadines through the Ministry of Agriculture, Forestry and Fisheries has developed a programme called the Integrated Forest Management and Development Programme. The Programme incorporates all stakeholders, from resource management agencies (governmental and non-governmental) to individual communities. The aim is to protect forest resources and enhance rural livelihoods by reducing poverty. This will require both adaptation measures and building resilience in the community.

The Programme Management Unit (est. 2003) had a mandate to develop conservation efforts for identified critical watersheds, develop projects for funding and develop public education initiatives. The PMU is funded by financial contributions from VINLEC, CWSA and the Government's capital programme. There have been successful efforts in the reforestation of critical watershed areas.

The alternative livelihoods component has maintained a continual process of working with rural farmers and forest users to developed viable alternatives to alleviate poverty and prevent deforestation for the cultivation of illegal crops such as marijuana.

The following points summarise relevant projects and initiatives in the forestry and watershed management sectors in Saint Vincent and the Grenadines over recent years. The SPCR proposed investment projects build on these initiatives to make best use of these resources:

- Started in the 1960s with the establishment of large Blue Mahoe (*Hibiscus elatus*) and Caribbean Pine (Pinus *caribea*) plantations around immediate Catchment areas. The objective here was to reforest denuded areas with a fast growing species for soil and water conservation purposes.
- This was followed by the reforestation of smallholdings disturbed by squatters and reclaimed by Forestry. The objective here was to maintain the integrity of the forest above the 1000' contour which Forestry is mandated to protect.
- In 1987 the Organization of Eastern Caribbean States Natural Resources management Unit (OECS/NRMU) conducted a socio economic study of the Montreal watershed. See Document for objectives.
- In 1990 the Canadian International Development Agency (CIDA) conducted a pilot project in the Colonarie watershed introducing a new methodology where several surveys/studies were carried out leading up to the development of a comprehensive watershed management plan. The objective was to demonstrate sound watershed management principles to neighbouring farmers and to transfer technologies and methodologies to other watersheds around the island.
- In 1990 CIDA also surveyed the forest reserve boundaries in the Montreal watershed as part of an island wide survey. Objective: The FRCA requires the Director to demarcate the forest resources managed by the Department.
- Under the same CIDA project (1989-1999) a special reforestation plan was done for Montreal where the Forestry Department was mandated to reforest 48 acres of land around immediate catchment areas. The objective was to protect the water catchment by conserving the soil and the Forest.
- June 1999 the OECS/NRMU made a second intervention in the Montreal watershed for the implementation of a pilot project. The objective was to test a sustainable watershed management plan that was similar to another plan that was simultaneously being implemented in St. Lucia. The focus was on the adaptation of an integrated approach to watershed management.
- In 2000-2003 the department continues its routine reforestation and land reclamation initiatives utilizing recurrent government Funds. The objective was soil and water conservation.
- In August 2004 to May 2005 the Forestry department through Funding from the Integrated Forest Management and Development Project reforested 95 % 0f lands in the upper Montreal

watershed occupied by squatters. The objective was to reverse the current trend of land degradation and water quality deterioration.

- In 2006, proposed National Capacity Building Strategy for Saint Vincent. This strategy is a response to the need to build the capacity of stakeholders for participatory policy analysis, policy formulation and forest management through effective training, technical assistance, and regional and cross sectoral dialogue. The overall goal of the project is to promote effective Sustainable Land Management in Saint Vincent and the Grenadines.
- Policy on protected areas systems for Saint Vincent and the Grenadines
- Saint Vincent and the Grenadines environmental management act 2008
- Environmental Watershed project to facilitate Forest based Livelihood Opportunities 2008.
- Capacity building and mainstreaming of Sustainable land management in Saint Vincent and the Grenadines. The focus is on; Historical perspective on Land management in Saint Vincent and the Grenadines, Current land degradation issues, land tenure, Regional and international conventions (signatory), and Legislative Instruments relevant to Saint Vincent and the Grenadines.
- Draft forest regulations for FRCA No. 42 of 1992. The objective is to strengthen the FRCA.
- Integrating Watershed and Coastal areas management in Caribbean Small island developing states (IWACAM) 2005-2010.
- National Biodiversity Action plan
- Integrated Forest Management and Development Programme. The main focus of this programme is to provide alternative livelihood opportunities for forest users and to build the capacity of the Forestry department.

3.11 Sustainable Land Management Project

The Sustainable Land Management Project (a separate project currently underway within the Ministry of Health and Environment) should be highlighted here as well given the activities of the project and the fact that the PPCR is taking a watershed management approach. There will be opportunities for synergies to be identified between both projects.

The objective of the SLM project is to "strengthen and develop capacities for sustainable land management in relevant government ministries, the private sector, and civil society organizations, and to mainstream sustainable land management into national development planning".
The project has five outcomes including:

1. Sustainable Land Management is mainstreamed into national development policies, plans and regulatory frameworks (inclusive of completion and ratification of the National Action Plan);
2. Individual and institutional capacities for SLM are developed;
3. Capacities for knowledge management in support of SLM are developed;
4. Investment planning and resource mobilization for implementation of SLM interventions are elaborated; and
5. Adaptive Management and Learning.

The three-year project is being implemented by the Environmental Management Department in the Ministry of Health and the Environment using a multi-stakeholder participatory approach involving public, private and non-governmental organizations. There will be considerable opportunities for SPCR projects to collaborate and support this existing project.

3.12 Gaps Identified in Water and Watershed Management

Some of the activities mentioned under the present initiatives are at varying stages of implementation while other has been implemented but not successfully due to certain limitations. It is therefore in light of these scenarios that the following gaps or propose activities are identified for possible action/further implementation. For the purpose of this document references will be made to specific project documents, particular attention should me paid to the objectives and achievements/variances.

- Under the national Water Resources management Study for Saint Vincent and the Grenadines, one will realize that due to financial and time constraints, some significant proposed activities have not been implemented. Revisiting the proposed deliverables for this project with an intention to finish such will definitely put Saint Vincent and the Grenadines in a position to better assess its water resources. (Outstanding: Rain gauges, Climate stations, water resources management Agency, data collection team, Vehicles, and water resources management policy, to name a few.)
- Quantity and quality of water resources not well known (need to launch an adequate hydro-meteorological monitoring network)
- Existing water resources are not adequately protected.
    - Need to ensure secured access by Officers to the resources (source and implement the appropriate training and equipment)
    - Need proper signage and demarcation of protected areas (Resource Inventory and Mapping)
    - Proper monitoring and policing (increase human, material and financial resources)
- Continued degradation of upper watersheds. What is needed hers is the continued sensitization of the populace along with several mitigating initiatives focusing on soil and water conservation and natural forest management. Management plans for selected affected areas is needed.
- Water Pollution. In the upper echelon of the watersheds this is caused mainly by the indiscriminate use of biocides for legal and illegal farming. Proper law enforcement is necessary and also capacity building to this effect
- Institutional weakness
    - Institutional strengthening
- Lack of a comprehensive water resources management policy, and the legal and organizational framework is somewhat fragmented.
    - With such a policy in place the Forestry Department will be guided accordingly and the relevant resources and collaborators brought on board having being mandated to do.
- Adequate supply/water shortage persistent in the Grenadines.
    - Rain water harvesting project be instituted
    - Continue the implementation of recommendations/work identified for the Grenadines in the National Water resources management Project.
- Review and strengthen the resources of the Forestry Department to adequately address the protection of water resources in Forest Reserves.
    - Most of the program areas within the Department are managed by non professionals; persons need to be trained at least to a professional level to effectively deal with the challenges/task set before them.
- Conservation of wetlands (Low priority at the moment). In Saint Vincent and the Grenadines wetlands are disappearing at an alarming rate and the remaining wet lands are given little or no attention. Wetlands need to be seen by the relevant resource managers as a priority. This would require knowledge about wetlands and specialist training.

- Saint Georges declaration of principles for environmental sustainability in the OECS
  - These principles address the causes and impacts of climate change.
- Proposed National capacity-Building strategy for Saint Vincent and the Grenadines (June 2006)
  - Capacity needs assessment and suggested possible recommendations. The recommendations should be revisited and implemented where applicable.
- Policy on protected areas systems for Saint Vincent and the Grenadines
- Saint Vincent and the Grenadines environmental management Act 2008
- Environmental Watershed Project to facilitate Forest based Livelihood Opportunities 2008. This project has a similar focus as the I.F.M.D.P., however it was not properly or even implemented. It is recommended that this project document be revisited and a way forward be chartered.
- A Law enforcement manual has been developed by Forestry officer III Bradford Latham, this document needs to be reviewed by a professional and adopted by the department for further endorsement by the authorities.
- The Forest Resources Conservation Act No. 47 of 1992 need to be enacted. This has legal implication for Officers who is currently authorize to perform duties under this act.
- The process for the passing of the Draft forest regulations of February 1994 which is needed to strengthen the FRCA of 1992 needs to be completed.

4. Rationale for PPCR Support

4.1 Added Value

Where can PPCR program add value? The PPCR will contribute to and facilitate improvements in the following areas:

- Enhancement of physical infrastructure
- Enhancement of natural ecosystems
- Enhancement of regulatory and legislative tools
- Knowledge management and a more informed populace
- Coastal protection
- Strong pilots that can test larger development plans
- finalization of national policies and plans
- strengthen legislative and regulatory frameworks
- increase capacity to produce, manage and utilize data
- Preservation and creation of livelihoods increasing the social and economic capital of the country.

4.2 Climate Resilience Priorities

What are country main priorities towards climate resilience? The country's main priorities towards climate resilience building are summed up in the National Climate Change Adaption Policy and the National Economic and Social Development Plan and the 1st and 2nd National Climate Change Communication Projects. The four components of PPCR were in fact formulated as a summary of the Government' priorities for climate change resilience building. The main priorities of the Government of Saint Vincent and the Grenadines on climate change resilience building are:

1) conducting country wide vulnerability and risk assessments on climate change;

2) develop and implement reduction and adaptation programmes aimed at reducing vulnerability and building resilience;
3) strengthening of existing policy, legal and institutional framework to address Climate Change;
4) design and implement a national public education and capacity building programme to inform and guide the populace with targeted pitch to specifically identified groups;
5) develop a national data management system to support climate change;
6) develop national capacities to formulate, implement and sustain where possible climate change resilience building.

4.3 PPCR Support Needed

What and why is PPCR support requested? The science on climate variability and change clearly predicts that the adverse effects that small island developing states (SIDS) like St Vincent and the Grenadines are likely to result in more displacement of human population, loss of life and livelihood, destruction to ecosystems, the environment as a whole and to our built infrastructure. If left unchecked, our way of life, our economies and our social capital is likely to be eroded, in the process, setting back development gains by decades. Our children's legacy will be in jeopardy.

Our people and our policy and decision makers all recognize that actions need to be taken to stem the tide and to adapt where there are no other recourses. And though the interventions of some local, regional and international organizations towards adaption are commendable, the efforts are for the most part piece-meal and unsustainable. There is an urgent need to be properly coordinated and fund a national programme aimed at building resilience for climate change in all sectors and for all our people. The PPCR is a systematic and coordinated proposal by the Government of St Vincent and the Grenadines to develop and implement a national programme that satisfies the needs identified above.

4.4 Climate Resilience Scaled-up

How does this support a shift in approach to development planning and scaled-up action towards climate resilience? This project is intended to change what can be capsule as "business as usual" regarding the way that development planning is done in Saint Vincent and the Grenadines. Component 2 is a data management capacity building module that will create the enabling environment for data management and analysis that will improve development planning. The added value is that the approach relies on the input of a multiplicity of agencies in both the private and public sectors in whom significant investments will be made improve capacity to develop and generate necessary data sets and to manage, process and analysis data pertinent to the processes necessary for building resilience to climate change. This project will result in a more informed community (businesses and residents) who will be better able to communicate their views, needs and proposals to the development planners.

4.5 Value for money – Investing in People

What is the potential cost effectiveness of proposed actions? Close examination of the PPRC proposals will revile that over 60% of the proposed budget will cater for institutional capacity strengthening and public awareness. This is a huge investment in the development of the people, institutions and governance mechanism of the country. The old adage of ***'teach a man to fish'*** is apt in explaining what the PPCR will achieve for St Vincent and the Grenadines. Such an investment in the development of the capacity of people, complimented by a strong and well-targeted public education and awareness programme on building awareness for climate change resilience building, must outweigh the dollar value of the investment.

4.6 Owned Driven and Sustained by Saint Vincent and the Grenadines

How is it sustainable? This SPCR has been prepared to ensure the long-term sustainability of these initiatives using the working tools described below. Building knowledge and understanding, providing extensive learning opportunities and increasing awareness of citizens, business and Government is at the core of this strategy. Taking a holistic approach is what will make it happen. A strengthened policy for example (revised Legislation) is of little value without the contingent training on it use, application and enforcement, or without the requisite skills in Government institutions to maintain and follow its guidance. In short, good design of policies and programmes is a firm basis for transformational change.

1) It was developed through widespread consultation with stakeholders throughout St Vincent and the Grenadines. The program was made by the people, and tailored to their needs. The people therefore own the program; country driven and country led. The Consultant Team has merely facilitated and communicated these identified and real priorities.
2) The program offers real and tangible solutions to many of the problems that the country faces. The program will be implemented by agencies within the country. This will ensures that there will be significant investments in the capacity of the people to make deliveries as planned.
3) The PPRC is an attractive program in which many other donors will make investments.
4) There is political will on the part of government and by the people to be involved in the development and implementation of this program.

5. Institutional Analysis

5.1 Structure and Functions of Government

St Vincent and the Grenadines has a Parliamentary Democracy based on the Westminster model and has remained part of the Commonwealth of Nations. There are three branches of Government: Executive, Legislative and Judicial. The legal system is based on English common law.

The Executive branch of Government makes policies, implements laws and governs the country. The Legislative branch of Government enacts laws and regulations. The Judicial branch makes legal decisions including interpreting laws as well as the constitution. Cabinet is the decision making body for Government and makes policy decisions based on submission from the various Ministries. There is a quasi-system of local government with non-elected town boards in all towns in St Vincent. The Government is in the process of reforming the local government structures.

5.2 Institutional Structure for Managing Climate Change Adaptation and Disasters

In Saint Vincent and the Grenadines, all key development sectors are impacted by the increased frequency of climate related hazards. Different ministries, line agencies, research organizations, academic institutions and NGOs play major roles in various activities related to adaptation to climate change. These roles are summarized in the following table.

Name of Institution	Roles and Responsibilities in Climate Change Adaptation and Climate Induced Disaster Management
Ministry of Health, Wellness and the Environment	Oversight of environmental issues, secretariat for multilateral environmental agreement, secretariat for climate change convention, implement climate change projects, policy advocacy, awareness campaign and international negotiation. Climate Change Focal Unit

	and coordinated Climate Change Cells located at relevant ministries and line agencies; responsible for complying with decisions under the UNFCCC and Kyoto Protocol including preparation of national communication, administering climate funds attending international negotiations, mainstreaming climate change at national and sector levels. Advocate adaptive public health intervention and monitoring communicable diseases.
Ministry of Transport, Works, Urban Development and Local Government	Coastal defences, shoreline protection, road construction and rehabilitation.
Ministry of National Mobilisation, Social Development, The Family, Gender Affairs, Persons with Disabilities, Youth, Sports and Culture	Work on the unprivileged sector of the society. Implement programs for disadvantages and vulnerable communities.
Physical Planning Unit	Planning approvals, building approvals, setbacks
Central Water and Sewerage Authority	Nation-wide water resource planning and management. Monitoring water resources. Key player in addressing water related vulnerabilities. Supplies Saint Vincent and the Grenadines with water and is responsible for sewage treatment and solid waste management.
Department of Forestry	Implementation of community based adaptation measures through coastal reforestation. Raising greenbelt/reforestation along the coaSaint Create forest biomass carbon inventory and develop forest based CDM projects.
NEMO	Coordinate activities related to disaster management from national to grass roots level. Formulation and implementation of Disaster Management Plan and focal point for CEDERA, provide support to disaster management decision makers, planners and practitioners in disaster preparedness, local level disaster contingency planning, awareness training, facilitating improved information collection. Responsible for pre- and post disaster rehabilitation. Formulation and implementation of Disaster Management Plan and related activities. Arrange meetings of the National Disaster Management Council to assess disaster preparedness of different Ministries, agencies, departments, local governments, CPP, Red Crescent, NGOs, etc.
Ministry of Agriculture	Dissemination of climate resilient crop variety, promotion and extension of adaptive agriculture to farmers. Carries out research on adaptive agriculture.
Department of Fisheries	Carry out research on adaptive aquaculture. Monitor fish sanctuaries and coastal activities.
Environmental Health Services	Provision of drinking water supply, sanitation and waste management and advisory service in framing policy and action plans for water and sanitation.
Meteorological Department	Monitor surface and upper air layers, provide weather forecasts for public, farmers, mariners and aviators, and issue warnings for severe weather phenomena. Exchange meteorological data, forecasts and warnings, and archive and publish climate data. Prepare special weather bulletins and publicize through news media such as radio, television and newspapers. Provides information for aviation services.
Ministry of Finance and Economic Planning	Mobilize external resources for socio-economic development. Interfacing with development partners, coordinating all external assistance inflows into the country. Assess needs for external assistance inflows into the country. Assess needs for external assistance, devise strategy for mobilizing foreign assistance, signing of loan and grant agreements. Facilitate overall planning. Support sector planning and provide guidance to sector ministries.
VINLEC	Responsible for supply of electricity in Saint Vincent and the Grenadines. Assess impact of rainfall variability on hydro dams.

National Trust	NGO involvement in environmental issues
JEMS	NGO involvement in community activities
Telecommunication Companies	Private sector companies such as LIME and Digicel are integral to disaster response and to an early warning system

Figure 24: Roles and Responsibilities in Climate Change Adaptation and Climate Induced Disaster Management

The preparation of a National Environmental Management Strategy and Action Plan (NEMS) for St Vincent and the Grenadines is a requirement of the Government in discharge of its obligations under the St George's Declaration (SGD) of Principles for Environmental Sustainability in the OECS, 2001. There are 21 Principles that have been prescribed in the SGD, and OECS Member States have agreed to utilize these in the governance of national affairs. Most of these Principles are directly relevant to the operations of many of the Ministries in St Vincent and the Grenadines, and these Ministries can best ensure that strategies and actions are utilized to uphold these Principles[33].

Other Agencies and Statutory Authorities

CENTRAL WATER & SEWERAGE AUTHORITY
The CWSA is a statutory organization responsible for the collection, treatment and distribution of water for domestic and industrial use. This institution is also responsible for solid waste management.

SAINT VINCENT ELECTRICITY SERVICES LTD.
The solitary electricity provider has three hydro-electricity plants. These stations are in Richmond, Cumberland and South Rivers and generate an average of 30.7% of power per annum.

NATIONAL IRREGATION AUTHORITY
A national Irrigation programme implemented under the Ministry of Agriculture and the CWSA preceded this authority, which was established by recent legislation. This authority functions to manage the collection, control and distribution of irrigation water.

NATIONAL PARKS, RIVERS AND BEACHES AUTHORITY
This authority is responsible for developing and managing recreational sites, terrestrial and marine ecosystems of recreational and conservation value.

LOCAL MANAGEMENT INITIATIVES
There are several local projects geared at better managing of the natural resources including the watersheds and water resources.

- The Integrated Forest Management and development programme
- The national water resources management study
- Sustainable watershed livelihood project

5.3 Strengthening Institutional Capacity

The PPCR seeks to provide institutional strengthening for key government agencies involved with climate change. The Ministry of Health, Wellness and the Environment, Ministry of Works, Physical Planning Unit, national Parks Authority, Fisheries Department, Forestry Department, Ministry of

[33] National Environmental Management Strategy and Action Plan (NEMS) for St Vincent and the Grenadines – 2004-2006, Floyd Homer and David Shim, CIDA, 2004, p.4.

Finance, Central Water and Sewage Authority. The Met Office and NEMO will all benefit from the improvement of their in house capabilities.

The objective of the PPCR institutional support would be to mainstream climate resilience in all aspects of the Government and also to improve the technical capacity of key government institutions to include climate resilience into their policies and operational plans. The PPCR also seeks to build bridges between the Government and the private sector and also to raise the awareness of members of the public.

Given the approach to development adopted under the PPCR special capacity building programs tailored to climate resilience have been designed for implementation. These capacity building programs should aim at enhanced awareness of climate change and its implications, adaptation and mitigation options, need for change of approach for pooling resources, integrating development strategies with programs that address climate change, and promulgation of policies. This requires a comprehensive assessment that includes both the institutional structures, cross sector linkages and coordination/ collaboration mechanisms, vertical and horizontal integration, functions and enforcement capabilities, gaps in the generation and dissemination of knowledge products will identify the capacity constraints that must be addressed to mainstream climate change adaptation in development policies and planning.

Climate change has implications for many economic sectors. Integrating climate issues into other aspects of development work (by mainstreaming them into strategies for growth and poverty reduction) and defining a common agenda for action will require investments in research and knowledge generation specific to the problems of Saint Vincent and the Grenadines, together with institutional strengthening and financing – all within a coherent framework.

As indicated in various policies and plans (e.g. NESDP and the Draft Climate Change Adaption Strategy) Saint Vincent and the Grenadines recognizes the need for capacity building, with enhanced awareness of climate change as an integral element to address the challenges that constrain effective implementation of the agreed policies and strategies for mainstreaming climate change in the nation's development agenda. The PPCR contains a range of capacity building programs that recognize the need for change in the mindset of decision makers for mainstreaming climate change in the development policies and strategies. These are needed if transformational change is to occur. In addition both Component 3 and 4 supports climate change adaptation oriented policy reform and institutional and legal strengthening as part of capacity building.

5.4 Private Sector and Climate Change

For the effective implementation of climate resilience it is of critical importance that private investors, governments work to overcome the barriers that restrict climate change, mitigation and adaptation.

The susceptibility to the physical effects of climate change varies considerably across sectors of the economy. For example, higher demands for electricity during periods of prolonged heat waves could stress and potentially overwhelm the electricity grid and have a major impact on VINLEC. More intense rains could restrict access to construction sites and affect productivity in the building sector. The agricultural sector is as risk where there is long or extreme drought. While some sectors are more at risk, all businesses face the possibility of property damage, business interruption and changes or delays in services provided by VINLEC and CWSA as well as impacts on construction infrastructure.

In Saint Vincent and the Grenadines an examination of the relationship of the private sector and climate resilience has not been undertaken in depth, though initial discussions have been held with selected businesses. These initial discussions clearly demonstrate that the private sector has a major

role to play in climate resilience. This matter should therefore be pursued in the early stages of the implementation of the PPCR. However Project 3.5 addresses the need to raise awareness among both government and the private sector. In addition Project 4. 10 seeks to establish collaborative mechanisms between government and the private sector. There are various areas of the private sector, which would be of particular importance for climate resilience. These include insurance, shipping, transport and the tourism industry.

6. Outline of the Strategic Program for Climate Resilience

6.1 Summary of Actions

The framework of actions designed for advancing climate resilience in Saint Vincent and the Grenadines is anchored on four (4) pillars. These are:

1. **Enhancement of physical infrastructure:** Physical infrastructure in the pilot sites that are in dire need of repairs or need to be retrofitted were identified through physical and structural inspections. Actions under these components are: 1.2.1, 1.2.2, 1.3.5.
2. **Enhancement of natural ecosystems**: Endangered ecosystems that are expressing stress due to climate variability were also identified for replanting and other distressing actions so that the country can benefit from their natural roles. Actions under this pillar are: 1.1.4, 1.2.7, 1.3.1
3. **Enhancement of regulatory and legislative tools:** In order to ensure that the institutional environment of the country can cope with the need for good governance, transparency of action, and modern democratic principles, regulatory and legislative tools that need to be upgraded were identified. Actions under these components are: 1.2.6, 1.3.3, 3.2, 3.6
4. **Knowledge management:** The underlying design parameter of the investment projects proposed is such that there should be a significant investment in the human capacity, of not only the public and private sectors but also that of the ordinary citizens, on how to cope with climate variability. This will be achieved through the training of public officials, the general public, formal and informal education, data collection and data management, data analysis and data modelling and case studies. Actions under these components are: throughout the Four Components.

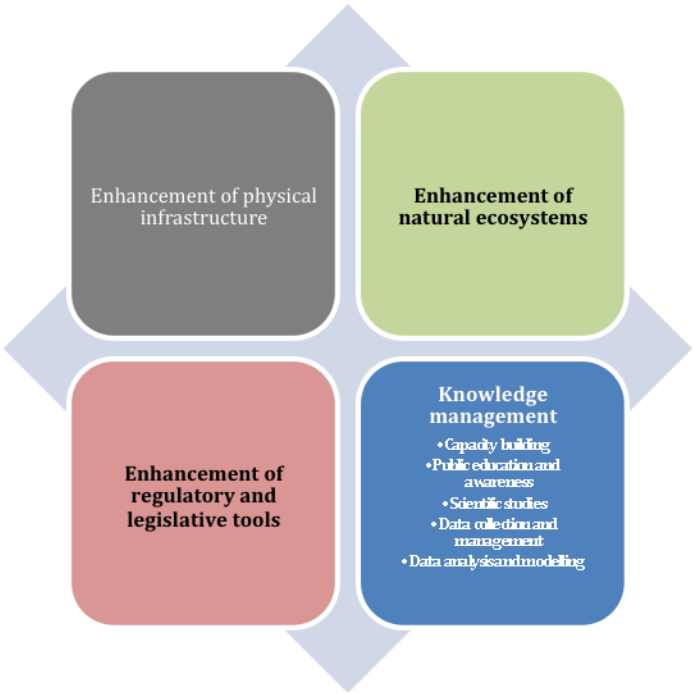

Figure 25: A Framework for Action

6.2 Guiding Principles

Building on the four pillars identified above, what has guided the planning and development of this Phase One PPCR has been twofold: i) the initial Phase One Proposal (November 2010), and ii) the need to comprehensively address the opportunities to build resilience to a changing climate in Saint Vincent and the Grenadines.

Ultimately, our collective efforts are to be directed towards minimizing the adverse impacts of climate change on families and communities. This has been the key guiding principle. Maintaining a comprehensive approach is the second.

Climate change is every body's business and we have seen how it touches all ministries, businesses and homes, particularly those in vulnerable coastal areas. Being comprehensive means many things including the following at least:

- children and youth;
- being sensitive to the special needs of women and the elderly;
- addressing basic information deficiencies and building data management capacity;
- identifying priorities for institutional capacity building (including training, professional development and equipment needs);
- collating relevant draft legislation and statutory control documents and prioritizing specific review and revision needs;
- making information and knowledge resources available to all, and
- stabilizing and protecting priority critical infrastructure.

Finally, teamwork is at the top of the list as a basic principle. Effectively facilitating the collective contributions of all involved (stakeholders, legislators, businesses, residents etc.) is the key to both

success and sustainability. The diagram below illustrates the overall approach using three pilot areas in Component 1 and how this testing and modeling contributes to the other three components.

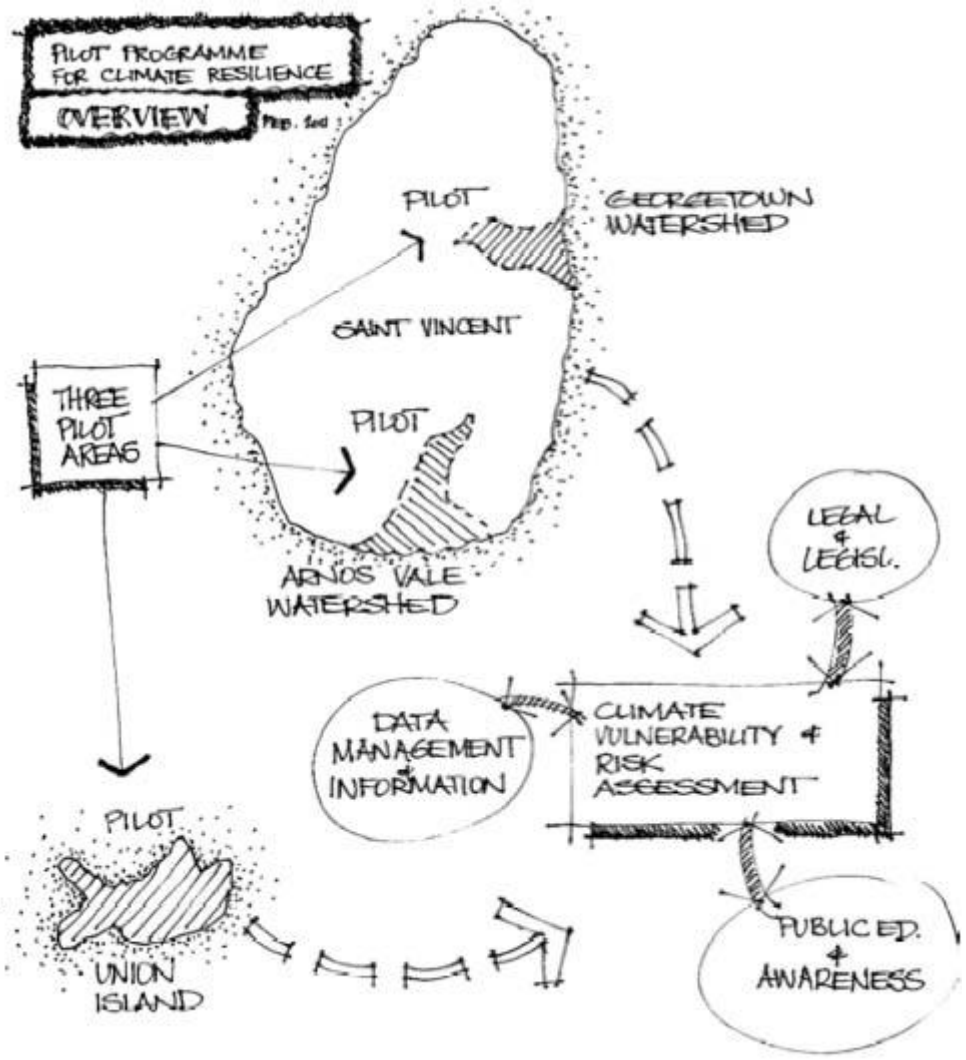

Figure 26: PPCR Overview Diagram

6.3 Financing and Linkages

The PPCR proposed investment activities are closely linked to the investments proposed under the Disaster Vulnerability Reduction Project, and indeed were developed simultaneously, with the PPCR providing the comprehensive approach to creating a programme of sustainable climate resilience and disaster risk reduction activities.

Included in the Financial Programme are projects, programmes and investment initiatives funded from three confirmed sources and one group of projects that have been identified which however have no identified source of funding. We have referred to these as the "Sponsor Wanted" group of projects. The complete list of those projects for which a funding source is yet to be determined is included in the Annexes.

To date, the following has been determined:

- DVRP has likely IDA funding of around ten million US dollars (m$10.0)
- ERL has approved funding of five million dollars (m$5.0)
- SPCR is applying for seven to eight million in grant funds from the CIF, combined with around two to three million in concessional financing, totalling around ten million dollars (m$10.4).

ERL Funding

ERL									
Project	Project Component #	Component 1: Disaster and Climate Risk Reduction Activities	Institutional Strengthening			Preliminary Costs (USD)	Implement'n	Beneficiary	Implementing Agency
			Knowledge mgt., Consultants	Goods	Works				
ERL	E 1.1	Retrofitting of Emergency Shelters: Rose Bank (complete retrofit - physical, generators, watertanks, additional kitchen anc shower facilities)		see below				MoW/MoE	MoW
ERL	E 1.2	Retrofitting of Emergency Shelters: Rillan Hill (complete retrofit - physical, generators, watertanks, additional kitchen anc shower facilities)		see below					
ERL	E 1.3	Retrofitting of Emergency Shelters: Rose Hall (complete retrofit - physical, generators, watertanks, additional kitchen anc shower facilities)		$2,446,000		$2,446,000		MoW	MoW
ERL	E 1.4	Strengthening of the Marriaqua River Defense (Tiviot River)		$416,000		$416,000			
ERL	E 1.5	Retrofitting of Emergency Shelters: Georgetown Primary		see below		see below			
ERL	E 1.6	Retrofitting of Emergency Shelters: Georgetown Secondary		see below		see below			
ERL	E 1.7	Retrofitting of Emergency Shelters: Troumaca Ontario Secondary School		$868,000		$868,000			
ERL	E 1.8	Rehabilitation of secondary road - Hopewell Road River Defense and Road Reconstruction		$400,000		$400,000		MoW	MoW
ERL	E 1.9	Stock-piling of gabion baskets		$290,000		$290,000			
		SUB-TOTAL	$0	$4,420,000	$0	$4,420,000			

Figure 27: Approved Financing for the ERL Project (Hurricane Tomas).

PPCR INVESTMENT PRPOGRAMME
Saint Vincent and the Grenadines

PPCR INVESTMENT PROGRAMME St. Vincent and the Grenadines				
Project Component 1	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction			$ 6,130,500
Project Component 2	Component 2: Data Collection, Analysis and Information Management			$ 953,910
Project Component 3	Component 3: Strengthening of existing policy, legal and Institutional framework to address Climate Change			$ 1,165,000
Project Component 4	Component 4: Design and implementation of a Public Education and Capacity Building Programme			$ 805,000
			Primary total	**$ 9,054,410**
			Project Management 10%	$ 905,441.0
			Secondary total	**$ 9,959,851.0**
			Contingency	$ 40,149.00
			GRAND TOTAL	**$ 10,000,000.00**

Figure 28: Summary of the SPCR Investment programme.

7. Participatory Process

7.1 Priorities – Families and Communities

In order for the SPCR to be truly driven by local and national needs, the design and selection of priority actions to build resilience in Saint Vincent and the Grenadines must come from at least three groups or communities:

i) those most affected by a changing climate,

ii) those most vulnerable to adverse climate impacts, and

iii) from those in a position of responsibility to effect societal and community change.

Persons most affected by climate hazards are also those most vulnerable; women, children and the elderly and infirmed are especially vulnerable. Primary research in the social assessment was able to identify and confirm earlier investigations on social vulnerabilities. Gender sensitivities and a gender balance has been incorporated wherever possible in the SPCR.

The Technical Working Group has been the key stakeholder group involved in the SPCR from the beginning. Throughout the consultation process, we have recognised that ultimately, the proposed transformational actions to build resilience must result in a quantifiable reduction in losses from the impacts of climate hazards, for families and communities.

7.2 DVRP National Consultation Processes in 2010

Throughout 2010, teams from the World Bank, consultants and teams from various Ministries worked through a thorough process of discussions, workshops and meetings with a full range of Agencies and Ministries. The priority projects indicated in the DVRP Financial Summary (Figure 36. above) have been derived from this consultation process. For further details on the extent of the investigations and the individuals and organizations consulted, see the current World Bank Project Appraisal Document for the project.

7.3 Comprehensive Consultation – the Social Assessment in 2011

This in-depth survey was done under the direction of the Social Assessment Team in the Ministry of Finance and Economic Planning. The assessment combined both SPCR and DVRP assessments. The social impact assessment of the proposed projects listed in the DVRP was combined with the socio-economic and vulnerability assessment (for the SPCR) of families and communities in vulnerable locations, mostly coastal. With the assistance of the Statistics Division of the Ministry of Finance and Economic Planning, a statistically valid selection of communities and locations within all representative Parishes were selected for the social survey. Sixteen Field Officers were trained (one-day training with the Social Assessment Team and the Lead Consultant) to undertake a total of 350 individual surveys in Saint Vincent and on the Grenadine island of Bequia.

<u>Climate Change, Communities and Poverty</u>

The bottom line for our collective efforts in building resilience and the ability to cope and adapt to a changing climate in Saint Vincent and the Grenadines, and the measure by which these efforts will be gauged, is the ability to minimise loss and the adverse impacts of climate change on families and communities.

As history has shown us in the Caribbean and indeed around the world, a disproportionate number of women suffer the adverse impacts of weather-related disasters. Few studies have been conducted

specifically on the effects of climate change on agriculture in small islands. Climate change and climate variability will likely affect the rainfall regime, increase evaporation, and/or reduce soil moisture which would in turn affect agricultural production, possibly with adverse consequences for food security and nutrition.

We know that women, the elderly, children and the infirmed often suffer more than others from disaster impacts; this includes climate and weather-related hazards. The proposed implementation of Phase Two is designed to recognise and respond to those vulnerabilities wherever possible. The opportunities for gender–sensitive design and planning have been identified in the Social Assessment process, undertaken as part of the PPCR investigations in collaboration with the Social Impacts assessment carried out for the Disaster Vulnerability Reduction Project in January and February this year.

Valuable primary data collection was undertaken during the preparation of the Phase One PPCR. Considerable pre-planning ensured a practical and relevant profile of various community's vulnerabilities both real and perceived. A brief summary of some of the results of the social assessment survey are included below:

Preliminary findings for the PPCR – Social Vulnerability Assessment

The social assessment was conducted in 19 communities in Saint Vincent and the Grenadines, namely Sandy Bay, Fancy, Georgetown, Chester Cottage, Colonarie, Spring, Marriaqua, Arnos Vale, Kingstown, Buccament, Barrouallie, Cumberland, Rose hall, Rose bank, Dark view, Troumaca, Chateaubelair, Bequia and Canouan. The communities were selected based on the level of social vulnerability and vulnerability to climate change. A questionnaire was completed by a statistically valid sample of 350 persons (selection made by statistics and census divisions to ensure a good representative spread). The questionnaire was developed in-house with the assistance of the Lead Consultant, and was designed to assess the following ten issues and concerns:

1. Experience of disaster – type, impact, losses and coping mechanisms
2. Vulnerabilities – real and perceived
3. Level of preparedness
4. Awareness of climate change issues & opportunities for further education
5. The gender distinction - what were the differential impacts of the natural disasters on women and men (overall)
6. The perception of social problems in communities – gender distinction (overall)
7. Levels of preparedness relative to impact of disasters experienced.
8. Levels of preparedness relative to vulnerability.
9. The human resources that are available and in what categories.
10. The willingness of members to participate in natural disaster reduction programmes.

This survey will be extended in the early stages of the Phase Two Implementation to include a larger sample and all of the Grenadine Islands.

Although the complete analysis of the results and findings of the survey was not available at the time of writing, the preliminary findings revealed the following three main points:

1. That the communities that are socially vulnerable are equally vulnerable to adverse impacts from changing climatic conditions.
2. The impact level of natural disasters on socially vulnerable communities is much higher when compared to other communities.
3. There are higher levels of frequency of social problems in the lower income vulnerable communities.

Likely recommendations arising from the assessment process include:

- Community participation programmes - Elaboration of community risk maps - networking between families.
- Educational programmes: - to promote awareness to climate change issues, build resilience, coping in crisis situation
- Prevention programmes- Mitigation to prevent further risk. Housing and drainage aspects (Risk Management and Risk Assessment)
- Other programmes: to be designed depending on information revealed in the study

Mapping Plan: The following are variables of interest which could be represented on a map;

- ✓ Level of awareness of climate change related issues (as indicated by question) by Enumeration District.
- ✓ Water storage (an indication of preparedness) by community.
- ✓ Experience/occurrence of disasters in the past five years
  - Type of disaster (aggregate) by community and
  - Level of threat of landslide/land slippage by community
- ✓ Impact of disaster – category of losses by community
- ✓ Overall preparedness (An index using Q.44)

7.4 Consultations – groups and individuals

In addition, a number of initiatives were undertaken with a range of stakeholders as follows:

(see also the Annexes for a full record of all key meetings, workshops, brainstorming, memos and discussions)

- telephone interviews with private sector business persons on the Grenadines;
- one-on-one meetings with key stakeholders (such as the Permanent Secretary of Tourism and her Deputy for example);
- brainstorming with small teams (with key partner the Ministry of Health and Environment) and the Technical Working Group (TWG);
- brief visits to infrastructure locations (Diamond and Belair solid waste disposal areas for example), tourism locations in Bequia, coastal areas with significant vulnerabilities to talk with locals (Arnos Vale, Vila Beach, Young Island(;
- periodic Memos from the Director of Planning to update stakeholders on progress, upcoming events and milestones, and to reinforce the need for comprehensive participation from these stakeholders (comprehensive list in the Annexes);
- OECS PPCR consultation in Grenada with PPCR teams from Saint Lucia, Saint Vincent and Grenada;
- The Technical Working Group and other invited stakeholders were broken into smaller groups for the Final Planning Workshops focussing on Watershed Management, Coastal Zone Management, Legal and Legislative issues.

7.5 Final Planning Workshops

The Final Planning Workshops in February considered all proposed actions in the draft Financial Plan. This draft plan included;

i) projects identified during the PPCR investigations and research,

ii) projects identified during the extensive national consultations and investigations for the development of the Disaster Vulnerability Reduction Programme (DVRP), and

iii) projects identified to be implemented under the Emergency Recovery Loan (ERL).

These proposed projects were discussed again at length, reviewed for their relevance, assigning priority, agreeing on the implementing agency, assess cost estimates and confirming the main beneficiaries.

All recommended changes, additions and revisions were then incorporated into the first complete draft subsequently presented to the Second Joint Mission. Revisions suggested from the Joint Mission Team will be incorporated into the final draft Financial Plan enclosed.

Pilot areas – demonstration, implementation and modeling

Of particular significance in these final planning workshops was the confirmed suggestion to utilise three pilot areas in Component One to demonstrate and model the recommended actions of the other three components. These pilots will consist of two watersheds in Saint Vincent, and Union Island as the third. Extensive discussions followed on what would be the watersheds on Saint Vincent, how would they be chosen, what were the criteria for selection.

Essentially, the selection criteria centred on the ability of the watershed to demonstrate and implement the actions described in the other three components - that is, the area that would best demonstrate the widest range of proposed projects, with the level of vulnerability of communities and businesses as the other main criteria.

In this way, the Arnos Vale sub-watershed and the Georgetown Watershed were selected. Union Island was chosen as the Grenadine watershed. These were long and animated discussions. The Country Poverty Assessment (CPA) 2007/2008 Document also provides support to the selection of the Georgetown Watershed in that the area has been identified as one of the poorest in the country.

7.6 OECS Collaboration

As mentioned above, a most valuable OECS PPCR consultation (one full day) was hosted by the PPCR Team in Grenada, with PPCR teams from Saint Lucia and Saint Vincent and the Grenadines. A significant discussion focussed on 'commonalities' between the programmes, that there exist a number of shared components that are almost identical for each country. It is therefore recommended that all subsequent Phase II components of the Caribbean PPCR Investment Programmes be reviewed for 'commonalities' and this be undertaken on a regional or sub-regional level, such as the OECS.

*** See Annexes for a summary of the overall outcomes of these consultations

Part 2: Proposed Investment Program Components for PPCR Funding

- The Investment Programme is contained in a separate document. The arrangement of the Components has been described in the READ ME FIRST section at the beginning.

- It is important to note that each and every proposed investment project has a one-page description of the Objectives, the Activities, the Rationale and the Expected Results/Outcomes included in the Investment Programme document.

Part 3: Request for Project Preparation Funding

PILOT PROGRAM FOR CLIMATE RESILIENCE **Project/Program Preparation Grant Request[34]**			
1. **Country/Region**:	SAINT VINCENT AND THE GRENADINES	2. **CIF Project ID#**:	(Trustee will assign ID)
3. **Project Name:**	*Strategic Programme for Climate Resilience - Saint Vincent and the Grenadines*		
4. **Tentative Funding Request (in USDmillion total) for Project[35] at the time of SPCR submission (concept stage):**	*Loan: USDmillion$3.0*	*Grant: USDmillion$7.4*	
5. **Preparation Grant Request (in USDmillion):**		*MDB: USDmillion$1.22*	
6. **National Project Focal Point**:	*Laura Anthony-Browne, Director of Planning, Ministry of Finance and Economic Planning*		
7. **National Implementing Agency (project/program):**	*Ministry of Finance and Economic Planning*		
8. **MDB PPCR Focal Point and Project/Program Task Team Leader (TTL)**:	*Headquarters-PPCR Focal Point: Kanta Kumari Rigaud*	*TTL: Niels Holm-Nielsen*	
9. **Description of activities covered by the preparation grant:** All components and activities described in the Table below. Commencement of activities under the Preparation Grant expected to commence at the end of Q2 2011.			

10. **Outputs:**	
Deliverable	**Timeline**
(a) Review alternative options for proposed works, prepare TOR, technical specifications and Works Schedule for River defense: Construction of gabion/reinforced concrete for the Warrawarrow including drainage improvements work: Arnos Vale Watershed	2 months Q2-Q3 2011
(b) Prepare TOR and Works Schedule for forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures for Arnos Vale Watershed	1 month Q2 2011
(c) Prepare technical specifications and works schedule for numerical and physical modeling to determine optimum shoreline stabilization techniques for the Georgetown pilot area, including ecosystem conservation, and reduction of downstream impacts in Georgetwon Watershed (In-house plus consultants)	2 months Q2-Q3 2011
(d) Prepare technical specifications for equipment needs. Acquisition and installation of telemetric hydro-climatic weather stations and software. See Equipment below.	2 weeks Q2

[34] A separate template needs to be presented for each project and program preparation grant request listed in the SPCR.

[35] Including the preparation grant request.

(e) Prepare technical specifications for development of enterprise National Spatial Data Infrastructure (NSDI)	Q2 2011
(f) Prepare TOR and detailed job descriptions for Institutional strengthening for the NEMO, MoFEP, MoHE, Ministry of Works, and Physical Planning to boost Climate Change capabilities in-house.	1 month Q2
(g) Prepare TORs for CWSA and Met Office institutional strengthening and detailed equipment needs for Met Office	2 weeks Q2
(h) Prepare TOR and detailed activities scheduling for the development of draft policy and legislation in support of mainstreaming climate change resilience into development planning. This will include the immediate needs to prepare revisions to the NESDP as a matter of urgency.	1 month Q2 URGENT
(i) Prepare TORs and implementation strategy (immediate, short and long term) for both the National three-year public education programme to build community based climate risk and resilience, and National curriculum development (including teacher training) for secondary schools in climate change and disaster risk reduction.	1 month Q3 2011
(j) Prepare TORs and implementation strategy for Planning and development of an all hazards early warning system in SVG, including special needs of women and children and the elderly.	2 weeks Q2
(k) Prepare strategic plans for the development of partnerships between Government and the Private sector. Undertake this Project as soon as possible.	Q2 2011

11. **Budget (indicative):**

Expenditures[36]	**Amount (USD) -** estimates
Consultants	$255,000
Equipment	Design specification and equipment procurement $787,000
Workshops/seminars	$15,000
Travel/transportation	$55,000
Others (admin costs/operational costs)	Administrative support and Project Management $50,000. TORs for the staffing will be prepared as part of Phase One in April 2011.
Contingencies (5%)	$58,000
Total Cost	**USD million$ 1.22**
Other contributions:	
• Government	In kind technical support
• MDB	In kind technical support
• Private Sector	N/A
• Others (please specify)	N/A

12. **Timeframe** (tentative)

Submission of pre-appraisal document for PPCR Sub-Committee Approval: March 4, 2011
Expected Board/MDB Management[37] approval date: May 31, 2011

[36] These expenditure categories may be adjusted during project preparation according to emerging needs.

[37] In some cases activities will not require MDB Board approval

13. **Other Partners involved in project design and implementation**[38]: IDB, (list SVG NGOs, private sector, etc. Ministry of Works Bridges Roads and General Services Authority (BRGSA) Ministry of Health and the Environment Ministry of Agriculture Forestry and Fisheries Ministry of National Mobilisation, Social Development Etc Ministry of National Security Saint Vincent and the Grenadines Port Authority Saint Vincent and the Grenadines Coast Guard Saint Vincent and the Grenadines Maritime Administration Saint Vincent and the Grenadines Fire Services National Parks, Rivers and Beaches Authority Ministry of Housing, Physical Planning, Land and Informal Settlements Attorney General's Office	Saint Vincent and the Grenadines Meteorological Office Basic Needs Trust Fund (BNTF) Central Water and Sewage Authority Ministry of Finance and Economic Planning Saint Vincent and the Grenadines' National Trust Grenadines' Affairs SANDWATCH Saint Vincent and the Grenadines' Hotel and Tourism Authority Private Climate Change Activists Saint Vincent and the Grenadines' Chamber of Industry and Commerce Social Investment Fund Saint Vincent and the Grenadines Electricity Services Ltd Energy Unit National Emergency Management Organisation (NEMO) Ministry of Tourism International Airport Development Corporation (IADC)
14. **If applicable, explanation for why the grant is MDB executed:** To ensure: 1) due diligence on social and environmental safeguards, 2) financial management support, and 3) Technical assistance	
15. **Implementation Arrangements** (incl. procurement of goods and services)**:** All goods and services will utilize international best practice according to World Bank standard procedures and will be implemented by the SVG PSIMPU.	

[38] Other local, national and international partners expected to be involved in design and implementation of the project.

Project #	Component and Activity	Duration	Estimated Cost (US$)
	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction		
1.2.1	Review alternative options for proposed works, prepare TOR, technical specifications and Works Schedule for River defense: Construction of gabion/reinforced concrete for the Warrawarrow including drainage improvements work: Arnos Vale Watershed	2 months	US$120,000
1.2.4	Prepare TOR and Works Schedule for forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures for Arnos Vale Watershed	1 month	US$15,000
1.3.4	Prepare technical specifications and works schedule for numerical and physical modeling to determine optimum shoreline stabilization techniques for the Georgetown pilot area, including ecosystem conservation, and reduction of downstream impacts in Georgetown Watershed (In-house plus consultants)	2 months	US$20,000
	Component 2: Data Collection, Analysis and Information Management		
2.1	Prepare technical specifications for equipment needs. Acquisition and installation of telemetric hydro-climatic weather stations and software. See Equipment below.	2 weeks	US$7,500
2.3	Prepare technical specifications for development of enterprise National Spatial Data Infrastructure (NSDI)	2 weeks	US$7,500
	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change		
3.2	Prepare TOR and detailed job descriptions for Institutional strengthening for the NEMO, MoFEP, MoHE, Ministry of Works, and Physical Planning to boost Climate Change capabilities in-house.	1 month	US$15,000
3.3 3.4	Prepare TORs for CWSA and Met Office institutional strengthening and detailed equipment needs for Met Office	2 weeks	US$7,500
3.6	Prepare TOR and detailed activities scheduling for the development of draft policy and legislation in support of mainstreaming climate change resilience into development planning. This will include the immediate needs to prepare revisions to the NESDP as a matter of urgency.	1 month	US$15,000

	Component 4: Design and implementation of a Public Education and Capacity Building Programme		
4.1 4.1a	Prepare TORs and implementation strategy (immediate, short and long term) for both the National three-year public education programme to build community based climate risk and resilience, and National curriculum development (including teacher training) for secondary schools in climate change and disaster risk reduction.	1 month	US$30,000
4.2	Prepare TORs and implementation strategy for Planning and development of an all hazards early warning system in SVG, including special needs of women and children and the elderly.	2 weeks	US$7,500
4.10	Undertake Project 4.10 as soon as possible.	2 weeks	US$10,000
		Subtotal	US$255,000
	Design specification and equipment procurement		
all	(see Equipment List - these goods may be purchased using a retro-active financing mechanism)	goods	US$786,904
	Administrative support and Project Management		
all	Chief Technical Advisor (International)	1 month	US$25,000
all	Climate change specialist (National)	1 month	US$15,000
all	Team Assistant (National)	1 month	US$4,000
all	Procurement Specialist (National)	1 month	US$6,000
	TORs for the above will be prepared as part of Phase 1. in April 2011.		
	Workshops/seminars		US$15,000
	Travel/transportation		US$55,000
	Contingencies (5%)		US$58,000
	TOTAL		**US$1,219,904**

List of Annexes

*** PLEASE NOTE THE ANNEXES ARE ALSO CONTAINED IN A SEPARATE DOCUMENT FOR EASE OF REFERENCE.

1. **PILOT PROGRAMME FOR CLIMATE RESILIENCE, CARIBBEAN REGIONAL TRACK FIRST PROGRESS REPORT**

2. **CARIBSAVE PROJECTS 2011**

3. **ENVIRONMENTAL LEGISLATION LIST**

4. **DISASTER VULNERABILITY REDUCTION PROJECT DESCRIPTION**

5. **LIST OF AGENCIES AND INDIVIDUALS CONSULTED**

6. **REFERENCES**

7. **BRAINSTORMING WORKSHOP SUMMARIES JANUARY 2011**

7. **KEY MEETINGS AND NOTES**

8. **CLIMATE RISKS FOR THE CARIBBEAN AND SAINT VINCENT AND THE GREANDIES**

9. **COMPLETE LIST OF UNFUNDED INVESTMENT PROJECTS (*"SPONSOR WANTED"*)**

Strategic Programme for Climate Resilience

SAINT VINCENT AND THE GRENADINES

PHASE ONE

Part Two

Proposed Investment Program

Components for PPCR Funding

2 March 2011

Contents of the Investment Programme

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1. SPCR Investment Programme Summary

PPCR INVESTMENT PROGRAMME St. Vincent and the Grenadines				
Project Component 1	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction			$ 6,130,500
Project Component 2	Component 2: Data Collection, Analysis and Information Management			$ 953,910
Project Component 3	Component 3: Strengthening of existing policy, legal and Institutional framework to address Climate Change			$ 1,165,000
Project Component 4	Component 4: Design and implementation of a Public Education and Capacity Building Programme			$ 805,000
			Primary total	**$ 9,054,410**
			Project Management 10%	$ 905,441
			Secondary total	**$ 9,959,851**
			Contingency	$ 40,149
			GRAND TOTAL	**$ 10,000,000**

Figure 1: SPCR Investment Programme Summary

2. Background

Rationale

Key challenges in St. Vincent and the Grenadines (SVG) are ensuring food and water security, managing disaster risk, effective management of the coastal zone and addressing overall environmental degradation. These problems are further compounded by constantly changing climate, uncertainty in the determination of potential impacts and their spatial contribution. For a vulnerable country like SVG, adaptation to climate change is a fundamental development challenge.

The financing need for climate change adaptation is significant and mobilizing adequate and timely financing is vital to addressing the looming challenge. The current financial allocation for climate change adaption is inadequate considering the extent of vulnerabilities and the percentage of the population potentially exposed.

Given that the PPCR aims to help countries transform to a climate resilient development path, consistent with poverty reduction and sustainable development goals, a key ingredient for addressing adaptation efforts successfully is the availability of the appropriate information, policies, procedures, guidelines and institutions which are adequately empowered and enabled to carry out their roles in a comprehensive manner and on a sustainable basis. SVG has taken a number of steps to address climate change related issues over the years and has prepared some draft policies that can contribute to successful implementation of climate related adaption and mitigation programs. For this reason strengthening institutions to handle the climate change impact effectively and decisively warrants an appropriately designed capacity building program aimed at addressing this important constraint to facilitate a move towards climate resilient development path is of critical importance. This aspect is dealt with in component 3 and 4 of this Investment Programme.

Development and dissemination of appropriate technologies, as the means of enhanced institutional capacity, has a significant role to play in meeting the challenges of adaptation to climate change. For this reason significant emphasis has been placed on data management issues in Component 2. However, translation of technologies into practical applications in the field to realize the benefits requires appropriate vehicles. These include enhancing awareness for adoption by creating conditions for adoption in promoting demand, promulgation and enforcement of appropriate policies for transformation, building institutional capacities for efficient and appropriate levels of delivery, and financing. Obviously institutional and non – institutional stakeholders have a major role to play and promoting the development and adoption of appropriate technologies that enhance climate resilience.

The many projects contained in the Investment Programme may need to be further streamlined to combine individual projects, increase the budget to then be redesigned during the project development phase prior to implementation. In this way, the project activities would not be limited to those identified at the workshops. This will allow some flexibility in the activities to be undertaken during the three years of Phase Two implementation.

Programmatic Approach

The PPCR has four main components. Component 1 deals with climate vulnerability risk assessment and risk reduction. Component 2 addresses Data Collection, Analysis and Information Management and Component 3 provides a comprehensive framework for strengthening of the existing policy, legal and institutional framework to address Climate Change. Finally, Component 4 relates to the design and implementation of a public education and capacity building programme.

Component 1 contains fundamental aspects of the PPCR. It covers three Pilot project sites: Union Island, Arnos Vale Watershed and the Georgetown Watershed. Through these pilot sites, we (SVG) will be able to collect a range of data relative to other components as well as addressing gender and also poverty issues within the pilot sites. Another major aspect of Component 1 is the assessment of climate change on marine ecosystem and commercial fisheries as well as the preparation of a Coastal Zone Management Policy and Plan.

Component 2: There are three key aspects to this Component; the acquisition and installation of telemetric weather stations and software; coastal zone impacts modeling and the development of a harmonized platform for data analysis and data management. The focus of Component 2 is to ensure comprehensive data collection, analysis and information management that will support both Component 2, 3 and 4 of the PPCR. Various agencies in St. Vincent and the Grenadines are engaged in collecting, monitoring and processing critical data required to support climate change impact, modeling and analysis. These include agencies such as the Ministry of Agriculture, Lands, Forestry and Fisheries; Ministry of Transport and Works; Meteorological Office; Statistical Department; Ministry of Physical Development and the Environment, inclusive of its Physical Planning Unit and Survey and Mapping; Ministry of Health, Wellness and the Environment; CWSA; NEMO and others, resulting in a fragmented approach.

This fragmented approach to data management in St. Vincent and the Grenadines has its challenges, including gaps, duplication and limited institutional capacity to capture and share information within and between Ministries and agencies. There is need for data collection and analysis on various aspects of resilience to climate change in affected sectors and dissemination to the potential beneficiaries. This should be possible through commissioned studies on specific topics, using national and international experts. Given the range of assistance programs (bilateral, multi lateral) for building resilience to climate change relevant data and information is needed to provide a one – stop shop for potential users of the information that would readily become available. To resolve this problem the development of a data management technology and policy will be undertaken.

Component 3 seeks to strengthen the existing policy, legal and institutional framework. It will commence with comprehensive review of current policies, plans and legislative framework to improve SPRC implementation in SVG. It will also involve finalizing various policies, drafting a disaster management plan and preparing and finalizing an Environmental Management Act and Environmental Impact Assessment Regulations. The outputs of Component 3 will be a range of finalized policies and plans that could be reviewed and presented for Cabinet approval. Also a wide range of legislation will be prepared (in consultation with the Attorney General's Department) and these will, when completed be ready for submission for Cabinet approval. The outcome will be the development of improved policies, plans and legislation to assist St. Vincent and the Grenadines to develop in an orderly manner and the implementation of key changes such as a coastal zone policy and management plan.

Component 4 relates to the design and implementation of a public education and capacity building programme. This component will provide for a range of initiatives in support of public and private sector capacity building. These include a national three – year public education programme to build community based climate risk and resilience, provide a national curriculum for schools in climate change and disaster risk reduction, plan and develop an early warning system for St. Vincent and the Grenadines, provide technical training and extend the school risk assessment to cover all constituencies in SVG. A capacity building program that encompasses raising the awareness of decision makers in the public and the private sector, develops and disseminates knowledge that not only aid the process of awareness raising but help bring relief to vulnerable communities would be a step in the right direction. Component 4 will improve information access and data resources for key stakeholders,

disseminate project generated data and information and improve public awareness about the potential impacts of climate change.

Investment Summary

(See also the SPCR Narrative; Financing and Linkages paragraphs in Section 6. Outline of the Strategic Program for Climate Resilience for a detailed summary of the investments and complementary investments that will contribute to resilience building in SVG).

Included in the Financial Programme are projects, programmes and investment initiatives funded from three confirmed sources and one group of projects that have been identified which however have no identified source of funding. We have referred to these as the "Sponsor Wanted" group of projects. The complete list of those projects for which a funding source is yet to be determined is included in the Annexes.

To date, the following has been determined:

- DVRP has confirmed funding of around ten million US dollars (m$10.0) Figure 2.
- ERL has approved funding of five million dollars (m$5.0) Figure 3.
- SPCR is applying for seven to eight million in grant funds from the CIF, combined with around two million in concessional financing, totalling around ten million dollars (m$10.4). Figure 4.
- All components are combined in Figure 5. prepared for the World Bank internal documentation.

The following tables describe the total funding for all concurrent projects and programmes under the complementary initiatives; the ERL (Hurricane Tomas Emergency Recovery), the DVRP and the PPCR.

DVRP Funding

Project	Project Component #	Component 1: Disaster and Climate Risk Reduction Activities	Institutional Strengthening			Preliminary Costs (USD)	Implement'n	Beneficiary	Implementing Agency
			Knowledge mgt., Consultants	Works	Goods				
DVRP	D 1.1	Rehabilitation South River Rd Bridge, Kingstown	in-house	$300,000		$300,000		MoW	MoW
DVRP	D 1.2	Rehabilitation of bridges: Fenton Road Bridge 1 - Dauphine; Bridge 2 - Green Hill	in-house	$1,000,000		$1,000,000		MoW	MoW
DVRP	D 1.3	Stockpile of gabion baskets (total of 12,000)	in-house		$800,000	$800,000		MoW	
DVRP	D 1.4	Slope Stabilization: Dark View (road realignment)	$150,000	$1,200,000		$1,350,000			
DVRP	D 1.5	Relocation of the Milton Cato Memorial Hospital	$2,000,000			$2,000,000		MoW	MoW
DVRP	D 1.6	River Defense: Colonaire river	in-house	$260,000		$260,000		MoW	MoW
DVRP	D 1.7	Retrofitting of Emergency Shelters: Dorsetshire Hill Government School	in-house	$150,000		$150,000		MoW/MoE	MoW
DVRP	D 1.8	Retrofitting of Emergency Shelters: Kingstown Governement School	in-house	$250,000		$250,000		MoW	MoW
DVRP	D 1.9	Satellite Warehouses (2) for Communities: Phase 1 - Sandy bay and Rose Hall	in-house	$800,000	$700,000	$1,500,000			
DVRP	D 1.10	Generators for shelters/schools (6): Phase 1	in-house		$100,000	$100,000			
		SUB-TOTAL	$2,150,000	$3,960,000	$1,600,000	**$7,710,000**			

Figure 2: DVRP funded projects

ERL Funding

ERL									
Project	Project Component #	Component 1: Disaster and Climate Risk Reduction Activities	Institutional Strengthening			Preliminary Costs (USD)	Implement'n	Beneficiary	Implementing Agency
			Knowledge mgt., Consultants	Goods	Works				
ERL	E 1.1	Retrofitting of Emergency Shelters: Rose Bank (complete retrofit - physical, generators, watertanks, additional kitchen anc shower facilities)		see below				MoW/MoE	MoW
ERL	E 1.2	Retrofitting of Emergency Shelters: Rillan Hill (complete retrofit - physical, generators, watertanks, additional kitchen anc shower facilities)		see below					
ERL	E 1.3	Retrofitting of Emergency Shelters: Rose Hall (complete retrofit - physical, generators, watertanks, additional kitchen anc shower facilities)		$2,446,000		$2,446,000		MoW	MoW
ERL	E 1.4	Strengthening of the Marriaqua River Defense (Tiviot River)		$416,000		$416,000			
ERL	E 1.5	Retrofitting of Emergency Shelters: Georgetown Primary		see below		see below			
ERL	E 1.6	Retrofitting of Emergency Shelters: Georgetown Secondary		see below		see below			
ERL	E 1.7	Retrofitting of Emergency Shelters: Troumaca Ontario Secondary School		$868,000		$868,000			
ERL	E 1.8	Rehabilitation of secondary road - Hopewell Road River Defense and Road Reconstruction		$400,000		$400,000		MoW	MoW
ERL	E 1.9	Stock-piling of gabion baskets		$290,000		$290,000			
		SUB-TOTAL	$0	$4,420,000	$0	**$4,420,000**			

Figure 3: Emergency Recovery Loan (ERL) following Hurricane Tomas

PPCR INVESTMENT PROGRAMME St. Vincent and the Grenadines				
Project Component 1	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction			$ 6,130,500
Project Component 2	Component 2: Data Collection, Analysis and Information Management			$ 953,910
Project Component 3	Component 3: Strengthening of existing policy, legal and Institutional framework to address Climate Change			$ 1,165,000
Project Component 4	Component 4: Design and implementation of a Public Education and Capacity Building Programme			$ 805,000
			Primary total	**$ 9,054,410**
			Project Management 10%	$ 905,441
			Secondary total	**$ 9,959,851**
			Contingency	$ 40,149
			GRAND TOTAL	**$ 10,000,000**

Figure 4: Summary of SPCR Investment Programme by component.

The table below indicates the combined figures from both the DVRP and the PPCR investments. The titles and names are a little different from those in the PPCR to accommodate the need for World Bank formats and procedures.

	Knowledge mgt., Consultants	Works	Goods	Preliminary Costs (USD)
Component 1: Disaster and Climate Risk Reduction Activities	$3,430,000	$7,830,000	$1,660,000	$12,920,000
Component 2: Capacity Building for Disaster Response, Climate Change Awareness and Adaptation, Hazard and Risk Evaluation and Applications for Improved Decision Making	$2,272,500	$125,000	$1,753,110	$4,530,610
Sub-total	***$5,702,500***	***$7,955,000***	***$3,413,110***	***$17,450,610***
Project Management (10% of Subtotal)				$1,745,061
Project Contingency (5% of Subtotal)				$872,531
Project Total				**$20,068,202**

Figure 5: Total Costs of Combined Project Proposals (DVRP and PPCR) – 12 February 2011.

Capacity Building Human Resources

The approach to capacity building in key institutions is to provide a combination of new and predominantly National Vincentian staffing, supplemented by periodic international advisory services provided to develop professional skills training, training of trainers and to deliver technical training specific to Ministry's and Agency's needs. Three to four interns per year are included (unpaid) to ensure a continued skills transfer to young professionals is also included in the programme.

The SPCR Financial Programme includes a standard project management component alongside the contingency to round out the final figures in the Programme; in this case around $900,000 is allocated for this purpose. Works supervision of construction projects in Component One are included in this Project Management budget (not detailed in the table below). The human resource needs detailed below draw on both specific project budgets and the separate allocation for PM. This is indicated in the table below.

The following table outlines the identified needs for Ministry and Agency institutional strengthening in support of the SPCR. The diagram below (Figure 3. below) illustrates the relationship between stakeholders and the institutional arrangements for the SPCR implementation. Brief descriptions of the human resource components are included below the summary table.

The vast majority of the budget allocation for the human resource requirements are either filled by talented new National staff, or are targeted training to build skills and knowledge of current staff. The number of international consultants in this part of the programme is minimal.

Ministry/Agency	*Discipline/Profession*	*Type of Resource*	*National / Int'l*	*Duration*	*Est. Cost (US$)*	*Source of Funds (Project Number in brackets)*
Ministry of Works	Coastal Engineering	Person	National	Staff, 3 years 3x $40,000 = **$120,000**	**$120,000**	**PPCR (3.2)**
Ministry of Works	Climate Change Adaptation and Specialist Coastal Zone Management Training (including designing/implementing Training of Trainer sessions)	Training	Int'l	1 week three times /year for two years 3x2 x $10,000 = **$60,000**	**$60,000**	**PPCR (3.2)**
Ministry of Health and Environment	Climate Change Adaptation Specialist (3.2)	Person	National	Staff 3 years 3x $40,000 = **$120,000**	**$120,000**	**PPCR (3.2)**
Ministry of Health and Environment	Climate Change Adaptation and Specialist Coastal Zone Management (shared with 2. above)	Training	Int'l	1 week three times /year for two years 3x2 x $10,000 = **$60,000**	**(see 2. above)**	**PPCR (3.2)**
Various	Climate Change Interns	Students/Young professionals	National & Int'l	Periodic, three to six month internships, Unpaid, travel costs only, basic per diem; four per year, three years, at $5000 each	**$60,000**	**PPCR**
Physical Planning Unit	Climate Change Adaptation Specialist	Person	National	Staff 3 years 3x $40,000 = **$120,000**	**$120,000**	**PPCR (3.2)**
Climate Risk Management Unit (Ministry of Finance and Economic Planning	Chief Technical Advisor (participant in Training of Trainers sessions)	Person	Int'l	3 weeks two times /year for two years plus one month at start-up 3x2x$18,000 = 1x$24,000= **$132,000**	**$132,000**	**PPCR** (Project Mgt budget)
	Climate Change Adaptation and Specialist Coastal Zone Management (shared with 2. above).	Training	Int'l	1 week three times /year for two years 3x2 x $10,000 = **$60,000**	**(see 2. above)**	**PPCR**
	Climate Change Adaptation Technical Officer	Person	National	Staff 3 years 3x $55,000 = **$120,000**	**$165,000**	**PPCR** (Project Mgt budget)

Figure 6: Human resources capacity building

Brief Descriptions

Coastal Engineering: The Coastal Engineer will complement the existing engineering capacity in the Ministry of Works, to provide the needed skills to oversee capital works programmes throughout the implementation of the SPCR Phase Two.

Climate Change Adaptation and Specialist Coastal Zone Management Training: This training will be made available to the key ministries to build a greater knowledge and understanding of climate change, adaptation and resilience building as it pertains to the specific activities of various Ministries. This will also include training of all appointed focal points from all ministries, and designing/implementing Training of Trainer sessions.

Climate Change Adaptation Specialist: This person will complement the existing range of skills in the Environmental Health Unit or elsewhere in the Ministry of Health and Environment. This person will be the key focal point for the programme implementation for this partner Ministry.

Chief Technical Advisor: This is a part-time position. The Senior Advisor will be familiar with the entire programme to provide brief periodic oversight for the first two years of the Programme, contributing to all standard World Bank monitoring and periodic reporting processes, coordination with Steering Committee and Technical Advisory Committee, performance reviews and a participant in Training of Trainers sessions. It will be valuable for the CTA to be on the ground during the establishment period of the first month of the programme upon receipt of funds and commencement approval.

Climate Change Adaptation Technical Officer: This position will provide general oversight on implementation , donor relations and resources mobilization, coordination and leadership with the Technical Advisory Committee, technical guidance with climate change and adaptation issues where required. This will require an experiences senior professional with a minimum of ten years relevant experience.

Communications Officer: Preparation of designs and content of awareness building materials, media relations, regular media communications, and PR materials as necessary, inter-ministry communications, facilitating training sessions and other communications related tasks. This person will be a key 'face' of the programme throughout implementation.

Team Assistant: This person will provide support to the entire team in all aspects of the smooth running of the projects including support to the Climate Change Adaptation Technical Officer. As a relatively junior person, this position is aimed at developing skills in all aspects of project and programme management.

Administrative Officer: This person will be proficient in all aspects of administration, contracts, travel and general support services necessary for maintaining budget allocations, tracking expenditures, working with the Procurement team and providing necessary administrative support to all team members.

Regional Partnerships Advisor: This will be a part-time position to provide the necessary regular guidance and communications with regional track activities as well as relationships with regional partners in the OECS and the Caribbean region. The PPCR Steering Committee have recognized this connection and link to regional activities as a critical factor to the success and requirements of the SPCR.

3. Development Objectives

Approach of the SPCR: As outlined in the Phase One Proposal, the SPCR has two parts; the SPCR Narrative and the Investment Programme (this document to which the narrative refers).

The Narrative has four components, which also provide the basic structure of the Investment Programme document. The narrative to follow below provides background and justification for the inclusion of each of the initiatives and investments included in the Investment Programme. An additional document titled 'Supporting Resources' includes the Annexes referred to in the SPCR below.

The key to the approach adopted in the SPCR and Investment Programme is the development of three site-specific vulnerable areas (two watersheds and one island) that will pilot the interventions recommended. The three pilot areas will then implement and test a broad spectrum of ideas and interventions to build resilience in these three vulnerable areas. They will be model comprehensive interventions, to be extended in future to all the Grenadine islands and remaining St. Vincent watersheds.

Key development challenges (vulnerability) related to climate change/variability:

- Extreme concentrations of population and critical infrastructure along vulnerable coastlines on St. Vincent and all the Grenadines. Coastal residents and businesses are vulnerable to significant loss or damage from extreme weather events, rising seal levels and storm surge.
- Sensitive marine and coastal environments in the Grenadines are under increasing climatic and anthropogenic (human) stress from lowering precipitation levels, increasing volume of recreational boating, inadequate urban drainage, poor solid waste disposal and other climate variables including sea surface temperatures and increasing extreme weather activity that threaten coral beds, reefs, sea grasses and marine ecosystems.
- Vulnerabilities are exacerbated by a lack of facility or expertise for basic information and data gathering, storage, access and knowledge management in general regarding climate change, and related disaster reduction issues. The need exists to build capacity and to develop a "culture of information" in Saint Vincent and the Grenadines.
- Level of knowledge and awareness of the potential impacts of a changing climate in urban, rural and island communities is low, thwarting a rapid transformation to a climate resilient population in St. Vincent and the Grenadines. Technical skills in climate adaptation, resilience building, and disaster risk management are limited.
- Some important legislative controls and guidelines from statutory authorities require strengthening. Many are in a draft form, incomplete or outdated and require revision and updating to accommodate climate adaptation and resilience building components. Enforcement remains patchy. Strengthening these tools will reduce uncertainty and improve the governance system.

4. Key Indicators and Baseline

These indicators, results and baseline statements are not attributed to specific project initiatives as these results in particular, are the results the stakeholders have articulated, and embody the objectives of the SPCR Investment Programme.

Programme Results	Baseline	Outcome Indicators
1. Strengthened Community Resilience *More confident coastal and inland communities better able to cope with the impacts of changing weather systems*	Coastal and inland communities currently not able to cope fully with the impacts of changing weather systems, including extreme weather events. Level of knowledge of climate change is low. Needs include: better preparedness, adequate early warning, and increased capability to recover.	*Census data questions on vulnerability and resilience, decrease in economic and social losses post-disaster events, decreased loss of roads and bridges, damage to river banks, decreased loss of livelihoods, lower levels of overall community impacts from climate hazards, improved ability to cope with disaster events (social survey).*
2. Increased Socio-economic stability *Vulnerable communities more knowledgeable of climate resilience, diversified livelihoods and livelihood protection.*	Vulnerable communities are not knowledgeable of climate resilience, livelihoods have not diversified for generations and livelihoods not well protected from hazard impacts. Communities incur losses, businesses are unprepared, visitors are not well informed (marine and land-based tourists), environmental conservation is not common to legislative controls, and enforcement achieves a minimal level of success.	*Communities incur fewer losses, businesses are better prepared, visitors are better informed (marine and land-based tourists), environmental conservation is more common to legislative controls, and enforcement achieves increased levels of success. Damage and Loss Assessment indicates fewer losses in coastal areas, lower economic impacts (fewer loss of livelihoods), increased awareness in visitors (survey), improved environmental practices (water conservation, water recycling) on the Grenadines, improved water accessibility in the Grenadines, increased use of rainwater harvesting and storage in St, Vincent.*
3. Increased capacity in Government institutions *Climate change expertise is available to all ministries, regular information sharing amongst Government departments and Regionally on climate issues.*	Climate resilience is not a national concern; no regional climate change events hosted by Saint Vincent and the Grenadines, Government, no Ministries or Agencies have a strategy for building climate resilience in their sector.	*Six Ministries/Agencies (Agriculture, Physical Planning, NEMO, Works, Lands and Statistics-MoFEP) have equipped and skilled persons for data management and GIS mapping. Eight Ministries/Agencies have had personnel trained in climate change impacts (sector-specific), increased attendance in Regional climate discussions and activities, Climate change expertise available in Ministry of Finance, Ministry of Health and Environment, publications on Governance available to Government officials (all Ministries).*
4. Strengthened knowledge and awareness *Information on climate change is available to every citizen in Saint Vincent and the Grenadines, and basic training delivered to every constituency and to a strengthened community leadership.*	Information or basic training on climate change is not yet available to every citizen in Saint Vincent and the Grenadines, there is no National programme of public education and curriculum development in schools to build awareness of climate change and resilience.	*The implementation of a National programme of public education and curriculum development in schools results in increased awareness of climate change and resilience that is exemplary in the Caribbean Region. Curriculum active in all schools, teachers trained to deliver climate change and disaster reduction education, climate change information and materials available to schools and teachers, number of community leaders trained in Hurricane Preparedness, number of brochures and publications available to the general public on climate change impacts at community level, early warning system installed, number of communities trained in EWS leadership. Responses to climate questions in the Census.*
5. Comprehensive hazard maps available to Government and communities *GIS mapping of social, economic and environmental impacts of climate change is upscaled to a National level, with hazard and vulnerability maps available to all vulnerable communities and*	The range of hazard maps currently available is inadequate for planning and risk management purposes. Capacity of Government in the use of GIS as a policy and education tool is minimal. NEMO is not able to generate its own hazard and vulnerability maps.	*Number of constituencies with localised Hazard and Vulnerability maps; number of competent GIS practitioners available to Government departments; amount of data made available for inter-agency use and sharing; number of presentation made by NEMO to agencies, communities on climate change and mapping hazards and vulnerabilities.*

community leaders (incl. shelters)		
6. Gender sensitive disaster risk management designed and implemented *Considerations of gender and age must be disaggregated to understand that vulnerable communities and individuals suffer disproportionately higher losses, injuries and damages from both natural and anthropogenic hazards.*	Shelter management does not include any special considerations for privacy, health and personal needs of women and the elderly; no gender-specific publications are available to provide guidance to women and men on disaster preparedness, or basic gender-specific guidelines for response to climate impacts or tools for a speedy recovery.	*Gender-sensitive Shelter Management Policy is operational, implemented and a number of shelters refurbished; publications on gender-specific concerns for preparedness ad response to the impacts of climate hazards; gender issues incorporated into guidelines and legislation.*
7. Collaboration, cooperation and support *Building climate resilience is everybody's business. Communities need to assume control of their collective needs in partnership with Government and businesses. A Team effort is necessary for effective disaster preparedness, response and recovery.*	As yet, citizens do not recognise the Government is committed to climate change and a green, clean Saint Vincent and the Grenadines. SVG could become a model country in the Caribbean with the development of the three Pilot areas demonstrating all aspects of building resilience for families and communities.	*Ministerial support measured by appointment of climate change focal point; number of businesses contributing to publications; number of hotels cooperating on Legislative change for coastal areas; number of communities and constituencies requesting support for building climate resilience; number of appearances in the media of climate issues.*

Figure 7: Key Indicators, Baseline and Results

5. Components and Activities: including Learning and Knowledge Management activities

Following the activities proposed in the Phase One Proposal (November 2010), the following four components describe the main themes of proposed interventions for Phase Two. The vulnerable sectors identified include Water, Health, Environment (coastal), Tourism, Agriculture, Fisheries, and Infrastructure. A multi-sectoral approach is embodied in the following four main areas of intervention:

Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction

Component 2: Data Collection, Analysis and Information Management

Component 3: Strengthening of Existing Policy, Legal and Institutional Framework to Address Climate Change

Component 4: Design and Implementation of a Public Education and Capacity Building Programme

The following lists all the proposed interventions (including learning and knowledge management activities) under these four headings:

Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction

1.1.1 Evaluation of the application of Union Island's ICZM Plan and community awareness strategy.
To test the utility, improve compliance and raise awareness of newly integrated coastal zone management policies and plans in relation to Union Island to climate change and improve coastal resilience through development control.

1.1.2 Implement appropriate shoreline numerical and physical modeling techniques on Union Island
This modeling programme will allow Ministry of Works to account for reduction of downstream and near shore impacts of hard coastal engineering projects, resulting in the design of site specific hard or soft engineering projects for Union Island, where indicated by the modeling. Reduction of downstream impacts, resulting in a

shoreline stabilization plan and site specific hard or soft engineering project for Union Island, inclusive of appropriate soft and hard options where indicated. The objectives are; to reduce negative impacts of coastal engineering works on fragile coastal ecosystems, development of a culture of knowledge-based decision making for regulating shoreline stabilization projects. Completion of an implementation plan to address beach erosion in Union island

1.1.3 Geological assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring.
To conduct geological assessment, soil testing and ground water assessment and monitoring on Union Island and the Arnos Vale catchment

1.1.4 Replanting of mangroves in selected areas, mangrove and coastal vegetation nursery establishment, soil and water conservation measures including retrofitting of selected shelters
To implement forestry management and Silviculture activities along with bioengineering works and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, establish terraces and sedimentation traps, support best practices in Agriculture, establish / re-establish buffers, etc. on Union Island Island (mangrove replanting and shelter retrofitting) and within the upper and middle water catchments of Arnos Vale and Georgetown, in addition to building climate resilience by retrofitting a selected public building

1.1.5 Drainage designs for Union Island (to address land degradation) as a single drainage basin inclusive of the various communities and GIS mapping to record drainage systems
To designate and delineate drainage channels and buffer zones on Union Island, and in the Arnos Vale and Georgetown Catchments while defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems.

1.2.1 River defense: Construction of gabion/reinforced concrete for the Warrawarrow including drainage improvements work: Arnos Vale
This project is designed to measurably reduce the negative impacts to life, the environment, private property and critical public infrastructure which may result from flooding in Arnos Vale.

1.2.2 Rehabilitation of River Crossings – Fenton River
This project will rehabilitate deteriorating fords at the Fenton with a view to minimizing human impacts on the riverine ecosystems at Fenton River.

1.2.3 Conduct a geology assessment of Arnos Vale as a single drainage basin inclusive of soil testing, ground water assessment and monitoring.
To conduct geological assessment, soil testing and ground water assessment and monitoring on Union Island and the Arnos Vale catchment. See also 1.1.3 above.

1.2.4 Conduct Forestry management activities inclusive of silviculture along with bioengineering works and other soil and water conservation measures
See 1.1.4 above.

1.2.5 Designation and delineation of drainage channels and buffer zones in the Arnos Vale watershed, and defining the legal and legislative implications of drainage channels.
To mainstream the activities of the Ministry of Works. Institutional strengthening for the Ministry of Works regarding coastal works. (See 1.1.5 above)

1.2.6 Application of Relevant Effluent Regulations and Standards at the Coastal Areas (Indian Bay and Villa Beach) in Arnos Vale Watershed
To protect near shore coral reefs as the main natural line of defence against storm surge and other climate related coastal impacts, by improving coastal water and sediment quality at the two beaches.

1.2.7 Warrawarra River Delta and Greathead Beach Management Pilot Programme

To reduce flooding of residents and businesses located near the banks of the Warraworow River upstream, To encourage participation of the downstream residents in flood mitigation, To identify the optimum management process for the river delta, such that the beach retains its width for the attenuation of high wave energy.

1.3.1 Conduct Forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures
(See 1.1.4 above).

1.3.2 Designation and delineation of drainage channels and buffer zones in the Georgetown watershed, and defining the legal and legislative implications of drainage channels.
(See 1.1.5 above)

1.3.3 Testing and monitoring of the enforcement of new building code provisions, including training of building inspectors
To build skills, knowledge and understanding of the Building Code and enhance enforcement and inspection processes.

1.3.4 Numerical and Physical Modeling for the Georgetown Pilot Area
Appropriate numerical and physical modeling to determine optimum shoreline stabilization techniques for the Georgetown pilot area, including ecosystem conservation, and reduction of downstream impacts

1.3.5 Coastal Defense: Georgetown (by administrative centre/opp. Ferdie's)
This project is designed to measurably reduce the risk to life, the environment, private property and critical public infrastructure which may result from coastal erosion in the Georgetown community.

1.4 Assessment of Climate Change impacts on Coastal and Marine Ecosystems and Commercial Fisheries, including the completion of a Coastal Zone Management Policy and Plan.
This assessment will include the completion of a Coastal Zone Management Policy and Plan with site-specific solutions for climate resilience in SVG (including compounding human-made impacts, coastal effluent discharge, waste water treatment, recreational boating (linked to preparation of guidelines in Component 4), coastal land use, drainage systems etc.).

Component 2: Data Collection, Analysis and Information Management

2.1 Acquisition and installation of telemetric hydro-climatic weather stations and software.
GIS and GPS hardware and software, as well as near shore and coastal monitoring stations for waves, tides, currents and beach profile measurements, among others) with sufficient density in all islands. (See Equipment on separate Sheet). To improve the decision making capacity of the public and private sectors through the use of primary climate-related data in support of key climate resilience decisions.

2.2 Coastal inundation impacts modeling (storm surge, sea level rise, high energy wave action, winter swells).
including mapping of communities and businesses in the Red Zone of the three pilot areas. (Collaboration with Regional modeling initiatives will be valuable.) To develop coastal inundation models (based on different hazards) for use in land use planning, disaster management and public education to build community awareness and capacity of coastal hazards and their destructive potential. To assist in bridging the gap between scientific monitoring/modeling and land use planning.

2.3 Development of enterprise National Spatial Data Infrastructure (NSDI)
To develop a harmonised platform for data analysis and data management in support of climate resilence data management through development of databases, data management protocols and standards, metadata, and training. To facilitate unhindered data dissemination, data sharing, and data quality assurance among all stakeholders.

Component 3: Strengthening of Existing Policy, Legal and Institutional Framework to Address Climate Change

3.1 Integrated Watershed Management Plan

To develop a draft integrated watershed conservation and management policy and action plan. This project will streamline integrated water resources conservation and management. It will clearly define the roles and responsibilities of the primary major users, and define the institutional and legislative frameworks needed for robust implementation and enforcement. It will address the three major challenges which are:

- To ensure that the water resources are managed so as to maximize the contribution that these natural resources can make to increasing the productivity of the economies of the nation;
- To manage the water resources so as to maximize their contribution to the elimination of poverty and to raising the quality of life;
- To ensure that water resources are managed so as to minimize the impact of water-using economic activities on the quality of the environment.

3.2 Institutional strengthening for the MoFEP, MoHE, Ministry of Works, and Physical Planning to boost Climate Change capabilities in-house.

Strengthening of EIA processes, preparation of revised land use zoning plans, and revision of the building code and guidelines to include drainage issues (focus on climate resilience) to guide future development and strengthen monitoring and enforcement capability. The Town and Country Planning Act should be amended to include integrated coastal zone management provisions for the declaration of the coastal zone management plan.

3.3 Strengthened capacity of the Met Office for forecasting and inter-ministerial coordination.

To improve the technical and institutional capacity of the Metrology Office to collect, analyse, predict, and disseminate climate data to all stakeholders including marine forecasting, communications equipment, planning for linkages to global systems of climate tracking, in close collaboration with regional organisations and initiatives. This includes a strategy for inter- ministerial capacity building, and relationships between Agriculture, NEMP CWSA, Forestry, VINLEC, National Parks, Environment and other ministries. Training and capacity building for Met Officers.

3.4 Strengthened capacity for CSWA for hydrology, drainage and waste water management.

In-house training and exchanges, utilizing Caribbean (CIMH) experts over two years. To strengthen the technical capacity of the Central Water and Sewerage Authority (CWSA) in the areas of hydrology, drainage and waste water management. Trainees may include experts from other ministries

3.5 Preparation of a small booklet, "Climate Change Governance in SVG"

The discussion of Governance is particularly significant in the early stages of mainstreaming climate change considerations into National Development Planning. All Government Departments and Ministries need to know their role, that of others, and the responsibilities of government, the businesses community and individual citizens in building resilience and awareness. This small booklet, "Climate Change Governance in SVG" (24-32 pp.) is intended for wide distribution amongst all stakeholders.

3.6 Development of draft policy and legislation in support of mainstreaming climate change resilience into development planning.

To improve the quality of governance with respect to the administration of climate resilience programmes

To provide transparency and coherence in the regulatory and legislative processes, revise National Physical Development Plan (in collaboration with the Sustainable Land Management Project), including preparation of data management policy (including protocols and standards), revision of National Emergency Management Plan, revising EIA regulations, and Environmental Management Act through Cabinet, revise Disaster Management Act , drafting Marine Pollution Act, revising the National Economic and Social Development Plan, drafting Effluent Limitation Guidelines (including the associated effluent regulations in the Environmental Management Act) and comprehensive consultations.

3.7 Water conservation and management in the Grenadines

Prepare management plans for potable and a sustainable solution for water needs in the Grenadines and also in Saint Vincent - including rainwater harvesting best practices, local training on water conservation, low cost water solutions, sustainable water recycling etc. (incl. public education programme). To develop and legislate comprehensive water conservation and management policy and action plan for the Grenadines and by extension SVG.

3.8 Institutional strengthening NEMO

To improve the institutional capacity of NEMO to guide the national programmes both of the public and private sectors in building resilience in support of climate change adaptation using public education as a vehicle, provide technical training in Climate Change (Specialist); enhancement of local Community Disaster Management Committees (training, computers, public education)

Component 4: Design and Implementation of a Public Education and Capacity Building Programme

(This Component remains broad in order to encompass all stakeholders, especially the communities which will be a critical stakeholder).

4.1 National three-year public education programme to build community based climate risk and resilience in Saint Vincent and the Grenadines

To develop and implement a national public education programme that will provide information and guidance necessary to build community based climate resilience in Saint Vincent and the Grenadines, including a community-based climate resilience and climate risk management programme and community leaders training. This will include Hurricane preparedness education and training, building civil defence capacity. Programme design, testing community-based approaches, design and prepare publications, brochures etc. This will be combined with other public education activities related to youth.

4.1a National curriculum development (including teacher training) for secondary schools in climate change and disaster risk reduction

To build skills, knowledge and awareness of climate change and resilience issues for high school teachers and youth; to develop appropriate curriculum materials for all levels of high school students, to research and utilize existing examples from the region or elsewhere to be adapted for SVG, including text book design and publication. (Draw in existing Caribbean examples and others from around the world to be modified for SVG).

4.2 Planning and development of an early warning system in SVG

The national early warning system will include community-based EWS training, community awareness, telephone network partnerships, issuing of warnings, planning and management of EWS - including specific community based training throughout SVG (consider the use of Common Alerting Protocol). Needs investigations will be undertaken to determine the activities to strengthen and maintain the EWS for SVG.

4.3 Technical training for monitoring programmes in support of climate resilience

To improve national capacity in the areas of coastal ecosystem monitoring and assessment, marine meteorology, climatology, hydrology and agronomy. (15 candidates - climatology, marine meteorology, coastal zone monitoring, hydrology, and agronomy)

4.4 Technician training in GIS data processing

To develop the technical capacity of the staff of state agencies to collect and process spatial data necessary for monitoring development activities in pilot watersheds (risk assessment and vulnerability maps generated with local community support and inputs) including basic training workshops in community risk management.

4.5 Production of community-based Climate Risk Base Maps in the three pilot areas

To improve public awareness on the impact of climate change on local communities (part of the outreach programme and will be used in training as well in the communities).

4.6 Training for senior Data/information management specialist

To improve the technical and managerial skills of designated National Spatial Data Manager, for regular updating, review and monitoring of the use, availability and accessibility of relevant GIS and risk management data, documentation and maps. (possibly from Land Management Unit in Physical Planning, person to have oversight for GIS and data collection/management for all Ministries and agencies)

4.7 Extension of Social Risk Assessment to cover all constituencies in St. Vincent and the Grenadines.

To expand the initial Social Assessment undertaken during the preparation of Phase I SPCR and Investment Programme preparations, with additional sampling from all constituencies and all Grenadine islands. This will

provide additional materials for the hazard and vulnerability mapping, and be included in the development of community-based approaches (e.g. early warning systems) and overall National awareness building.

4.8 Prepare Guidelines for Commercial Fishing and Recreational boating
To ensure that commercial fishermen and recreational boaters in SVG marine waters are made aware of climate change impacts on coastal and marine ecosystems, and how on-board activities may exacerbate those impacts, especially in respect of wastewater management, including strategy planning for the disposal of solid waste, grey and black water (and the use of holding tanks as a medium term solution). Information Publications.

4.9 Development of information packages for families and communities in the "Red Zone" .
This project will take an "all hazards" approach to community-based disaster risk reduction, coastal ecosystems information etc. Delivery of talks, leader training, advocacy training, Living in the "Red Zone". Publications. This again can be streamlined into the public education programme.

4.10 Prepare strategic plans for the development of partnerships between Government and the Private sector
To establish collaborative mechanisms between Government and the private sector to combat the adverse impacts of climate change. This would include the compilation and subsequent development of example best practices from the region and elsewhere

4.1.11 Awareness and education program for farmers and communities in the pilot areas, on the use of agrochemicals that leads to surface freshwater contamination
(Linked to 4.1 above). This again can be streamlined into the public education programme.

4.12 Caribbean-SVG exchange of research, capacity building, training and public education systems, policy and practices
To foster collaborative action-research among regional institutions involve in PPCR pilot projects through exchange of ideas, work programmes, facilities, and personnel and to build regional exchange and collaboration. Establish partnership with Barbados Coastal Zone management Unit for example (training and capacity building), 5Cs etc.

6. Risks

Risks	Risk Mitigation
Sustainability factors of post-project implementation (maintenance, condition monitoring, general upkeep of goods and services	Maintenance plans included in project TORs, Cabinet approval of the roles and responsibilities of implementing agencies, regular dialogue on progress, constraints and opportunities, regular diligence of Advisory Panel to monitor progress, funds allocation and performance indicators.
Existing weaknesses in public institutions and legislative frameworks	To address the institutional and judicial weakness, regular monitoring and reporting meetings with the relevant players in the sector in each of the projects and with communities engaged in climate sector dialogue. Enforcement clauses for revised legislation, written into the legislation, agreed by Cabinet.
Country's ability to provide in-kind resources.	Project's demands on line ministry participation when resources are minimal, clear definition of expected in-kind contributions, performance indicators prepared

	for those contributions and proposed actions if obligations are not met.
National complexity of the project.	Guidance on project implementation will be provided by a Project Steering Committee, also a Technical Advisory Committee may be beneficial, Climate Change focal points should be appointed from each ministry. Use of 'counterpart' training with all consultant deployment.
Delivery of project outputs is untimely	Project supervision will focus on securing an adequate level of highly qualified staff for the project, as well as rigorous formulation of the project components and TORs, in particular management of consultants (preparation of Terms of Reference, hiring of legal and technical consultants).
Complexities of coordinating/implementing activities in the Grenadines	Designated visits to Grenadines written into TORs, programme of local consultation undertaken with all affected communities in the Grenadines.
Implementing agencies/ Ministries do not provide adequate support to project activities	Project activities will need to be reflected in the work plans of implementing agencies, commitment made through Cabinet approval (see above).
Risk Mitigation	***i) Due diligence in skilled project management,*** ***ii) political will and commitment, and*** **iii)** ***clarity and thoroughness in all TORs and contract documents.***

Figure 8: Risks and mitigation measures

7. Results and Performance Logical Framework

SPCR Results and Performance Logical Framework

Vision and Long Term Outcome for Saint Vincent and the Grenadines

Vision: The initiatives and investments proposed in the PPCR will jump-start the transformation of Saint Vincent and the Grenadines into climate resilient communities; an example to the OECS countries, to all of the Caribbean and indeed, small island states around the world. This is the vision and the PPCR is a leap forward in achieving that vision.

National Outcomes include: i) reduced vulnerability to climate variability and future climate change for businesses and communities, and less vulnerable better protected coastal areas and watersheds ; ii) increased protection of families and communities against the adverse impacts of climate change for those most vulnerable (incl. women, children and the elderly); iii) increased capacity of Government of SVG to lead and build resilience to climate change and to reduce disaster risks; iv) a transformed population, climate aware, knowledgeable, better prepared for weather hazard impacts and better able to cope with response and recovery needs; and v) a transformed legislation and national development planning system that is climate and gender sensitive, constructive and comprehensively enforced.

Phase Two Investment Programme Components			
Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction	**Component 2**: Data Collection, Analysis and Information Management	**Component 3:** Strengthening of Existing Policy, Legal and Institutional Framework to Address Climate Change	**Component 4**: Design and Implementation of a Public Education and Capacity Building Programme
Investment Programme Outcomes			
Less vulnerable communities, risks reduced, preparedness strengthened, ability to cope strengthened.	Planning and analysis information and data accessible and used to support climate resilient strategies and development planning.	Governance systems improved, strengthened policy and legislation, community-based and participatory approaches mainstreamed.	Knowledge that builds resilience is delivered to every Vincentian with special attention to those most vulnerable. New Government capacities available to manage climate risks in all sectors.
Investment Programme Outputs			
Successful pilot projects, modelled, ready for wider application	NSDI in place.	Water conservation methods are operational in the Grenadines.	Early warning system in place and operational.
Communities more resilient in pilot areas.	Cooperative data collection and sharing	Governance enhanced.	Technicians trained.
Works programmes successfully implemented, watersheds, coastal zones protected.	Modelling successfully developed and lessons learned, analyses utilized comprehensively.	Coastal Zone and Watershed Management Plans completed in tested.	Public education programme implemented, revised and prepared for further development.
Legislation strengthened, enforcement improved.	New equipment operational and maintained.	Capacities strengthened in Met Office, NEMO, MoFEP, MoHE, Works and Physical Planning.	Guidelines and information packages available to vulnerable groups.

Figure 9: SPCR Results and Performance Logical Framework

8. Detailed Profiles of Investments

(next page)

PROJECT NAME:	**Application of Union Island's ICZM Plan and community awareness strategy**
Investment	Component 1: Climate Vulnerability, Risk Assessments and Risk

Component:	Reduction
Project Number	**1.1.1**
Cost	**In house**

Objective:
To test the utility improve compliance and raise awareness of newly integrated coastal zone management policies and plans in relation to Union Island to climate change and improve coastal resilience through development control.

Rationale
Integrated Coastal Zone Management (ICZM) is relatively new to St Vincent and the Grenadines. Historical planning controls have included limited consideration of coastal ecosystem protection for climate resilience. But the fast onset of coastal climate impacts requires a radical shift in governance for ICZM that will benefit from an evaluation exercise. The small size of Union Island will allow for a comprehensive review and assessment of the ICZM elements, and adjustments to those components that are not in keeping with the local context. The effectiveness of the education programme will be evaluated

Project Activities	Cost
• Identification of test elements of the Union Island ICZM Plan and Policy • Physical Planning to work with development control partners (Works and Fisheries) to test-run the enforcement of those elements for a specific period • Public awareness of the trial in Union Island • Amendments as necessary, based on the trial, to the ICZM Plan and Policy	$0

Expected Results/Outcomes

- Thorough stakeholder understanding of ICZM for their island
- A thorough assessment of the ICZM provisions for Union Island before legal adoption
- On a trial basis, the representatives in the new ICZM development control system have the opportunity to test their ICZM implementation skills before being legally required to do so.

PROJECT NAME:	**Implementation of numerical and physical modelling techniques to inform shoreline stabilization in Union Island**
Investment	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction

Component:	
Project Number	**1.1.2**
Cost	**$300,000**

Objective:

- To reduce negative impacts of coastal engineering works on fragile coastal ecosystems
- To develop a culture of knowledge-based decision making for regulating shoreline stabilization projects
- To complete an implementation plan to address beach erosion in Union island

Rationale

The Ministry of Works has overall responsibility for coastal engineering works. However, the best practises employed in coastal engineering design have not been utilised. As a result, beach erosion continues unabated, in spite of engineering interventions at degraded sites. Union Island has suffered significant erosion on many beaches, increasing the vulnerability of coastal infrastructure to coastal hazards. The completion of a shoreline stabilization plan for the island will facilitate the search for funding sources for implementation.

Project Activities:	Cost
• Use of ocean and coastal data collected in Component 2 (Data Collection and Management) to conduct numerical modelling for beaches showing erosional trends in Union Island	75,000
• Conduct one (1) physical model for the most oceanographically complex beach and near-shore system	150,000
• Workshop for engineers in the Ministry of Works to promote knowledge-based regulation coastal engineering development	25,00 50,000
• Based on numerical and physical modelling outputs, generate a shoreline stabilization plan for Union Island, separated into discrete project segments	

Expected Results/Outcomes

- Increased understanding within the Ministry of Works of the use of numerical and physical models
- A series of science-based recommendations for shoreline stabilization in Union Island
- A document that facilitates the sponsorship of site-specific climate resilient projects

PROJECT NAME:	***Conduct a geology assessment of Union Island, Arnos Vale Catchment, and Georgetown Catchment as separate, single drainage basins inclusive of soil testing, ground water assessment and monitoring.***
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.1.3**
Cost	**$60,000.00**

Objective:

To conduct geological assessment, soil testing and ground water assessment and monitoring on Union Island and the Arnos Vale catchment

Rationale

The continuous trend being observed and projected is the increase of global air temperature between 1.5 and 2.0 degrees Celsius and the decrease in precipitation quantity. The projections are for a 7-8 % decrease in the length of the rainy season by 2050, while there is a 6-8% increase in the length of the dry season being projected for the same period. In addition, the frequency of intense rainfall is already up an average of 3% and this is projected to increase to 20% by 2050 and the number of consecutive days of heavy rainfall events is increasing.

Due to the above trends, it becomes imperative to develop and implement a robust national watershed management program inclusive of legislating and implementing a watershed management and integrated coastal zone management plans ultimately geared towards sustainable development and economic prosperity. Based on the trends, the following are most likely:

- Reduction in rainfall distribution
- Increase dry spells / drought like conditions
- Increase incidence of flash floods and flooding events
- Increase need for water storage
- Increase need to promote and engage in rainwater harvesting especially on mainland
- Promote and encourage water conservation practices along with the installation of water conservation devices
- Need to understand soil properties and structure for ground water movement and retention capability.

As a result of the above, some technical work in the form of soil testing, geological assessment, and ground water assessment and monitoring will be done through a consultant or regional training institution. This activity will be done in two areas namely Union Island and Arnos Vale Catchment. With regards to Union Island, the ground water assessment and monitoring coupled with the other technical work will be of significant importance as ground water is and can further become a primary source of freshwater for the people and communities of this Grenadine Island especially in light of the pressures being placed on the water resources by climate variability and climate change.

Also, salt water intrusion into ground water is one of the single most important adverse impacts of climate variability and climate change that will affect Union Island, thus the need to understand the rate at which this can happen and the rate at which freshwater must be removed from present and potential wells. The objective of the technical work to be done for the two mainland catchments on St. Vincent will be slightly different as surface water is of primary importance, thus the focus will be to determine the water retention and recharge capabilities (rate at which ground water recharge our rivers especially during the dry season) of the catchments due to soil properties and structure.

Overall, other benefits from such technical work include (1) knowing the engineering properties of our soils which will be of extreme importance to our construction industry and (2) assist in determining the best crops to grow and the nutrients and water requirements both spatially and temporally.

While the technical work is being done, capacity shall be built among the civil engineers within the Ministry of Works. The capacity building activity will be aimed at ensuring the civil engineers embrace the roles and responsibilities of soil engineers / soil scientists.

Project Activities	**Cost**
• *Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring*	• USD30,000
• *Conduct a geology assessment of Arnos Vale Catchment as a drainage basin inclusive of soil testing, ground water assessment and monitoring*	• USD30,000

Expected Results/Outcomes

- Develop and implement a robust national watershed management program inclusive of legislating and implementing a watershed management and integrated coastal zone management plans ultimately geared towards sustainable development and economic prosperity
- Determine the water retention and recharge capabilities (rate at which ground water recharge our rivers especially during the dry season) of the catchment due to soil properties and structure
- Know the engineering properties of our soils which will be of extreme importance to our construction industry
- Assist in determining the best crops to grow and the nutrients and water requirements both spatially and temporally
- Ensure the civil engineers embrace the roles and responsibilities of soil engineers / soil scientists.

PROJECT NAME:	**Implement forestry management activities inclusive of Silviculture activities along with bioengineering works and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, establish terraces and sedimentation traps, support best practices in Agriculture, establish / re-establish buffers, etc. on Union Island and within the upper and middle water catchments of Arnos Vale and Georgetown; in addition to building climate resilience by retrofitting a selected public building.**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.1.4**
Cost	**Total: $125,000** 1.1.4 = $125,000 1.2.4 = $65,000 1.3.1 = $15,000

Objective:

To implement forestry management and Silviculture activities along with bioengineering works and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, establish terraces and sedimentation traps, support best practices in Agriculture, establish / re-establish buffers, etc. on Union Island and within the upper and middle water catchments of Arnos Vale and Georgetown, in addition to building climate resilience by retrofitting a selected public building.

Rationale

The continuous trend being observed and projected is the increase in global air temperature between 1.5 to 2.0 degrees Celsius and the decrease in precipitation quantity. The projections are for a 7-8 % decrease in the length of the rainy season by 2050, while there is a 6-8% increase in the length of the dry season being projected for the same period. In addition, the frequency of intense rainfall is already up an average of 3% and this is projected to increase to 20% by 2050 and the number of consecutive days of heavy rainfall events is increasing. Due to the above trends, it becomes imperative to develop and implement a robust national watershed management program inclusive of legislating and implementing a coastal zone management plan ultimately geared towards sustainable development and economic prosperity. Based on the trends, the following are most likely:

- Reduction in rainfall distribution
- Increase dry spells / drought like conditions due to general increase in extreme events
- Increase incidence of flash floods and flooding events due to general increase in extreme events and increase intensity of heavy rain events leading to increase soil erosion, run-off of contaminants, and adverse effects on coastal waters (pollutants and sedimentation) and coral reefs
- Increase need for water storage
- Increase irrigation initiatives for Agriculture especially vegetable production
- Increase need to promote and engage in rainwater harvesting especially on mainland
- Promote and encourage water conservation practices along with the installation of water conservation devices
- Increased inland and coastal erosion and contamination of coastal areas

- Sea Level Rise – median projection 40 cm by 2080 (IPCC, 2007) – causing increased salt water intrusion, augmented by storm surges
- Strongest hurricanes more intense (10 - 20%), increasing disaster losses
- Increase sea surface temperatures – northward migration of fishes, bleaching of coral reefs, ocean acidification
- Increase rate of evaporation and evapo-transpiration
- Decrease in soil moisture content
- Changes in flowering, seeding, fruiting period
- Increase stress on biodiversity and indigenous species

With regards to the adverse impacts of climate variability and climate change on Union Island, actions must be focused on coastal protection, protecting coral reefs against sedimentation and other pollutants, providing fodder for small ruminants, and reforestation programs such as replanting mangroves and other coastal vegetation as well as establishing community forests in selected areas. In order to protect coastal areas against sea level rise and storm surges, efforts shall focus on replanting mangroves, sea grapes, white cedar and other indigenous coastal vegetation in addition to ensuring healthy coral reefs by preventing sediments and other pollutants from reaching the reefs by reducing/stopping soil erosion and nonpoint sources pollution.

Overgrazing, soil compaction by animals and soil erosion leads to land degradation that will be exacerbated by climate variability and climate change and a response will need to be the establishment of community forests that will provide fodder for animals (a cut and carry policy will have to be introduced and enforced) and attract rainfall to help alleviate the water shortage problem on the fairly dry island ecosystem. In addition water conservation practices will continue to be encouraged and supported through rainwater harvesting techniques, installation of water conservation devices and increase individual and community water storage capacity. Finally, with the projection that the intensity of hurricanes is most likely to increase by 10-20%, structural integrity of infrastructure will need to be assessed and corrective actions taken to enhance the structural integrity through retrofitting works.

The adverse impacts of climate variability and climate change on the water catchments / drainage basins of Arnos Vale and Georgetown require reforestation using indigenous species to prevent/reduce soil erosion, provide increase quantity and quality freshwater and provide food and habitats for biological diversity and supporting ecosystems, establishment and re-establishment of buffers along with the implementation of bioengineering works to reduce/prevent soil erosion and provide river bank stabilization, construct sedimentation traps and terraces to trap sediments to prevent siltation of rivers and reduce turbidity levels thereby enhancing water quality, and introduce best land use practices especially for the agriculture sector such as contour farming and selection of appropriate planting materials.

In addition, rainwater harvesting and storage along with the installation of water storage tanks on all buildings on mainland St. Vincent need to be promoted, encouraged and legislated. Thinning operations will be conducted to establish the three-storey forest structure that is ideal to increase water recharge and retention capabilities within the catchments and reduce / prevent soil erosion.

Project Activities	Cost
• Implement forestry management activities and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, possible establishment of terraces and sedimentation traps, support best practices in Agriculture and agro-forestry, establish / re-establish buffers, etc. on Union Island	• USD85,000
• Enhance structural integrity of a selected public building	
• Implement forestry management activities inclusive of Silviculture activities along with bioengineering works and other soil and water conservation measures such as reforestation, establishment of terraces and sedimentation traps, support best practices in Agriculture and Agro-forestry, establish / re-establish buffers, etc. within the upper and middle water catchments of Arnos Vale.	• USD40,000 • USD35,000
• Implement forestry management activities inclusive of Silviculture activities along with bioengineering works and other soil and water conservation measures such as reforestation, establishment of terraces and sedimentation traps, support best practices in Agriculture and Agro-forestry, establish / re-establish buffers, etc. within the upper and middle water catchments of Georgetown.	• USD45,000

Expected Results/Outcomes

- Protect coastal areas against sea level rise and storm surges
- Increase water recharge and retention capabilities within the catchments and reduce / prevent soil erosion
- Promote encourage and legislate rainwater harvesting and storage along with the installation of water storage tanks on all buildings on mainland St. Vincent
- Prevent and/or reduce soil erosion
- Provide increase quantity and quality of freshwater
- Provide food and habitats for biological diversity and supporting ecosystems
- Establishment and re-establishment of buffers with bioengineering works to reduce and/or prevent soil erosion and provide river bank stabilization
- Trap sediments to prevent siltation of rivers and reduce turbidity levels thereby enhancing water quality
- Introduce best land use practices especially for the agriculture sector such as contour farming and selection of appropriate planting materials
- Increase individual and community water storage capacity
- Enhance structural integrity of a public infrastructure

PROJECT NAME:	**Designation and delineation of drainage channels and buffer zones on Union Island, and in the Arnos Vale and Georgetown Catchments while defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.1.5; 1.2.5; 1.3.2**
Cost	**Total : $105,000.00** 1.1.5 = $65,000 1.2.5 - $40,000 1.3.2 = $0 (in- house)

Objective:
To designate and delineate drainage channels and buffer zones on Union Island, and in the Arnos Vale and Georgetown Catchments while defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems

This project directly speaks towards capacity building within the Ministry of Works with regards to roles and responsibilities of soil engineers / soil scientists. This will be done by enhancing the technical capacity / capability of the Civil Engineers and Civil Environmental Engineers within the Ministry of Works.

Also the technical knowledge obtain through this capacity building exercise will be quite beneficial to many government, quasi government and private / Civil Society organisations especially NEMO and the Physical Planning Unit. In light of this technical training and capacity building, policies and legislations with supporting institutional structure should be embark upon to move the Physical Planning Unit to a Quasi-Government Authority with a controlled level of autonomy.

This type of on the ground training will provide data and information to help address flooding and landslides. Enhance technology in the form of GIS will be used to prepare and store all relevant drainage maps. It is time that we legislate and enforce our formal drainage systems. Also, we will be embarking on river bank stabilization and excellent quality and quantity water. This will supports our social systems with regards to health, hygiene, education, sanitation, poverty reduction and overall improvement of the standard of living of the people within the various communities.

Project Activities	Cost
• Designation and delineation of drainage channels and buffer zones on Union Island, while defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems	• USD65,000

• Designation and delineation of drainage channels and buffer zones within the Arnos Vale and Georgetown Catchments, while defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems	• USD40,000

Expected Results/Outcomes

- Capacity Building within the Ministry of Works and any other agencies of 15 or so civil engineers
- The production of the legal and institutional frameworks that will strengthen our drainage systems, watersheds and ecosystems and processes
- Introduction of enhance/new technologies that will help the country make robust decisions that will ensure sustainable development and economic prosperity
- Reduce the incidence of flooding events, surface run-offs, and sheet erosion

PROJECT NAME:	**Warrawarrow River Defense and Arnos Vale Drainage Improvement**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.2.1**
Cost	**$2,000,000**

Objective:

This project is designed to measurably reduce the negative impacts to life, the environment, private property and critical public infrastructure which may result from flooding in Arnos Vale.

Rationale:

Arnos vale and neighbouring communities such as Fountain, Villa and Belair, have undergone significant developments in recent years including the construction of a number of major infrastructural projects. Due this development, the Warrawarrow river has experienced dramatic changes in flow, some reduction in its ability to adjust to and absorb disturbances leading to large increasing in flood flows. Without any intervention, this will continue to threaten the lives and properties of residents, commercial enterprises and a number of critical infrastructure including the E.T. Joshua Airport and the Arnos Vale Sporting Complex.
In additional to the issues with the river, there are also other drainage concerns in the Arnos Vale basin which need to be addressed as well.

Project Activities	Cost
The main activities of the project includes: ▪ Installation of gabion walls at the Warrawarrow river ▪ Construction of 350 metres of concrete lined drainage channel ▪ Construction of 2 detention ponds, and ▪ Construction of cross culvert	$2,000,000

Expected Results/Outcomes

- Gabion wall constructed
- Drainage improved
- Risk to human life measurably reduced
- Residential properties in Arnos Vale protected
- Threat to critical public infrastructure reduced

PROJECT NAME:	**Rehabilitation of River Crossings – Fenton River**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.2.2**
Cost	**$200,000**

Objective:

This project will rehabilitate deteriorating fords at the Fenton with a view to minimizing human impacts on the riverine ecosystems at Fenton river

Rationale:

Over time, the Fenton river has experienced dramatic changes in flow, frequently resulting in overflow of the river banks. While engineering solutions have been installed to bolster the river's ability to adjust, deterioration in these structures has reduced effectiveness. The project proposed to rehabilitate four fords and a swale at the Fenton river to reduce the incidence of flooding in the area.

Project Activities	Cost
The main activities of the project includes: ▪ Reconstruction of four (4) fords ▪ Construction of one (1) swale	$200,000

Expected Results/Outcomes

- Drainage improved
- Flooding reduced
- Threat to critical public infrastructure reduced

PROJECT NAME:	***Conduct a geology assessment of Union Island, Arnos Vale Catchment, and Georgetown Catchment as separate, single drainage basins inclusive of soil testing, ground water assessment and monitoring.***
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.2.3**
Cost	**$30,000**

Objective:
To conduct geological assessment, soil testing and ground water assessment and monitoring on Union Island and the Arnos Vale catchment

Rationale

The continuous trend being observed and projected is the increase of global air temperature between 1.5 and 2.0 degrees Celsius and the decrease in precipitation quantity. The projections are for a 7-8 % decrease in the length of the rainy season by 2050, while there is a 6-8% increase in the length of the dry season being projected for the same period. In addition, the frequency of intense rainfall is already up an average of 3% and this is projected to increase to 20% by 2050 and the number of consecutive days of heavy rainfall events is increasing. Due to the above trends, it becomes imperative to develop and implement a robust national watershed management program inclusive of legislating and implementing a watershed management and integrated coastal zone management plans ultimately geared towards sustainable development and economic prosperity. Based on the trends, the following are most likely:

- Reduction in rainfall distribution
- Increase dry spells / drought like conditions
- Increase incidence of flash floods and flooding events
- Increase need for water storage
- Increase need to promote and engage in rainwater harvesting especially on mainland
- Promote and encourage water conservation practices along with the installation of water conservation devices
- Need to understand soil properties and structure for ground water movement and retention capability.

As a result of the above, some technical work in the form of soil testing, geological assessment, and ground water assessment and monitoring will be done through a consultant or regional training institution. This activity will be done in two areas namely Union Island and Arnos Vale Catchment. With regards to Union Island, the ground water assessment and monitoring coupled with the other technical work will be of significant importance as ground water is and can further become a primary source of freshwater for the people and communities of this Grenadine Island especially in light of the pressures being placed on the water resources by climate variability and climate change.

Also, salt water intrusion into ground water is one of the single most important adverse impacts of climate variability and climate change that will affect Union Island, thus the need to understand the rate at which this can happen and the rate at which freshwater must be removed from present and potential wells. The objective of the technical work to be done for the two mainland catchments on St. Vincent will be slightly different as surface water is of primary importance, thus the focus will be to determine the water retention and recharge capabilities (rate at which ground water recharge our rivers especially during the dry season) of the catchments due to soil properties and structure.

Overall, other benefits from such technical work include (1) knowing the engineering properties of our soils which will be of extreme importance to our construction industry and (2) assist in determining the best crops to grow and the nutrients and water requirements both spatially and temporally.

While the technical work is being done, capacity shall be built among the civil engineers within the Ministry of Works. The capacity building activity will be aimed at ensuring the civil engineers embrace the roles and responsibilities of soil engineers / soil scientists.

Project Activities	**Cost**
• *Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring*	• USD30,000
• *Conduct a geology assessment of Arnos Vale Catchment as a drainage basin inclusive of soil testing, ground water assessment and monitoring*	• USD30,000

Expected Results/Outcomes

- Develop and implement a robust national watershed management program inclusive of legislating and implementing a watershed management and integrated coastal zone management plans ultimately geared towards sustainable development and economic prosperity
- Determine the water retention and recharge capabilities (rate at which ground water recharge our rivers especially during the dry season) of the catchment due to soil properties and structure
- Know the engineering properties of our soils which will be of extreme importance to our construction industry
- Assist in determining the best crops to grow and the nutrients and water requirements both spatially and temporally
- Ensure the civil engineers embrace the roles and responsibilities of soil engineers / soil scientists.

PROJECT NAME:	**Implement forestry management activities inclusive of Silviculture activities along with bioengineering works and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, establish terraces and sedimentation traps, support best practices in Agriculture, establish / re-establish buffers, etc. on Union Island and within the upper and middle water catchments of Arnos Vale and Georgetown; in addition to building climate resilience by retrofitting a selected public building.**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.2.4**
Cost	**Total: $65,000** 1.1.4 = $125,000 1.2.4 = $65,000 1.3.1 = $15,000

Objective:
SEE PROJECT 1.1.4

Rationale

SEE PROJECT 1.1.4

Project Activities	Cost
• SEE PROJECT 1.1.4	•

Expected Results/Outcomes

- SEE PROJECT 1.1.4

PROJECT NAME:	**Designation and delineation of drainage channels and buffer zones in the Arnos Vale Watershed zones and defining the legal**

	and legislative implementation of drainage channels
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.2.5 SEE PROJECT 1.1.5**
Cost	**$40,000**

Objective:
To mainstream the activities of the Ministry of Works.
Institutional strengthening for the Ministry of Works regarding coastal works.

Rationale:

Project Activities	**Cost $40,000**

Expected Results/Outcomes

-

PROJECT NAME:	**Application of Relevant Effluent Regulations and Standards at the Coastal Areas (Indian Bay and Villa Beach) in Arnos Vale Watershed**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.2.6**
Cost	**US$35,000**

Objective:
To protect near shore coral reefs as the main natural line of defence against storm surge and other climate related coastal impacts, by improving coastal water and sediment quality at the two beaches.

Rationale:
This component seeks to test the application of draft effluent standards on the ground, as well as guidelines for solid waste and wastewater management from recreational boating, for feasibility of enforcement and usefulness in reducing the impacts of high concentrations of marine pollutants reaching the near shore coral reefs and causing large scale mortality.

Project Activities	Cost
• To work with the residents, and businesses to address their point source marine discharges, based on draft guidelines and standards, through demonstration projects that address water quality • To amend, where required, the standards and guidelines to ensure compliance in all sectors	$35,000

Expected Results/Outcomes
- Increased knowledge of stakeholders regarding the standards and impacts on ecosystems
- Improved public awareness about the low-cost options for improving point source wastewater management
- Legal adoption of field-tested robust standards and guidelines

PROJECT NAME:	**Warrawarra River Delta and Greathead Beach Management Pilot Programme**
Investment Component:	Component 1. Climate Vulnerability, Risk Assessment and Risk Reduction
Project Number	**1.2.7**
Cost	**US$10,000**

Objective:

- To reduce flooding of residents and businesses located near the banks of the Warraworow River upstream
- To encourage participation of the downstream residents in flood mitigation
- To identify the optimum management process for the river delta, such that the beach retains its width for the attenuation of high wave energy

Rationale:

The greater is the sediment loading to the beach and near shore areas, the higher is the berm build-up at the delta of the River. As a result, when river stage reaches a critical height due to changing rainfall patterns and resultant flash flooding (i.e. higher than the river banks in specific areas), widespread flooding is experienced.

The beach and delta management project proposes the start of a permanent monitoring and sediment-clearing programme to assist in ensuring that high volumes of discharge reach the ocean at a faster rate, reducing the incidence of upstream flooding. (This project would be complemented by a dredging programme for the River channel as well.)

Project Activities:	Cost
• Conducting small stakeholder consultations with stakeholders in the lower river quadrant. Clearing of the debris and sediment at the delta of the River in association with the residents closest to the river mouth	10,000

Expected Results/Outcomes

- Reduction in flooding of residents on the banks of the river, by assisting in the maintenance of a lower stage through increased rates of discharge
- Improved knowledge and understanding by stakeholders of the river and beach ecosystem as a whole

PROJECT NAME:	**Implement forestry management activities inclusive of Silviculture activities along with bioengineering works and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, establish terraces and sedimentation traps, support best practices in Agriculture, establish / re-establish buffers, etc. on Union Island and within the upper and middle water catchments of Arnos Vale and Georgetown; in addition to building climate resilience by retrofitting a selected public building.**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.3.1**
Cost	**Total: $15,000** 1.1.4 = $125,000 1.2.4 = $65,000 1.3.1 = $15,000

Objective:
SEE PROJECT 1.1.4

Rationale

SEE PROJECT 1.1.4

Project Activities	Cost
• SEE PROJECT 1.1.4	

Expected Results/Outcomes

- SEE PROJECT 1.1.4

PROJECT NAME:	**Designation and delineation of drainage channels and buffer zones on Union Island, and in the Arnos Vale and Georgetown Catchments while**

	defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.3.2**
Cost	**$0** 1.1.5 = $65,000 1.2.5 - $40,000 1.3.2 = $0 (in- house)

Objective:

SEE PROJECT 1.1.5

Rationale:

SEE PROJECT 1.1.5.

Project Activities	Cost
•	$0

Expected Results/Outcomes

- SEE PROJECT 1.1.5

PROJECT NAME:	**Testing and monitoring of the enforcement of new building code provisions, including the training of building inspectors**
Investment Component: 1	Component 1: Climate vulnerability, Risk assessments and Risk reduction.
Project Number	**1.3.3**
Cost	**$15,000**

Objective:
To build skills, knowledge and understanding of the Building Code and enhance enforcement and inspection processes..

Rationale:
A new Building Code is now in place. A proper understanding of the Code should facilitate compliance. The project will also monitor new developments for compliance with the Building Code

Project Activities	Cost

• Monitoring of building codes • Workshops for building inspectors	$15,000

Expected Results/Outcomes

- Building inspectors trained in the application of the Building Codes
- Preparation of procedures /check list for carrying out building inspections under the Building Code

PROJECT NAME:	**Appropriate Numerical and Physical Modeling Techniques to Determine the Optimum Shoreline Stabilization for the Georgetown Pilot Area, including ecosystem conservation, and reduction of downstream impacts**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.3.4**
Cost	**US$100,000**

Objectives:

- To inform proposed coastal engineering intervention at Georgetown by the infusion of ocean and coastal modelling outputs into designs
- To build capacity in the Ministry of Works in basic modelling procedures
- To build ecosystem conservation by accounting for the impacts of structures on neighbouring ecosystems

Rationale:

The needs assessment for the design and construction of coastal structures for adaptation demonstrated the paucity of rigorous and scientifically based engineering interventions on the coast. As a result, the possibility exists that a coastal defence for climate change adaptation, could exacerbate coastal erosion downstream of the project site, because of deficiencies in data collection and modelling.

This type of design work should be accompanied by a strong training component for a Coastal Engineer within the Ministry of Works, to undertake the coastal programme. The extensive data needs of such a programme will also be addressed, and data optimization tested

Project Activities	**Cost**
• Newly trained Coastal Engineer to work with Consultants on numerical modelling for Georgetown	$100,000
• Data collection process jointly by Ministry of Works and Fisheries Division to determine permanency of the programme	In-house
	$100,00

Expected Results/Outcomes

- Complete jurisdictional responsibility for oceanographic monitoring
- A well-designed coastal engineering solution for Georgetown, based on modelling
-

PROJECT NAME:	**Georgetown Coastal Defense**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.3.5** (see also 1.3.6 activities applicable to Georgetown area)
Cost	**$1,900,000**

Objective:
This project is designed to measurably reduce the risk to life, the environment, private property and critical public infrastructure which may result from coastal erosion in the Georgetown community.

Rationale:
Georgetown is a rural coastal community on the north eastern coast of St. Vincent. It is the service centre for the windward communities, particularly those north of the Rabacca Dry River. As such, the government has, in recent years, made several large investments in the area including the construction of an Orphanage, reconstruction of the Georgetown Police Station and in 2010 the completion of the School for Children with Special Needs.
In addition, a Modern Medical Complex is being constructed which will provide diagnostic, surgical, laboratory, and dialysis services among other modern hospital services, and will significantly improve health care in St.Vincent and the Grenadines. There are also advanced plans to construct a multimillion dollar facility to house the Town Board Office, Revenue Office, Post Office, a branch of the National Commercial Bank, Restaurants, and medium sized shops in the vicinity of the proposed site. This will generate much needed economic activity and assist to further decentralize critical services to benefit these areas.
The Georgetown coast has over time but most notably in recent years suffered extensive erosion. At the site of the proposed works, this erosion threatens the main windward highway; the only playing field in Georgetown; other critical public infrastructure; private residences and a number of restaurants and shops along the coast. The problem has been exacerbated by damage sustained by the passage of several hurricanes including Tomas in October 2010 and now requires immediate attention.
It is estimated that the Georgetown Beach has lost over 30m of sand width over the last 20 years, and the general agreement in SVG is that climate change impacts such as sea level rise and storm surge have contributed to significant beach loss. This project seeks to halt the erosion trend on the beach and, using the model outputs for the data collection and modelling project at Georgetown, actually construct a shoreline stabilization structure.

Project Activities	Cost
The main activities of the project includes: ▪ Construction of a reinforced concrete, stepped sea wall ▪ Apply model outputs to inform final designs of structure, and supervise the construction of the project, using structural specifications for marine environments	$1,900,000

Expected Results/Outcomes
- Seawall constructed
- Residential properties along coast protected
- Critical public infrastructure protected
- Road access for northern communities maintained
- Significant improvement in the function of coastal structures
- Built capacity for coastal engineering design and construction supervision
- Greater knowledge of coastal processes at the project site, leading to enhanced

ecosystem resilience

PROJECT NAME:	**Assessment of Climate Change impacts on Coastal and Marine Ecosystems and Commercial Fisheries**
Investment Component:	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction
Project Number	**1.4**
Cost	**US$1,200.000** (Country-wide)

Objective:

- To provide an objective baseline evaluation of the current health of coastal and marine ecosystems taking into account all measurable impacts of climate change, and including human impacts that compound the negative effects on these systems
- To utilise all of the data and information collated to complete a draft integrated coastal zone management policy and plan for the islands of St Vincent and the Grenadines

Rationale:

The needs assessment for this project identified the limited supporting scientific evidence for the impacts observed in coastal areas throughout SVG. In addition, little effort has been made to assess human activities and behaviors that further degrade these coastal environments. Therefore, this comprehensive assessment will serve to inform the requirements for all aspects of coastal intervention, from ridges in the heart of each island, to protective reefs offshore. Further, the assessment will identify previous attempts at interventions that actually worsened the climate impacts, rather than improved resilience. The third rationale for this project is to provide a complete baseline assessment against which climate resilience interventions conducted in this programme may be measured.

Project Activities	Cost
a) Acquisition and installation of equipment and start-up of permanent data collection programme	55,000
b) Conducting coastal ecosystem surveys, using indicators of health	128,000
c) Identify, inspect and assess all coastal infrastructure for negative impacts on climate resilience	122,000
d) Quantify major river discharge volumes and concentrations of key pollutants to the coast	98,500
e) Quantify effluent discharge to beaches and nearshore areas from coastal properties	108,000
f) Identify and highlight best practices in wastewater treatment in support of coastal ecosystems	30,000
g) Assess land use patterns and that impact negatively on climate resilience	160,000
h) Quantify the negative impacts of recreational boating on the marine environment	68,040
i) Synthesize all data and information collected for inclusion in the proposed national data and information management system	66,000
j) Complete a draft integrated coastal zone management plan and policy for SVG	334,460
	$1,200,000

Expected Results/Outcomes

- A complete data directory of all climate and human-compounding impacts on the coastal and marine areas of SVG
- A draft integrated coastal zone management plan and policy
- A comprehensive series of technical benchmarks for interventions in drainage, discharges, land use planning, recreational boating,

PROJECT NAME:	**Capacity Enhancement in Climate Data Collection and Impact Monitoring**
Investment Component:	Component 2: Data Collection, Analysis and Information Management
Project Number	**2.1**
Cost	**US$583,910** (Country-wide)

Objective:
To improve the decision making capacity of the public and private sectors through the use of primary climate-related data in support of key climate resilience decisions.

Rationale:
St. Vincent and the Grenadines suffers from lack of primary climate and weather related data as well as climate impact monitoring data. It relies on proxy regional data in crafting climate resilience programmes. In the atmosphere of scare financial resources, it is pertinent that key investment decision should be supported by time series hydro-climatic data and the impact of these investments should be adequately monitored.

The country has neither infrastructure for near shore and coastal monitoring of waves, tides, currents and beach profile nor capacity for data analyses and impact assessments. There is also the need to improve the density of coverage of climate data throughout all the islands so as to produce a nation-wide monitoring and impact assessment.

Project Activities	Cost
• Acquisition and installation of data collection and monitoring equipment	$483,910
• Training of personnel in data collection and equipment maintenance	$100,000

Expected Results/Outcomes
- Knowledge-based decisions are made with respect to climate proofing investments
- Improved public awareness on the impact of climate variability on the local communities
- Improved landuse planning and development processes

PROJECT NAME:	**Coastal inundation analysis and modelling**
Investment Component:	Component 2: Data Collection, Analysis and Information Management
Project Number	**2.2**
Cost	**US$100,000**

Objectives:

- To develop coastal inundation models (based on different hazards) for use in land use planning, disaster management and public education
- To build community awareness (and build knowledge and capacity) of coastal hazards and their destructive potential
- To assist in bridging the gap between scientific monitoring/modelling and land use planning

Rationale:

The general focus of awareness about tropical cyclones in the Caribbean has been the wind and its potential impacts on built infrastructure. However, in recent years, stakeholders are becoming more aware of the coastal component of hydro-meteorological hazards. This project seeks to increase that awareness, not only among vulnerable coastal residents, but also among decision makers and technical agencies.

The model outputs, once animated, are capable of maximum visual impact on audiences, and will support the efforts of NEMO in planning disaster preparedness activities.

Project Activities:	Cost
• Development of models (using info from within the region and abroad) and simple web interface developed for capacity building	75,000
• A series of training and capacity building workshops in model interpretation and use for decision making	25,000

Expected Results/Outcomes

- A culture of informed decision-making is developed in the area of coastal development planning, both within the regulatory system and among land developers
- Improved education and awareness on the types and potential impacts of coastal climate-related hazards
- Best practises utilised by NEMO in disaster planning, as well as education and awareness building for coastal hazards

PROJECT NAME:	**Development of an Enterprise National Spatial Data Infrastructure (NSDI) in support of Climate Resilience**
Investment Component:	Component 2: Data Collection, Analysis and Information Management
Project Number	**2.3**
Cost	**US$270,000**

Objectives:

- To develop a harmonised platform for data analysis and data management country-wide.
- To facilitate unhindered data dissemination, data sharing, and data quality assurance among all stakeholders.

Rationale:

The results of the needs assessment showed that current national data management scenarios are in a state of chaos with: high levels of duplications and gaps; lack of clearly defined responsibility for data collection and data quality assurance; lack of protocols for data management and data sharing; inadequate infrastructure for developing a common database on the natural and built resources of the country.

Development of enterprise National Spatial Data Infrastructure (NSDI) in support of climate resilience data management through development of databases, data management protocols and standards, metadata, and training.

Project Activities	Cost
• Acquisition and installation of information and communication technologies	$150,000
• Development of data management protocols and standards	$20,000
• Training of personnel in data management	$100,000

Expected Results/Outcomes

Open access to key data needed to build climate resilience
Improved quality of key datasets
Improved quality of decisions

PROJECT NAME:	Development of draft integrated watershed conservation and

	management policy and action plan
Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.1**
Cost	**$80,000**

Objective:
To develop a draft integrated watershed conservation and management policy and action plan

Rationale

This project will streamline integrated water resources conservation and management. It will clearly define the roles and responsibilities of the primary major users, and define the institutional and legislative frameworks needed for robust implementation and enforcement. It will address the three major challenges which are:

- To ensure that the water resources are managed so as to maximize the contribution that these natural resources can make to increasing the productivity of the economies of the nation;
- To manage the water resources so as to maximize their contribution to the elimination of poverty and to raising the quality of life;
- To ensure that water resources are managed so as to minimize the impact of water-using economic activities on the quality of the environment.

Ultimately, this project will seek to ensure the following:

- Safeguard of existing water rights
- Improve knowledge of availability and reliability (quality and quantity) of water
- Safeguard of the environmental aspects
- Prevent conflict between competing users (conflict resolution)
- Prevent over-exploitation

Project Activities	Cost
• Conduct broad based consultations leading to the development of the policy and action plan	USD20,000
• Develop draft policy and action plan	USD60,000

Expected Results/Outcomes

- Produce a draft integrated water resources conservation and management policy and action plan

PROJECT NAME:	**Institutional strengthening for the MoFEP, MoHE, Ministry of Works and Physical Planning to boost Climate Change capabilities in-house**

Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.2**
Cost	**$230,000**

Objective:

To strengthen institutions for adjusting to climate resilience.

Rationale

In order to mainstream climate residence it will be necessary to strengthen several institutions that have responsibility for aspects of climate resilience. Institutional strengthening in the form of training, exchange and development of "best practices" will be implemented.

Project Activities	Cost
a) Preparation of land use zoning plans for the three pilot areas; These plans will assist in rezoning of these areas where there are hot spots (eg sea level rise) restrictions on building and greater use for recreational area. This would develop procedures, practices and experiences which could be utilized for consideration as to the suitability for zoning of all of SVG.	$60,000
b) Training of staff in drainage management taking into consideration land degradation issues.	$40,000
c) Institutional Strengthening of Physical Planning Unit. ▪ Preparation of Developers Handbook; ▪ Preparation of Coastal Zone, Management Handbook; ▪ Strengthen the capacity for the enforcement of building codes; ▪ Training for planners, environmental scientists, engineers and architects to better integrate hazard vulnerability into the design and construction process and coastal zone management issues; ▪ Training of professionals (engineers, architects, real estate developers) in the use and scope of the Building Codes ▪ Preparation of Coastal Zone Management Policy and Plan ▪ Coastal zone.	$120,000

Expected Results/Outcomes

- Land use zoning plans for three pilot areas;
- Staff trained in drainage management;
- Improved enforcement of building codes;
- Training/workshops for planners, environmental scientists and engineers;
- Developers Handbook;
- Coastal Zone Management Handbook.
- Coastal Zone Management Plan
- Coastal Zone Management Policy

PROJECT NAME:	**Enhancing the Technical and Institutional Capacity of the Metrology Office**
Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.3**
Cost	**US$225,000**

Objective:
To improve the technical and institutional capacity of the Metrology Office to collect, analyse, predict, and disseminate climate data to all stakeholders.

Rationale:
The Metrology Office is currently constrained with adequately trained personnel and facilities to undertake trends and predictive analyses of climate data. The Office relies on regional partners for its climate forecasting needs. In order for the PPCR project to be sustainable, the technical and institutional capacity of the Metrology Office needs to be improved.

Project Activities	Cost
• Training in trends and predictive analyses of climate data	$125,000
• Acquisition and installation of data collection and monitoring equipment	$100,000

Expected Results/Outcomes
- Improvement in local capacity to analyse and predict climate phenomena
- Improved access to climate information

PROJECT NAME:	Strengthened capacity for CWSA for hydrology, drainage and

	waste water management
Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.4**
Cost	**$40,000**

Objective:
To strengthen the technical capacity of the Central Water and Sewerage Authority (CWSA) in the areas of hydrology, drainage and waste water management

Rationale:

The CWSA has recently set up a water resources unit to address all the organisation's hydrology issues and this unit needs capacity building in the form hydrology technicians and enhance training for the hydrologist. In addition, understanding the natural drainage and implications is necessary and capacity will be built in this area especially with regards to Physical Hydrology, Watershed Processes and Human Impacts on Water Resources. Capacity will be improved with regards to the effects of land management and vegetation on the quantity, quality and timing of water yields, including floods, erosion and sedimentation.

The issue of waste water management is not address by any entity and it needs urgent attention. The CWSA is uniquely placed to address this as its legislative and institution structure is the most adequate and can be easily amended and enhanced to on board such responsibilities. The lack of waste water management allow for increase pollution of the environment especially and ground and surface waters. Training on waste water management will be provided and in order to implement, there will be need for policy formulation, legislation and regulations, and strict enforcement. Therefore, the training will embrace these areas as well.

Project Activities	Cost
• Strengthened capacity for CWSA for hydrology, drainage and waste water management	$40,000

Expected Results/Outcomes

- Build technical capacity in hydrology, drainage and waste water management
- Obtain a broader and more indepth knowledge of hydrology, drainage and waste water management and their interrelationships / interactions
- Establish the foundation for the development and implementation of waste water management

PROJECT NAME:	**Preparation of a small booklet, "Climate Change Governance in SVG"**
Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.5**
Cost	**$35,000** (incl. printing and distribution)

Objective:
To raise awareness of climate change and resilience issues amongst Government and the private sector in particular; to describe the roles and responsibilities of stakeholders (incl. regional responsibilities); and to describe the mutual benefits of partnerships.

Rationale:

Governance is particularly significant in the early stages of mainstreaming climate change considerations into National Development Planning. All Government Departments and Ministries need to know their role, that of others, and the responsibilities of government, the businesses community and individual citizens in building resilience and awareness. This small booklet, "Climate Change Governance in SVG" (24-32 pp.) is intended for wide distribution amongst all stakeholders.

Project Activities	Cost
• Desk review of regional examples • Interviews with relevant stakeholders • Draft text preparations • Stakeholder review • Finalise, print, distribute (repeat distribution in Year Two)	$25,000 $10,000 (printing) Total: $35,000

Expected Results/Outcomes

- Thorough stakeholder participation in the preparation of the booklet
- Clear concise guidance provided on governance issues for climate change
- Valued publication, revised every two of three years
- Basic document utilized throughout the awareness building activities in SVG

PROJECT NAME:	**Development of draft policy and legislation in support of**

	mainstreaming climate change resilience into development planning.
Investment Component: 3	Strengthening of existing policy, legal and institutional framework to address climate change
Project Number	**3.6**
Cost	**$345,000**

Objective:

The Project will seek to mainstream climate resilience into the Policy and Legislative framework of St Vincent and the Grenadines (SVG). At present the current policy and legislative framework is not adequate to respond to the ongoing requirements of climate change. This Project will build on existing policies and plans in SVG to bring these in line with climate resilience requirements in SVG.

Rationale:

j) Preparation of Data Management Policy.
This policy would establish a framework for the management of data including protocols and standards.

k) Finalizing National Development Plan

l) Finalizing Climate Change adaptation

m) Preparing National Emergency Plan
The current National Emergency Plan is outdated and does not address climate resilience issues or some other key disaster management issues. The new National Emergency Plan will be prepared to address key issues in disaster management.

n) Finalizing National Economic and Social Development Plan

o) Drafting Drainage Regulations

p) Drafting amendments to legislation relating to the Office of Chief Engineer Act
This Act will recognize the role of the Chief Engineer in drainage developments as well as urban development

q) Drafting amendments to the Town and Country Planning Act
These amendments will increase the level of fines and penalties and introduce other sanctions (eg injunctions, stop orders etc to strengthen the enforcement of the planning process. The amendments will also require the development of a coastal zone management plan. Once approved by the Minister, the Plan be tabled in Parliament and gazetted.

r) Drafting EIA Regulations

s) Drafting a Marine Pollution Act
A draft Marine Pollution Act will be drafted to address Coastal and Marine Pollution.

t) Drafting Disaster Management Act

u) Drafting Environmental Management Act
A current draft Environmental Management Act exists, the object of the Project would be to revise and finalize the current draft.

v) Drafting Effluent Limitation regulations

w) Revised Building Codes: include drainage – setback provisions
In order to improve land development the Building Codes will be revised

x) Workshops/Consultations will be held in respect of all draft Policies, Plans, Acts and Regulations.

Project Activities	**Cost $345,000**

Expected Results/Outcomes

1. Data Management Policy; (2) National Emergency Plan; (3) Finalized National Economic and Social Development Plan; (4) Finalized climate change Adaptation Policy; (5) Drainage Regulations; (6) New Act to regulate operation of the office of Chief Works Officer; (7) Draft Town and Country (Amendment) Act; (8) Draft EIA Regulations; (9) Draft Marine Pollution Act; (10) Draft Disaster Management Act; (11) Draft Effluent Limitation Regulations; (12) Revised Building Codes

PROJECT NAME:	**Water conservation and management in the Grenadines**

Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.7**
Cost	**$110,000**

Objective:
To develop and legislate comprehensive water conservation and management policy and action plan for the Grenadines and by extension SVG.

Rationale

There is the need to provide the protection to the water resources of SVG as required especially with the happenings of climate variability and climate Change. One such way is to have a comprehensive water conservation and management policy and action for the country. However, due to the unique situation in the Grenadines with regards to sources of freshwater, water harvesting techniques and the attitude and behaviour towards freshwater, the policy and action must address the Grenadines from this unique perspective and as priority. The policy must address water quality, quantity and storage; extraction rate from wells; salt water intrusion along with other adverse effects of climate change; establishment and security of man-made catchments; desalination and the use of renewable energy sources to support; provide relevant links to waste water management; incentives for the procurement and installation of water conservation devices with regards to residential versus commercial/business/private sector versus public buildings especially health and education facilities; and the ancillary supports (legislation and regulations, institutional framework, human resources, etc.).
There is a draft water policy; however, it appears that it only addresses potable water and does not comprehensively addresses the holistic concept of water resources. This draft policy need to be revised with the objective of improving it to address the shortfalls and gaps.

Project Activities	Cost
▪ Develop and legislate a comprehensive water conservation and management policy and action plan for the Grenadines and by extension SVG	$95,000
▪ Printing and distribution	$15,000

Expected Results/Outcomes

- Produce a water conservation and management policy and action plan for the Grenadines
- Implement various water conservation and management activities on Union Island with the foresight to transfer such best practices and technologies to other Grenadine Islands such as Bequia, Mayreau and Canouan
- Increase water storage capacity on Union Island
- Increase water use and reduce wastage
- Increase water quality and quantity

PROJECT NAME:	**Institutional Strengthening of NEMO**
Investment Component:	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change
Project Number	**3.8**
Cost	**$100,000**

Objective:

To improve the institutional capacity of NEMO to guide the national programmes both of the public and private sectors in building resilience in support of climate change adaptation using public education as a vehicle.

Rationale:

There is no sustained programme in St. Vincent and the Grenadines that aims to provide information and training to the public and private sectors on how to build resilience to climate change. Project PPCR 4.1 ***"National 3-year Public Education to Build Climate Resilience"*** is intended to fill this gap. There is however the need for a nationally recognized and respected organisation to implement this national sustainable programme that will provide targeted information on climate resilience building to specially identified groups of vulnerable persons

NEMO is well placed to be tagged as the national lead organisation for this process. NEMO is established legislatively as a conglomerate of government agencies, departments, NGOs, and private sector organisations that advise on policies and actions necessary for disaster risk reduction for the entire country. NEMO is however limited in its capacity to generate all the necessary information for a national climate change outreach programme. NEMO can however lead the process of collating pertinent information packages, facilitate Train the Trainer Workshops and generally lead on directing the information flow as per the National Public Education Plan on "Taking the Message of Building Resilience to Every Man, Woman, and Child."

It will however be necessary to build the training capacity of NEMO and to provide a consultant to guide the development and implementation of a sustained national climate resilience building outreach programme.

Project Activities	Cost
• Train the Trainer (climate change) workshops (some through overseas attachment)	$30,000
• Training of Local Disaster Risk Management Committees to be leaders and champions of climate change resilience building	$20,000
• Enhancement of local (communities) capacity to implement and participate in the programme	$20,000
• Enhancement of training Capacity o Computers and other training equipment	$30,000

Expected Results/Outcomes

- Improved public awareness on the impact of climate variability on the local communities
- Cadre of Trainers in climate change available to facilitate and instruct workshops locally
- Improved capacity of NEMO to deliver training and publications on climate change resilience building

PROJECT NAME:	**National three-year public education programme to build community based climate risk and resilience**
Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.1**
Cost	US$300,000

Objective: To develop and implement a national public education programme that will provide information and guidance necessary to build community based climate resilience.

Rationale:

There is limited capacity in St Vincent and the Grenadines for the establishment and deliver of a fully integrated public education programme that delivers specific and sustain messages/information packages to vulnerable group and the population as a whole in the area of building resilience to climate variability and change. This projects aims to fill this gap through the creation and implementation of a comprehensive national public education programme that incorporates the science, economics and social aspects of climate change.

The projects also targets communities that are at high risk to the effects of climate change to provide an awareness and sensitization to the identified communities with the expressed purpose of guiding small business owners on actions and initiatives that can help to create new livelihoods and protect and preserve existing livelihoods.

This project is linked to PPCR 3.8 which will provide for building the institutional capacity of a national agency, NEMO, to lead the delivery of the national public education programme.

Project Activities	Cost
• Development of a National Public Education Strategy and Plan on "Taking to Message of Climate Resilience Building to Every man, woman and child"	$50,000

• Implementation of a National Public Education Programme (over 3 years)
  o Sustained electronic and print media programme
  o Publication of Climate resilience brochures
  o Workshops, exhibitions and Road Shows
• Community Based Programme on Livelihood creation and preservation in identified climate change hotspots (pilot sites and Red Zone) in the country
	$200,000
	
	$50,000

Expected Results/Outcomes

- A national population that is more receptive to embracing initiatives and actions necessary for climate resilience building
- A sustained and systematic outreach programme that incorporates and showcases the works and results of various agencies involved in climate change adaptation
- Creation of new and climate resilient livelihoods

PROJECT NAME:	**National curriculum development (including teacher training) for secondary schools in climate change and disaster risk reduction**

Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.1a**
Cost	**$150,000** (incl. training, textbook design and CC information publication)

Objective:

To build skills, knowledge and awareness of climate change and resilience issues for high school teachers and youth; to develop appropriate curriculum materials for all levels of high school students, to research and utilize existing examples from the region or elsewhere to be adapted for SVG.

Rationale:

Current curriculum materials for developing climate change knowledge and awareness can be significantly strengthened by the inclusion of CC and resilience issues in geography, social studies and science subjects for high schools.

Youth are generally very interested in this current and vital subject. They become teachers themselves, transferring knowledge and experiences back to families and communities (elderly especially).

This will include text book design and publication drawing in existing Caribbean examples and others from around the world to be modified for SVG, and local preparation of a book "*Climate Change For Kids in the Caribbean*" prepared by well known SVG child author Storm Halbich.

Investment in youth education will realize a tenfold return at the very least.

As a Phase Two of this project, it is envisaged those trained teachers will be able to subsequently develop materials for primary education in house in year two or three.

Project Activities	Cost
• Review of existing regional examples of curricula. • Interviews with relevant teachers/educators, curriculum developers. • Workshop with teachers to develop outline material/contents, messages, identify specific curriculum needs etc. • Prepare drafts, circulate, review, design texts, activate curriculum testing • Test, review, finalise prepare text books and teaching materials. • Develop teacher training, train selected teachers, print texts and teacher training materials, distribute.	Printing/materials $30,000 "*Climate Change For Kids in the Caribbean*" $5000 Curriculum dev't testing, etc. $25,000 Total: $60,000

Expected Results/Outcomes

- High school curriculum developed, teachers trained, curriculum on climate change, resilience and disaster risk reduction incorporated into high school subjects.
- Awareness of CC issues significantly raised in youth and communities.
- Resilience strengthened through knowledge.

PROJECT NAME:	**Planning and development of an early warning system in SVG**
Investment	Component 4: Design and implementation of a Public Education and

Component:	Capacity Building Programme
Project Number	**4.2**
Cost	**$60,000** (incl. training and partnership building)

Objective:
To raise awareness of climate change and resilience issues amongst Government and the private sector in particular; to describe the roles and responsibilities of stakeholders (incl. regional responsibilities); and to describe the mutual benefits of partnerships.

Rationale:

Current early warnings sent via cell phone networks is not well understood and has not been as effective as it should be. A review of all possible and necessary EWS's will be undertaken, review of regional examples and strengthening the cell phone network.

This national system will include community-based EWS training, community awareness, Digicel/Lime telephone network partnerships, issuing of warnings, planning and management of EWS - including specific community based training throughout SVG (consider the use of Common Alerting Protocol). Needs investigations will be undertaken to determine the supplementary activities to strengthen and maintain the EWS for SVG. .

Project Activities	Cost
• Review of existing system, desk review of regional examples • Interviews with relevant stakeholders, cell network providers • Workshop with communities to develop protocols, messages, identify specific needs etc. • Prepare report of options, recommended actions • Design and activate system • Test, review, finalise prepare awareness information for adults and children.	Total: $60,000

Expected Results/Outcomes

- Thorough stakeholder participation in the preparation of the EWS
- Clear concise guidance provided on warnings, responses for children and adults
- Short publication on "how it works" for all citizens.
- System installed, tested and in good working order.

PROJECT NAME:	**Technical Training for monitoring Programmes in Support of Climate Resilience**
Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.3**
Cost	**$75,000**

Objective:
To improve national capacity in the areas of coastal ecosystem monitoring and assessment, marine meteorology, climatology, hydrology and agronomy

Rationale:
To support the legal and scientific processes identified in this project, and to achieve long-term sustainability of national efforts in climate resilience, it is critical that specific expertise is developed and maintained. Skills in climatology and marine meteorology will enable SVG to conduct a permanent monitoring programme for ocean and atmospheric climate, understanding both the rate of climate change, as well as the change itself, and responding appropriately to the impacts observed.

This project proposes a rigorous national integrated coastal zone management programme, charting the way for pioneering activities in the areas of coastal ecosystem monitoring and conservation, data collection and analysis for coastal hazard assessment, coastal engineering and coastal planning. These programmes require skills present in-country, and this project component begins the task of building that needed capacity.

This project will embark on improving the technical skills of hydrology technicians, enhance training of local hydrologist, improve the skills of a local agronomist to incorporate climate change into agriculture planning and development, and improve the technical skills of a forecaster and train an additional forecaster to provide farmers and the Ministry of Agriculture with useable information specific to Agriculture. This information will assist farmers and the Ministry in selecting the types of crops to grow at certain times of the year and what yields to expect both from agriculture crops and livestock. The additional training in hydrology will support the need for comprehensive data on water resources availability and demand and this information is needed before an extremely needed comprehensive water management can be introduced in St. Vincent and the Grenadines. The capacity built will now ensure that there is accounting for environmental flow requirements that is a critical factor which can extend its impact beyond the immediate physical extents to the economic and social condition of the island inhabitants.

Project Activities	Cost
• Regional (CIMH) training programmes in climatology and marine meteorology for two technicians in each discipline	$12,000
• Regional exchanges and training programmes in CZM strategies and procedures for five field officers	$15,000
• Training for MoW engineer to conduct regional training in coastal engineering	$30,000
• Regional (CIMH) training programs in hydrology (two technicians, one advance training of local hydrologist) and forecasting (one forecaster and advance training for local forecaster)	$13,000
• Training for Ministry of Agriculture Agronomist to incorporate climate change into Agriculture planning and development	$5,000

Expected Results/Outcomes
- Improved capacity to develop and implement permanent monitoring programmes for climate resilience

PROJECT NAME:	**Training of GIS Technicians**
Investment Component:	Component 4: Design and Implementation of a Public Education and Capacity Building Programme
Project Number	**4.4**
Cost	**$20,000**

Objective:
To develop the technical capacity of the staff of state agencies to collect and process spatial data necessary for monitoring development activities in pilot watersheds

Rationale:
Data on the current characteristics of physical development is required to develop climate proofing strategies and programmes. This data must be collected and updated on a regular basis. They also provide the basis for hazard mitigation policy and action plans. Whereas the country has a spatial database of buildings based on 2007 aerial photos, this database lacks information on the current uses of the buildings and the type of structure. Information on the characteristics of critical facilities is also lacking. There is thus a need to develop the capacity of hired staff of relevant agencies to collect and maintain data on building and facilities.

Project Activities	Cost
Training on GIS database design and data integration	$10,000
Training of field data collection using mobile GPS/GIS technologies	$10,000

Expected Results/Outcomes

- Availability of current and accurate data on built facilities
- Improved quality of vulnerability assessment studies

PROJECT NAME:	**Production and Distribution of Community-Based Climate Risk Maps**
Investment Component:	Component 4: Design and Implementation of a Public Education and Capacity Building Programme
Project Number	**4.5**
Cost	**$17,500**

Objective:
To improve public awareness on the impact of climate change on local communities

Rationale:
The active involvement of local communities is a precursor to the sustainability of climate resilience programmes. Engaging the residents in the local community to produce and publish base maps of climate risk in their community is a proactive approach that gains buy-in and documents local knowledge. Using a participatory approach, community members will be able to discuss and agree on climate risk elements and share ideas on coping strategies. The risk map will be distributed to each household and thus improve the level of awareness. It will also improve the advocacy potential of the community.

Project Activities	Cost
Community-based climate risk mapping	$9,000
Printing and distribution	$8,500

Expected Results/Outcomes

- Enhanced community awareness of climate risk in their neighbourhood
- Community participation and interaction fostered

PROJECT NAME:	**Training of a National Spatial Data Manager**
Investment Component:	Component 4: Design and Implementation of a Public Education and Capacity Building Programme
Project Number	**4.6**
Cost	**$30,000**

Objective:
To improve the technical and managerial skills of designated National Spatial Data Manager

Rationale:
The current project-based approach to data management requires a paradigm shift to that of managing data as a resource in an enterprise environment. It requires that the data manager must have an understanding of the needs and requirements of the end users, act as a data broker and a clearing house for climate related data, facilitate the use of data for decision making and develop programmes for data quality assurance and data currency. This knowledge base is currently lacking amongst the spatial data managers in St. Vincent and the Grenadines.

Project Activities	Cost
Training in enterprise GIS: Systems configuration and protocols	$10,000
Training in metadata development and management	$10,000
Training in data evaluation, quality assurance, usage enhancement	$10,000

Expected Results/Outcomes
Creation of virtual and seamless data infrastructure for the sharing of climate resilience information

PROJECT NAME:	**Extension of Social Risk Assessment to cover all constituencies in St. Vincent and the Grenadines.**
Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.7**

Cost	**$7,500** (incl. training of numerators/ Field Officers as required)

Objective:

To expand the initial Social Assessment undertaken during the preparation of Phase I SPCR and Investment Programme preparations, with additional sampling from all constituencies and all Grenadine islands. This will provide additional materials for the hazard and vulnerability mapping, and be included in the development of community-based approaches (e.g. early warning systems) and overall National awareness building .

Rationale:

The initial 350 individuals surveyed (a statistically valid number designed by the Census and Statistics Unit on the MoFEP), returned very rich data and information on vulnerability, needs and levels of awareness in communities throughout the DVG. At little cost, and with strong Government support, this expansion will further substantiate findings form the initial survey and ensure a complete coverage of the country.

This will be a valuable vehicle for the development of community-based approaches to building resilience, awareness building and hazard mapping.

Project Activities	Cost
• Review of existing survey, make small adjustment as necessary • Retrain Field Officers as necessary. • Conduct up 1500 additional surveys over two months • Compile results, adjust maps, publish relevant findings, feed back to communities.	In-house plus $500/consitiuency, 15 Constituencies Total: $7,500

Expected Results/Outcomes

- Compilation of thorough data and information on resilience, awareness and needs of communities.
- Awareness of CC issues significantly raised in elderly and communities.
- Resilience strengthened through knowledge.

PROJECT NAME:	**Prepare Guidelines for Commercial Fishing and Recreational boating including strategy planning for the disposal of solid waste, grey and black water**
Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.8**
Cost	US$50,000

Objective: To ensure that commercial fishermen and recreational boaters in SVG marine waters are made aware of climate change impacts on coastal and marine ecosystems, and how on-board activities may exacerbate those impacts, especially in respect of wastewater management

Rationale:

There is a vibrant boating industry in SVG, with both national and foreign boats fishing commercial species, and recreational boating as a significant contributor to the tourist sector. However, there is currently limited regulation of boating activities in the reduction of human-compounding climate impacts.

This targeted public awareness, education and best practises training and information dissemination programme for boaters builds on the requirement for entry into SVG by the Immigration and Customs Departments. Utilizing this first entry point for information and recommendations reduces the negative human component of climate impacts. One spin-off benefit is the necessary training of the Government officers in these two departments to understand and present the information as well.

Project Activities	Cost
• Development of training materials, training of Immigration and Customs officers, printing of education materials and detailing procedures for dissemination	$50,000

PROJECT NAME:	**Development of information packages for families and communities in the "Red Zone"**

Investment Component:	Component 4: Design and Implementation of a public education and capacity building programme
Project Number	**4.9**
Cost	$55,000

Objective:

- To ensure that all families and businesses within the coastal strip of land between the 0m to 5m contours are aware and educated regarding the climate vulnerabilities they face;
- To support individual and community disaster risk reduction activities that build climate resilience

Rationale:

Many disaster risk reduction best practices have been shown to be more effective at the community level, where community leadership and teamwork lead to reduced risks of disasters worldwide. As a consequence of its coastal topography, SVG is defined by discrete coastal communities within specific watersheds or valleys, unlike some other Caribbean islands, where coastal settlements are continuous. Each community is able to increase resilience to coastal climate-related and other hazards through a shared understanding of the vulnerabilities faced by each community, and clear guidance concerning activities and programmes that result in disaster risk reduction,

Project Activities	Cost
• Identification and training of DRR 'champions' within each community • Development and printing of information packages for all families and businesses within the "Red Zone" on all hazards identified. • Leadership and "Train the Trainers" programmes for all communities • Workshops and presentations on all hazards facing the specific community and recommended actions	$55,000

Expected Results/Outcomes

- Thorough stakeholder understanding of hazards in the Red Zone.
- Knowledge and implementation of a suite of hazard mitigation activities, both at the individual, household, and community levels.
- Community trainers sustain education and awareness programmes beyond the life of the project.

PROJECT NAME:	**PREPARE STRATEGIC PLANS FOR THE DEVELOPMENT OF PARTNERSHIPS BETWEEN GOVERNMENT AND THE PRIVATE SECTOR**
Investment Component: 4	Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.10**
Cost	**$10,000**

Objective:
To establish collaborative mechanisms between Government and the private sector.

Rationale
The effective management of climate change requires partnerships between the public and private sector.

Project Activities	**Cost**
• Workshop involving business sector, general public and the financial and insurance sector regarding issues related to climate resilience. • Informal consultations with private sector in respect of areas where private sector can make financial, human or other contributions to climate resilience.	**$10,000**

Expected Results/Outcomes

- Greater awareness by private sector in regard to climate resilience issues participation of private sector to the various Disaster Committees
- Financial or other assistance from the private sector in the renovation of shelters and assistance to disaster.

PROJECT NAME:	**Awareness and education program for farmers and communities in the pilot areas, on the use of agrochemicals that leads to surface freshwater contamination**
Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	**4.11**
Cost	**$15,000**

Objective:
To develop and implement an awareness and education program for farmers and communities in the pilot areas on the use and best practices of agrochemicals so as to prevent surface freshwater contamination

Rationale

In most cases farmers are only concern about application of agrochemicals to improve crop yields and do not think or pay attention on the impact of these chemicals on the natural environment. On many occasion some farmers even abuse the use of chemicals by overusing because the thinking is that stronger the dosage (required / relevant dosage ignored) less problems with pests and diseases and higher will be the yields. The cohesive relationships between the chemicals and the soil is not understood and considered. Also, after agrochemicals application and the physical presence of the chemicals are no longer visible, farmers think that the agrochemicals no longer exist in the soil and if some soil is eroded and enters the rivers then there are not any chemicals in the water, but only soil. To compound the issue, farmers will cultivate up to the edge of the river banks, removing any or all buffers that help reduce erosion and sedimentation of the rivers. This thought process needs changing. This is because farmers will take their livestock lower downstream of the same rivers to drink water and even bathe and wash clothes. Women and children are usually most affected because they will use the rivers more than the men. This can also lead to serious health implications and possible pregnancy deformities/complications.

In addition, the soil with the chemicals will eventually reach the coast where both (soil and chemicals) are deposited in/on living ecosystems such as seagrass beds, coral reefs, lagoons, and mangroves thereby damaging and destroying these living ecosystems. This is extremely dangerous because these living ecosystems that are destroyed and damaged provide coastal protection against storm surges and sea level rise, nursery ground for aquatic life (freshwater and marine), food / source of protein for rural communities and act a natural filter between land and sea. Therefore, farmers need to be made aware and educated on these pertinent issues.

See also Project number 4.1.

This project has been incorporated into this National three year public education programme.

Project Activities	Cost
• Develop and implement an awareness and education program for farmers and communities in the pilot areas on the use and best practices of agrochemicals so as to prevent surface freshwater contamination	• • •

Expected Results/Outcomes

- Farmers adopt and practice best agriculture practices
- Enhance knowledge on the adverse impacts of agrochemicals on the natural environment, ecosystems and humans
- Reduce contamination/pollution of rivers and coastal waters
- Increase environmental integrity of ecosystems
- Building climate resilience with regards to enhance coastal protection against storm surges and sea level rise

PROJECT NAME:	**Caribbean exchange of research, capacity building, training and public education systems, policy and practices**
Investment Component:	Component 4: Design and implementation of a Public Education and Capacity Building Programme
Project Number	4.12
Cost	US$90,000

Objective:
To foster collaborative action-research among regional institutions involve in PPCR pilot projects through exchange of ideas, work programmes, facilities, and personnel.

Rationale:
St. Vincent and the Grenadines does not have the critical mass to undertake developmental research and capacity building in support of climate resilience programming and implementation. Through the development of regional linkages and pooling of resources, the country will be able to sharing experiences and initiate joint action research. This will be done through collaboration with leading regional institutions such as CCCCC, CIHM, Barbados Coastal Protection Unit, UWI.

Project Activities	Cost

• Establishment of a sub-regional action research team
  o Travel and accommodation
  o Meeting facilitation
	$55,000

• Development of a knowledge-porter for sharing of experience	$15,000

• Semi-annual meeting of key researchers
  o Travel and accommodation
  o Meeting facilitation
	$20,000

Expected Results/Outcomes

- An high skilled regional advisory team on climate change resilience building
- Regular exchange and training of personnel involved in climate change adaptation programmes
- A vibrant knowledge-porter as a custodian of project results, regional initiative and a venue for expert meetings.

9. Investment Programme Matrix of Investment Projects

(on the following pages)

Project / Programme	Project Component #	Component 1: Climate Vulnerability, Risk Assessments and Risk Reduction	Institutional Strengthening			Preliminary Costs (USD)	Implementation Period	Beneficiaries	Implementing Agency
		SEE MORE DETAILED PROJECT DESRIPTIONS BELOW	Knowledge mgt., Consultants	Goods	Works				
	1.1	**PILOT AREA ONE: Union Island**							
		(sub-projects under Pilot Area One)							
PPCR	1.1.1	Evaluation of the application of Union Island's ICZM Plan and community awareness strategy.	**in-house**			$0	Year 2,3	Planning. local communities, marine parks, tourism sector	
PPCR	1.1.2	Implement appropriate numerical and physical modelling techniques for the shoreline stabilization programmes in Union Island.	**$300,000**			$300,000		pilot area residents, ministry of works and planning	
PPCR	1.1.3	Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring.	**In -house plus $30,000**			$30,000	year 3	MAFF, Ministry of Tourism, Seismic Unit, Land and Surveys Department, Physical Planning Unit, Contractors and Engineers	Land and Surveys Department & Soil conservation Unit
PPCR	1.1.4	Replanting of mangroves in selected areas, mangrove and coastal vegetati0n nursery establishment, soil and water conservation measures.Including retrofitting of selected shelters @$10,000 per shelter (total $40,000 with special attention to gender sensitive design).	**in-house**	**$20,000**	**$105,000**	$125,500	Year 2,3	Communities, CWSA, Fishers, Tourism, MAFF	Forestry Department (MAFF) and Soil Conservation Unit
PPCR	1.1.5	Drainage designs for Union Island (to address land degradation) as a single drainage basin inclusive of the various communities and GIS mapping to record drainage systems	**$40,000**		**$25,000**	$65,000	year 3	Communities, Building Contractors and Engineers, Tourism Ministry, Hotels and Resorts, Physical Planning Unit, MAFF	MoW
					Subtotal	**$520,500**			

	1.2	**PILOT AREA TWO: Arnos Vale Watershed**							
PPCR	1.2.1	River defense: Construction of gabion/reinforced concrete for the Warrawarrow including drainage improvements work: Arnos Vale	**in-house**	**$2,000,000**		$2,000,000	Years 2.3	MoW, pilot community, visitors to SVG,	MoW
PPCR	1.2.2	Rehabiliation of River Crossings (fords/culverts x5): Fenton River	**in-house**	**$200,000**		$200,000	Years 1,2	MoW, uppoer watershed residents, visitors to the upper watershed area,	MoW
PPCR	1.2.3	Conduct a geology assessment of Arnos Vale as a single drainage basin inclusive of soil testing, ground water assessment and monitoring.	**$30,000**			$30,000	year 1	Farmers, MAFF, Physical Planning Unit, Contractors and Engineers	Land and Surveys Department & Soil conservation Unit
PPCR	1.2.4	Conduct Forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures	**in-house**	**$15,000**	**$50,000**	$65,000	year 1	Communities, CWSA, Farmers, MAFF local communitites	Forestry Department (MAFF) and Soil Conservation Unit
PPCR	1.2.5	Designation and delineation of drainage channels and buffer zones in the Arnos Vale watershed, and defining the legal and legislative implications of drainage channels.	**in house $40,000**			$40,000	year 3	Communities, Farmers, Building Contractors and Engineers, Physical Planning Unit, MAFF	MoW
PPCR	1.2.6	Application of relevant effluent regulations/standards at the coastal area in Arnos Vale (Indian Bay and Vila Beach).	**in-house plus $35,000**			$35,000	year 3	local communitites, tourism industry, sea bathers, coastal residents,recreational swimmers	MoW
PPCR	1.2.7	Warraworrow/Greathead Beach management (beach and delta breaching of berm, sediment removal)	**in house**		**$10,000**	$10,000	year 1	beach goers, riverbank residents, low income households along the river. local communitites	MoW
					Subtotal	**$2,380,000**			

	1.3	**PILOT AREA THREE: Georgetown Watershed**							
PPCR	1.3.1	Conduct Forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures	**in-house**	**$15,000**		$15,000	year 2	Communities, CWSA, Farmers, MAFF	Forestry Department (MAFF) and Soil Conservation Unit
PPCR	1.3.2	Designation and delineation of drainage channels and buffer zones in the Georgetown watershed, and defining the legal and legislative implications of drainage channels.	**in-house**			$0	year 2 & 3	Communities, Farmers, Building Contractors and Engineers, Physical Planning Unit, MAFF	MoW
PPCR	1.3.3	Testing and monitoring of the enforcement of new building code provisions, including training of building inspectors	**$15,000**			$15,000	Yr 2-3	land developers, propoerty owners, local communitites	Physical Planning
PPCR	1.3.4	Appropriate numerical and physical modelling to determine optimum shoreline stabilization techniques for the Georgetown pilot area, including ecosystem conservation, and reduction of downstream impacts	**in house plus $100,000**			$100,000	Year 1	Gorrgetwon coastal residents, climate change modellers, local communitites, MoW	MoW
PPCR	1.3.5	Coastal Defense: Georgetown (by administrative centre/opp. Ferdie's)	**in-house**	**$1,900,000**		$1,900,000	Yr 2	Gorrgetwon coastal residents, climate change modellers, local communitites, MoW	MoW
PPCR	**1.4**	Assessment of Climate Change impacts on Coastal and Marine Ecosystems and Commercial Fisheries, including the completion of a Coastal Zone Management Policy and Plan, taking into conosideration gender sensitiveissues relevant to climate change..	$1,200,000			$1,200,000	Year 1,2	statutory agencies, line ministries, regulatory agencies, red zone residents, tourism sector, developer of tourist facilities, recreational boaterslocal communitites	Fisheries/National Parks/Tobago Cays
					Subtotal	**$3,230,000**			
		TOTAL				**$6,130,500**			

BRIEF PROJECT/INVESTMENT DESCRIPTIONS

1.1.1 Evaluation of the application of Union Island's ICZM Plan and community awareness strategy.
To test the utility improve compliance and raise awareness of newly integrated coastal zone management policies and plans in relation to Union Island to climate change and improve coastal resilience through development control.

1.1.2 Implement appropriate numerical and physical modelling techniques for the pilot area.
This modelling programme will allow Ministry of Works to account for reduction of downstream and nearshore impacts of hard coastal engineering projects, resulting in the design of site specific hard or soft engineering projects for Union Island, where indicated by the modelling. Reduction of downstream impacts, resulting in a shoreline stabilization plan and site specific hard or soft engineering project for Union Island, inclusive of appropriate soft and hard options where indicated. To reduce negative impacts of coastal engineering works on fragile coastal ecosystems. To develop a culture of knowledge-based decision making for regulating shoreline stabilization projects. To complete an implementation plan to address beach erosion in Union island

1.1.3 Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring.
To conduct geological assessment, soil testing and ground water assessment and monitoring on Union Island and the Arnos Vale catchment

1.1.4 Replanting of mangroves in selected areas, mangrove and coastal vegetatin nursery establishment, soil and water conservation measures.Including retrofitting of selected shelters
To implement forestry management and Silviculture activities along with bioengineering works and other soil and water conservation measures such as replanting of mangroves and other plant species in selected areas, establishment of flying nurseries, establish terraces and sedimentation traps, support best practices in Agriculture, establish / re-establish buffers, etc. on Union Island and within the upper and middle water catchments of Arnos Vale and Georgetown, in addition to building climate resilience by retrofitting a selected public building

1.1.5 Drainage designs for Union Island (to address land degradation) as a single drainage basin inclusive of the various communities and GIS mapping to record drainage systems
To designate and delineate drainage channels and buffer zones on Union Island, and in the Arnos Vale and Georgetown Catchments while defining the legal and legislative implications of drainage channels for various communities and GIS mapping to record drainage systems

1.2.1 River defense: Construction of gabion/reinforced concrete for the Warrawarrow including drainage improvements work: Arnos Vale
This project is designed to measurably reduce the negative impacts to life, the environment, private property and critical public infrastructure which may result from flooding in Arnos Vale.

1.2.3 Conduct a geology assessment of Arnos Vale as a single drainage basin inclusive of soil testing, ground water assessment and monitoring.
To conduct geological assessment, soil testing and ground water assessment and monitoring on Union Island and the Arnos Vale catchment. See also 1.1.3 above.

1.2.4 Conduct Forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures
See 1.1.4 aove.

1.2.5 Designation and delineation of drainage channels and buffer zones in the Arnos Vale watershed, and defining the legal and legislative implications of drainage channels.
To mainstream the activities of the Ministry of Works. Institutional strengthening for the Ministry of Works regarding coastal works. (See 1.1.5 above)

1.3.1 Conduct Forestry management activities inclusive of Silviculture along with bioengineering works and other soil and water conservation measures
(See 1.1.4 above).

1.3.2 Designation and delineation of drainage channels and buffer zones in the Georgetown watershed, and defining the legal and legislative implications of drainage channels.
(See 1.1.5 above)

1.3.3 Testing and monitoring of the enforcement of new building code provisions, including training of building inspectors
To build skills, knowledge and understanding of the Building Code and enhance enforcement and inspection processes.

1.3.5 Coastal Defense: Georgetown (by administrative centre/opp. Ferdie's)
This project is designed to measurably reduce the risk to life, the environment, private property and critical public infrastructure which may result from coastal erosion in the Georgetown community.

1.4 Assessment of Climate Change impacts on Coastal and Marine Ecosystems and Commercial Fisheries, including the completion of a Coastal Zone Management Policy and Plan.
(including compounding human-made impacts, coastal effluent discharge, waste water treatment, recreational boating (linked to preparation of guidelines in C4), coastal land use, drainage systems etc.). This assessment will include the completion of a Coastal Zone Management Policy and Plan with site-specific solutions for climate resilience in SVG.

Project / Programme	Project Component #	**Component 2: Data Collection, Analysis and Information Management**	**Institutional Strengthening**			**Preliminary Costs (USD)**	**Implementation Period**	Beneficiaries	Implementing Agency
		SEE MORE DETAILED PROJECT DESRIPTIONS BELOW	**Knowledge mgt., Consultants**	**Goods**	**Works**				
PPCR	2.1	Acquisition and installation of telemetric hydro-climatic weather stations and software.		$583,910		$583,910	Years 1,2,3	MET Office, MOA, CWSA, VINLEC, NEMO	CWSA, Met Office
PPCR	2.2	Coastal inundation impacts modelling (storm surge, sea level rise, high energy wave action, winter swells).	$100,000			$100,000	Year 2	Red Zone Residents, Tourism Industry, Minisitry of Works	MoW
PPCR	2.3	Development of enterprise National Spatial Data Infrastructure (NSDI)	$120,000	$150,000		$270,000	Years 1,2,3	Physical Planning, Lands and Survey, Telecomunications	Telecommunications
		SUB-TOTALS				**$953,910**			

BRIEF PROJECT/INVESTMENT DESCRIPTIONS

2.1 Acquisition and installation of telemetric hydro-climatic weather stations and software.

GIS and GPS hardware and software, as well as near shore and coastal monitoring stations for waves, tides, currents and beach profile measurements, among others) with sufficient density in all islands. (See Equipment on separate Sheet). To improve the decision making capacity of the public and private sectors through the use of primary climate-related data in support of key climate resilience decisions.

2.2 Coastal inundation impacts modelling (storm surge, sea level rise, high energy wave action, winter swells).

including mapping for St. Vincent and the Grenadines, particularly aimed at communities and businesses in the Red Zone of the three pilot areas. (Collaboration with Regional modelling initiatives will be valuable.) To develop coastal inundation models (based on different hazards) for use in land use planning, disaster management and public education
To build community awareness and capacity of coastal hazards and their destructive potential. To assist in bridging the gap between scientific monitoring/modelling and land use planning.

2.3 Development of enterprise National Spatial Data Infrastructure (NSDI)

To develop a harmonised platform for data analysis and data management in support of climate resilence data management through development of databases, data management protocols and standards, metadata, and training. To facilitate unhindered data dissemination, data sharing, and data quality assurance among all stakeholders.

Project / Programme	Project Component #	Component 3: Strengthening of existing policy, legal and institutional framework to address Climate Change	Institutional Strengthening			Preliminary Costs (USD)	Implementation Period	Beneficiaries	Implementing Agency
		SEE MORE DETAILED PROJECT DESRIPTIONS BELOW	Knowledge mgt., Consultants	Goods	Works				
PPCR	3.1	Integrated Watershed Management Plan	$80,000			$80,000	Years 1,2,3	Environment and communities, all line ministruies, agenciues.	MoHE
PPCR	3.2	Institutional strengthening for the MoFEP, MoHE, Ministry of Works, and Physical Planning to boost Climate Change capabilities in-house.	$220,000	Printing and distribution $10,000		$230,000	Years 1,2,3	Physical Planning, Rivers andBeaches Authories, Hoteliers, Tourism Industry	Physical Planning
PPCR	3.3	Strengthened capacity of the Met Office for forecasting and inter-governmental coordination.	$125,000	Communications equipment $100,000		$225,000	Years 1,2	Met Officers, MOAF&F, VINLEC, National Parks	MET Office
PPCR	3.4	Strengthened capacity for CSWA for hydrology, drainage and waste water management.	$20,000 / year for two years.			$40,000	Years 1,2	CWSA	CWSA
PPCR	3.5	Preparation of a small booklet, "Climate Change Governance in SVG" (24-32 pp. max, for wide distribution amongst stakeholders with special attention to the climate change and gender issues) (SHOULD BE MOVED TO COMPONENT 4.)	$25,000	Printing and distribution $10,000		$35,000	Years 2,3	Families and businesses in the Red Zone, NGOs, all Grenadines Residents	MoFEP
PPCR	3.6	Development of draft policy and legislation in support of mainstreaming climate change resilience into development planning.	$345,000			$345,000	Years 1,2,3	Physical Planning, Ministry of Health and the Environment, CWSA, coastal Hotels and businesses	Physical Planning
PPCR	3.7	Water conservation and management in the Grenadines.	$95,000	Printing and distribution $15,000		$110,000		Residents of the Grenadines, CWSA,	CWSA
PPCR	3.8	Institutional strengthening NEMO	$100,000			$100,000	Years 1,2,3	NEMO, Ministry of Agriculture, Local Disaster Committees,	NEMO
		SUB-TOTALS				**$1,165,000**			

BRIEF PROJECT DESCRIPTIONS

3.1 Comprehensive Watershed Management Plan (to be completed)

3.2 Institutional strengthening for the MoFEP, MoHE, Ministry of Works, and Physical Planning to boost Climate Change capabilities in-house.
Prepare for strengthening of EIA porcesses, preparation of revised land use zoning plans, and revise the building code and guidelines to include drainage issues (focus on climate resilience) to guide future development and strengthen monitoring and enforcement capability (in conjunction with the National Sustainable Land Management Programmed currently under review by Government) The Town and Country Planning Act should be amended to include integrated coastal zone management provisions for the declaration of the coastal zone management plan.

3.3 Strengthened capacity of the Met Office for forecasting and intergoivernmental coordination.
To improve the technical and institutional capacity of the Metrology Office to collect, analyse, predict, and disseminate climate data to all stakeholders. including marine forecasting, communications equipment, planning for linkages to global systems of climate tracking, in close collaboration with regional organisations and initiatives. This includes a strategy for inter-givernmental capacity building, and relationships between Agriclture, NEMP CWSA, Forestry, VINLEC, National Parks, Environment and other ministries. Training and capaacity building for Met Officers.

3.4 Strengthened capacity for CSWA for hydrology, drainage and waste water management.
In-house training and exchanges, utilizing Caribbean (CIMH) experts over two years. Training may include experts from other ministries. To strengthen the technical capacity of the Central Water and Sewerage Authority (CWSA) in the areas of hydrology, drainage and waste water management.

3.5 Preparation of a small booklet, "Climate Change Governance in SVG"
The discussion of Governence is particularly significant in the early stages of mainstreaming climate change considerations into National Development Planning. All Government Departments andMinistries need to know their role, that of others, and the responsibilities of government, the businesses community and individual citizens in buidling resilience and awarenesss. This small booklet, "Climate Change Governance in SVG" (24-32 pp.) is intended for wide distribution amongst all stakeholders.

3.6 Development of draft policy and legislation in support of mainstreaming climate change resilience into development planning.
To improve the quality of governance with respect to the administration of climate resilience programmes
To provide transparency and coherence in the regulatory and legislative processes, revise National Physical Development Plan (in collaboration with the Sustainable Land Management Project), including prep of data management policy (including protocols and standards), revision of National Emergency Management Plan, drafting EIA regulations, finalising Environmental Management Act, revise Disaster Management Act , drafting Marine Pollution Act, revising the National Economic and Social Development Plan, drafting Effluent Limitation Guidelines and comprehensive consultations.

3.7 Water conservation and management in the Grenadines
Prepare management plans for fresh, potable and a sustainable solution for water needs in the Grenadines and St. Vincent - including rainwater harvesting best practices, local training on water conservation, low cost water solutions, sustainable water recycling etc. (incl. public education programme). To develop and legislate comprehensive water conservation and management policy and action plan for the Grenadines and by extension SVG.

3.8 Institutional strengthening NEMO
To improve the institutional capacity of NEMO to guide the national programmes both of the public and private sectors in building resilience in support of climate change adaptation using public education as a vehicle, provide technical training in Climate Change (Specialist); enhancement of local Community Disaster Management Committees (training, computers, public education)

Project / Programme	Project Component #	Component 4: Design and implementation of a Public Education and Capacity Building Programme	Institutional Strengthening			Preliminary Costs (USD)	Implementation Period	Beneficiaries	Implementing Agency
		SEE MORE DETAILED PROJECT DESRIPTIONS BELOW	Knowledge mgt., Consultants	Goods	Works				
PPCR	4.1	National three-year public education programme to build community based climate risk and resilience				$300,000	Years 1,2,3	Local communities, businesses, lawmakers, policymakers	NEMO, and line Ministries
PPCR	4.1a	National curriculum development (including teacher training) for secondary schools in climate change and disaster risk reduction.	$75,000	$75,000		$150,000	Years 1,2,3	Education, teachers, school kids, parents, lcoal communities	Education
PPCR	4.2	Planning and development of an all hazards early warning system in SVG, including special needs of women and children and the elderly.	$60,000			$60,000	Year 1,2	Vulnerable Communities Country wide, NEMO, Met Office	NEMO, Met Office
PPCR	4.3	Technical training for monitoring programmes in support of climate resilience (15 candidates - climatology, marine meteorology, coastal zone monitoring, hydrology, and agronomy)	$25,000 over three years			$75,000	Years 1,2,3	MET Office, MOA, CWSA, VINLEC, NEMO	
PPCR	4.4	Technician training for 15 Vincentians in GIS data processing (candidates drawn from different Ministries (two to three per ministry).	Two one week training sessions @ $10,000 each			$20,000	Year 1,2	Lands and Surveys, MOA, Valuation, Physical Planning	Physical Planning
PPCR	4.5	Production of community-based Climate Risk Base Maps in the three pilot areas	$17,500			$17,500	Year 2,3	Communities, Parishes, NEMO	MoHE, NEMO
PPCR	4.6	Training for senior Data/information management specialist	One staff (training and salary/year for 3 years) $10,000/year			$30,000	Year 1,2,3	MoPP, NEMO	MoHE, NEMO, MoPP
PPCR	4.7	Extension of Social Risk Assessment to cover all constituencies in St. Vincent and the Grenadines with special attention to those most vulnerable including single mothers, women, elderly, the informed and children.	In-house plus $500/consitiuency, 15 Constituencies $7,500			$7,500	Year 1	Community, Parishes, NEMO	MoFEP
PPCR	4.8	Prepare Guidelines for Commercial Fishing and Recreational boating	$35,000	$10,000		$50,000	Year 2	Tourism Industry, Fisherfolks, Fisheries Unit,	Fisheries Unit
PPCR	4.9	Development of information packages for families and communities in the "Red Zone" .	$35,000	$10,000 Year One, $10,000 Year Two		$55,000	Year 2,3	Families in the Red Zone, busineses in the Red Zone, local communities	NEMO
PPCR	4.10	Prepare strategic plans for the development of partnerships between Government and the Private sector	$10,000			$10,000	Year 1	Businesses sector, general public, finance and insurance sector	MoFEP
PPCR	4.11	Awareness and education program for farmers and communities in the pilot areas, on the use of agrochemicals that leads to surface freshwater contamination. (Llinked to 4.1 above)	$5,000 /year for 3 years			$15,000	Year 1,2,3	Farmers, local residents	Agriculture / Forestry
PPCR	4.12	Caribbean-SVG exchange of research, capacity building, training and public education systems, policy and practices	$20,000 /year training, education capacity building etc. Best preactices meetings for example.	Travel budget annual $10000=$30000		$90,000	Years 1,2,3	NEMO, Physical Planning	MoFEP
		SUB-TOTALS				**$805,000**			

BRIEF PROJECT/INVESTMENT DESCRIPTIONS

4.1 National three-year public education programme to build community based climate risk and resilience
To develop and implement a national public education programme that will provide information and guidance necessary to build community based climate resilience, including a community-based climate risk management programme and community leaders training. This will include Hurricane preparedness education and training, building civil defence capacity. Programme design, testing community-based approaches, design prepare publications, brochures etc.

4.1a National curriculum development (including teacher training) for secondary schools in climate change and disaster risk reduction
To build skills, knowledge and awareness of climate change and resilience issues for high school teachers and youth; to develop appropriate curriculum materials for all levels of high school students, to research and utilize existing examples from the region or elsewhere to be adapted for SVG, including text book design and publication. (Draw in existing Carib examples and others from around the world to be monfied for SVG).

4.2 Planning and development of an early warning system in SVG
This national system will include community-based EWS training, community awareness, Digicel/Lime telephone network partnerships, issuing of warnings, planning and management of EWS - including specific community based training throughout SVG (consider the use of Common Alerting Protocol). Needs investigations will be undertaken to determine the supplementary activities to strengthen and maintain the EWS for SVG.

4.3 Technical training for monitoring programmes in support of climate resilience
To improve national capacity in the areas of coastal ecosystem monitoring and assessment, marine meteorology, climatology, hydrology and agronomy. (15 candidates - climatology, marine meteorology, coastal zone monitoring, hydrology, and agronomy)

4.4 Technician training for 15 Vincentians in GIS data processing (candidates drawn from different Ministries (two to three per ministry).
To develop the technical capacity of the staff of state agencies to collect and process spatial data necessary for monitoring development activities in pilot watersheds 4.5 (risk assessment and vulnerability maps generated with local community support and inputs). Including basic training workshops in community risk management.

4.5 Production of community-based Climate Risk Base Maps in the three pilot areas
To improve public awareness on the impact of climate change on local communities.

4.6 Training for senior Data/information management specialist
To improve the technical and managerial skills of designated National Spatial Data Manager, for regular updating, review and monitoring of the use, availability and accessibility of relevant GIS and risk management data, documentation and maps. (possibly from Land Mangement Unit in Physical Planning, person to have oversight for GIS and data collection/ management for all ministeries and agencies)

4.7 Extension of Social Risk Assessment to cover all constituencies in St. Vincent and the Grenadines.
To expand the initial Social Assessment undertaken during the preparation of Phase I SPCR and Investment Programme preparations, with additional sampling from all constituencies and all Grenadine islands. This will provide additional materials for the hazard and vulnerability mapping, and be included in the development of community-based approaches (e.g. early warning systems) and overall National awareness building.

4.8 Prepare Guidelines for Commercial Fishing and Recreational boating
To ensure that commercial fishermen and recreational boaters in SVG marine waters are made aware of climate change impacts on coastal and marine ecosystems, and how on-board activities may exacerbate those impacts, especially in respect of wastewater management, including strategy planning for the disposal of solid waste, grey and black water (and the use of holding tanks as a medium term solution). Information Publications.

4.9 Development of information packages for families and communities in the "Red Zone" .
This project will take an "all hazards" approach to community-based disaster risk reduction, coastal ecosystems information etc.. Delivery of talks, leader training, advocacy training, Living in the "Red Zone". Publications

4.10 Prepare strategic plans for the development of partnerships between Government and the Private sector
To establish collaborative mechanisms between Government and the private sector to combat the adverse impacts of climate change. This would include the compilation and subsequent development of example best practices from the region and elsewhere

4.1.1 Awareness and education program for farmers and communities in the pilot areas, on the use of agrochemicals that leads to surface freshwater contamination
(Llinked to 4.1 above)

4.12 Caribbean-SVG exchange of research, capacity building, training and public education systems, policy and practices
To foster collaborative action-research among regional institutions involve in PPCR pilot projects through exchange of ideas, work programmes, facilities, and personnel and to build regional exchange and collaboration. Establish partnership with Barbados Coastal Zone management Unit for example (training and capacity building), 5Cs etc..

Strategic Programme for Climate Resilience

SAINT VINCENT AND THE GRENADINES

PHASE TWO PROPOSAL

Resources Documents

ANNEXES

2 March 2011

Contents of the Annexes

1. Pilot Programme for Climate Resilience, Caribbean Regional Track First Progress Report

Prepared by Patricia Mendoza
PPCR Regional Coordinator

Submitted to Gerard Alleng
IDB PPCR Caribbean Coordinator
Inter-American Development Bank
Washington, D.C.

Copied to Dr. Neville Trotz
Caribbean Community Climate Change Centre

February 7th, 201

Pilot Programme for Climate Resilience, Caribbean Regional Track, First Progress Report

Background

The Pilot Programme for Climate Resilience (PPCR) is the first programme to become operational under the Strategic Climate Fund (SCF). The Fund in turn is one of two which make up the Climate Investment Fund (CIF). The PPCR was approved in November 2008, and Caribbean countries accepted an invitation to participate in the program in on May 14, 2009. The PPCR is intended to-

- Pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning;
- Strengthen capacities at the national levels to integrate climate resilience into development planning;
- Scale up and leverage climate resilient investment, building upon other ongoing initiatives;
- Enable learning by doing and lesson sharing at the country, regional and global levels;
- Strengthen cooperation and capacity at the regional level to integrate climate resilience in national and appropriate regional development planning and processes.

The Caribbean participation in the PPCR consists of national track and regional track programmes.[1] Joint missions are critical aspect of programme monitoring; for the PPCR regional track, the first joint mission was undertaken in June, 2010 in Barbados. One key output of the mission was a decision to engage a consultant to assist in the "coordination and implementation of activities under the Caribbean Regional –Track." Coordination activities would include linkages and relevance to country level and other regional activities geared toward building climate resilience. Main responsibilities of the Regional Coordinator are listed below, and the full terms of reference can be found at Annex 1.

1. Undertaking a needs assessment to identify tools, training and data gap analysis for implementing the PPCR;
2. Assessing whether the PPCR could support specific interactive elements of the Information Clearing House (ICH);
3. Undertaking a regional and national level consultations and dissemination of information concerning the PPCR Phase I to regional stakeholders in the public and private sector, non-government organizations (NGOs), bilateral agencies and other civil service organizations;
4. Identification and analysis of institutional capacity needs, existing knowledge, studies, research and assessment of gaps for implementation of PPCR regional track programme;
5. Identify possible areas and partners where the private sector can be supportive of regional adaptions strategies;
6. Support preparation and development of joint missions and assist technical team from IDB, World Bank and regional organizations in the coordination and implementation of PPCR regional track.

[1] Caribbean pilot countries are (i) Jamaica (ii) Haiti (iii) Saint Lucia (iv) Saint Vincent and the Grenadines (v) Grenada and (vI) Dominica.

Activities Completed as of February 4, 2010

Design of Caribbean PPCR Phase I Activities and Financing Proposal

With the contracting of a consultant as of November 8th, 2010, coordination and implementation of PPCR regional track activities were initiated. Initial tasks were geared toward consolidating design of the Phase I programme and preparation of a proposal for its financing. The key output of this Phase I is to be a Strategic Plan for Climate Resilience (SPCR) to be implemented in a follow-up Phase 2.

The preliminary draft of the Phase 1 regional track activities was prepared, discussed at a meeting of November 11, 2010 meeting to review PPCR progress. The draft financing proposal was revised and circulated for stakeholder input. Once comments were received and incorporated, an updated draft was circulated for further inputs, final comments received and amendments made and the proposal was submitted to the PPCR Review Committee at the end of December, 2010. The proposal was approved on January 19, 2011. Minor edits recommended by committee members were incorporated in the final edit of the proposal and the document finalized for dissemination.

Per the proposal, the Phase I Regional Track activities approved were the following-

Module 1: Capacity Development and Information Sharing

1. Support for Strengthening of data management capacity.

   Evaluation of data collection and management systems and processes;

   Workshop on climate modeling and monitoring systems.

2. Identification of Data Needs.
3. Information sharing and exchange of best practices.
   a. Assessment of need for additional functionality of the information clearing house.

Module II: Advocacy and policy development

1. Regional Policy Dialogue.
2. Stakeholder consultations.
3. Development and piloting of climate risk screening toolkit
   a. Piloting of screening tool.
   b. Formulation of toolkit.

Module III: Coordination, scoping and SPCR preparation

1. Coordination and national programs interface
   a. Participation in joint missions.
   b. Support to the development of regional results framework.
   c. PPCR Phase I coordination and transition to PPCR Phase II.
2. Gap Analysis of climate resilient systems, capacities and practices in the PPCR pilot countries.

b. Caribbean PPCR Start-up Activities

The first PPCR regional track start-up activity was the initial work-break down for the modules and activities listed above. This work breakdown, which can be found at Annex 2, better details the intended PPCR Phase I activities.

c. Assessment of clearing house mechanism

Discussions were initiated with the information technology (IT) team of the Caribbean Community Climate Change Centre (CCCCC) toward understanding the intended design of the Information Clearing House (ICH). The discussions helped to clarify that the core of the ICH is a document management system (DMS) which is being populated and refined to allow for ICH functionality.

The design process so far entails assessment of a web-based and desk-top interface. The second fully integrates with Microsoft Office programmes, allowing users to seamlessly access the DMS, which presents as a "drive" on users' computer systems. Both the web-based and desk-top interface were shared by the IT unit with the PPCR Regional Coordinator for collaboration on their assessment.

The ICH will involve various levels of users, and document saving will include options available at any of the levels that the user would want. The IT team also shared a draft MOU which is being refined and is intended to facilitate the collaboration of users. In addition to the type of data to be shared, the MOU provides for parties' responsibilities and limitations, intellectual property rights and metadata requirements.

Interaction with team developing the Implementation Plan for the Regional Framework for Achieving Development Resilient to Climate Change

The PPCR Regional Coordinator has initiated and is maintaining regular communication with the team which is preparing the Implementation Plan (IP) for the Caribbean Regional Framework for Development Resilient to Climate Change. So far the Coordinator and the team have shared background information on the respective initiatives and are liaising to ensure that conflicts are avoided and efforts and resources maximized. The IP preparation team has shared a database of projects and initiatives that have been undertaken in the region with the PPCR team. This database is expected to prove a key starting point for the PPCR gap analysis exercise.

The PPCR Coordinator is also included now in the monthly meetings that are conducted to track progress of the IP design.

Gap Analysis

A draft framework for analyzing gaps in climate resilience systems, capacities and practices in the PPCR pilot countries was prepared. The gaps will be assessed for plans, policies and strategies, institutional and individual capacities and information and data. The framework, found at Annex 3, is intended to guide the assessment of gaps in the priority areas indicated in the PPCR Phase I financing proposals. Assessment will be geared toward the regional priorities of supporting improvement in climate modeling and monitoring capacity and in improving the enabling policy and institutional framework for climate resilience. The assessment will be informed also by national priorities of PPCR pilot countries as listed below.

- Agriculture and food security
- Coastal zone management
- Infrastructure
- Land use planning and human settlement
- Human health
- Water resources
- Tourism

3. Immediate Next steps

a. Joint Missions

Second joint missions for Saint Vincent and the Grenadines and Grenada have been scheduled respectively for February 15th and 16th, and February 17th and 18th, 2010. It is anticipated that the PPCR Regional Coordinator will participate in these, as well as joint missions for other PPCR pilot countries.

b. Clearing House Mechanism

Collaboration will continue with the IT team at the Caribbean Community Climate Change Centre to determine the best approach to providing PPCR focal points and representatives from other countries with early access to the ICH. The process will also involve explicit efforts to identify what

stakeholders anticipate from a clearing house facility. The collaboration is expected to result in mutual benefit. For the IT team, it would provide early feedback on ICH functionality from a small team of users and so support design improvement. For the PPCR, it will facilitate information sharing and enable determination of whether and what measures for additional functionality of the ICH should be incorporated into the regional SPCR.

c. Regional Policy Dialogue and Stakeholder Consultations

Consistent with the requirements at 3.1(d) of the TOR, Phase I activities includes participation of PPCR regional track representatives in regional consultations to disseminate information on the PPCR. A second, and equally or more important objective of this dialogue would be to draw information on priorities for improving contribution to or acquisition of climate resilience on the part of the region's stakeholders. To this end, participation in a number of regional meetings will be sought, and parallel consultations through direct interviews or focus group meetings will be organized. The consultations will center on the priority areas of the national and regional track programmes, and will include stakeholders with involvement in and perspectives on the intersection of climate resilience and cross cutting issues such as gender and poverty.

In addition to assessment of data needs, the meetings to be targeted and/or organized will include any scheduled event within the region or to be attended by regional experts in the PPCR priority areas.

A preliminary schedule of regional meetings can be found at Annex 4. Meetings that are of the highest priority or will be attended by PPCR team members are shaded.

d. Preparation of Terms of Reference

i) Evaluation of data collection and management systems and processes

Terms of reference for a consultant for the evaluation for the data collection and management systems and processes will be developed over the next week and circulated and discussed among the PPCR regional track team.

ii) Development of climate risk screening toolkit

Terms of reference for a consultant for the design and application of a climate risk screening tool and development of a toolkit will be drafted within two weeks and will be circulated to and discussed among the PPCR regional track team.

e. Assessment of Data Needs

Assessment of data needs will be initiated with a determination of the bathymetric, hydrometric and topographic data critical to climate modeling and risk assessment. This will be followed by a stock-take of available national and regional level bathymetric, hydrometric and topographic data and identification of gaps. Assessment will be made thereafter of options for acquisition of the data required, including the application of LIDAR technology.

Annex 1: Terms of Reference, Regional Coordinator, Pilot Programme for Climate Resilience

I. BACKGROUND

1.1 All Caribbean countries are particularly vulnerable to climate change, with the expected main impacts to include shifts in precipitation patterns, with more intense storms and longer dry spells, increased hurricane intensity and unrelenting sea-level rise. These unavoidable consequences of global warming are coupled with the fact that most are Small Islands, with the majority of their populations and main commercial activities on, or near, the coastline and with limited surface and groundwater resources.

1.2 In response for the need to urgently scale up investments in climate risk and resilience measures for highly vulnerable countries, the Pilot Program for Climate Resilience (PPCR) was designed under the Strategic Climate Fund (SCF) to pilot and demonstrates ways to integrate climate risk and resilience into developing countries' core development planning. The pilot programs implemented under the PPCR are primarily country led but for the Caribbean and the Pacific regional programs are also being implemented. The PPCR provides incentives for scaled-up action and transformational change and offers additional financial resources to help fund public and private sector investment for climate resilient development plans.

1.3 The objectives of the PPCR are to pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning; to strengthen capacities at the national levels to integrate climate resilience into development planning; to scale-up and leverage climate resilient investment, building upon other ongoing initiatives; and to enable learning-by-doing and sharing of lessons at the country, regional and global levels. In addition, regional PPCR pilots will aim to achieve economies of scale in supporting action at the national level in countries participating in the pilot program and to strengthen cooperation and capacity at the regional level to integrate climate resilience into national and appropriate regional development planning and processes

1.4 The Caribbean pilot consists of a regional approach that proceeds along two closely linked and complementary tracks (i) country based investments in six highly vulnerable nations–Haiti, Jamaica, Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines; (ii) region-wide activities including data management and monitoring for improving understanding of climate risks and potential impacts, as necessary to take actions to enhance climate resilience, coupled with activities to tackle risks and vulnerabilities common to all Caribbean countries. The regional track will work through key entities in the Caribbean region to provide the scientific analysis so that countries can incorporate climate resilience into their national climate change strategies as well as in regional planning strategies, policies and financing mechanisms. The two tracks will thus be synergistic–the regional activities will supplement and strengthen the country-led programs and activities and also extend public good benefits and lessons learned from the pilot program to all CARICOM member countries.

1.5 The Caribbean PPCR is being implemented jointly by the Inter-American Development Bank and the World Bank Group in a multi-sectoral and integrated manner involving both public and private sector entities, regional organizations and development partners.

II. OBJECTIVE

2.1 The purpose of this consultancy is to assist in the coordination and implementation of activities under the Caribbean PPCR Regional-Track, at the regional level, including ensuring linkages and relevance to country level and other regional activities for building climate resilience.

III. SCOPE OF SERVICES

3.1 The consultant will undertake the following activities under the development and preparation of the "*Strategic Program for Climate Resilience*" (SPCR) for the Regional-track, but not limited to these:

a. Assist the PPCR Regional-Track Steering Committee in the coordination and supervision of technical and administrative activities related to the design and implementation of the Caribbean PPCR Regional-Track, including the organization of meetings, workshops, facilitate stakeholder participation, preparation of documents for submitting to the PPCR sub-committee and minutes of meetings, amongst other activities;

b. Clearing-house mechanism – assess whether PPCR could support specific interactive elements of this program. The assessment should include (i) specifications for CH structure, platform design (ii) the implementation strategy and stage, (iii) readiness for countries to access and utilise the platform, (vi) suitability of the platform, (v) knowledge management and learning, and (vi) other data formats.

c. Undertake a needs assessment to identify tools, training & data gap analysis for implementing PPCR, including how existing and new regional activities can support countries objectives for strengthening climate resilience, both in the PPCR pilot countries and more widely in the region;

d. Regional dialogue - undertake consultations at the regional and national levels and disseminate information concerning Phase 1 of the program to regional stakeholders (public and private sector, NGOs, bilateral agencies etc.);

e. Identification and analysis of institutional capacity needs, existing knowledge, studies, research and assessment of gaps for the implementation of the PPCR regional track;

f. Prepare a draft regional SPCR for discussions and agreement among regional and national stakeholders;

g. Support the preparation and development of the Joint Missions' program and relevant outputs;

h. Assist the technical team from the IDB, World Bank and regional organizations in the coordination and implementation of the PPCR regional track;

i. Interact with the team (coordinated by the Caribbean Community Climate Change Centre in partnership with the Climate and Development Knowledge Network (CDKN) developing the implementation plan for the Regional Framework for Achieving Development Resilience to Climate Change to ensure compatibility and complementarities among both programs (e.g. clearing house knowledge platform which is a joint deliverable and consultations);

j. Identify possible areas and partners where the private sector can be supportive of regional adaptation strategy.

IV. SPECIFICATION OF SERVICES

4.1 The consultancy will consist of the following:

- Type of consultant: Individual consultant.
- Duration of contact: The consultancy will be for 4.5 months starting November 8th, 2010.
- Place and time of work: The consultant will be based in the offices of the Caribbean Community Climate Change Centre (CCCCC) in Belize and will follow normal working hours. In addition the consultant will be expected to travel and work when required in the Caribbean region especially in the pilot countries of the Program.
- Qualifications: Masters degree or equivalent professional experience, in political sciences, environmental economics, environmental management or similar areas.

- Experience: Minimum 5 (five) years experience in the coordination and management of projects, preferably environmental projects; knowledge and understanding of the adaptation to climate change; working experience in the Caribbean; working knowledge of French would be an asset.

V. REPORTING[2]

5.1 An inception report after two weeks of the start of the consultancy. This report shall be limited to 5 pages (11 font size) and shall include a timeline of activities that the consultant will be engaged in.

5.2 In addition, a progress report should be submitted at the end of the first quarter of the consultancy. This report shall be limited to 5 pages (11 font size) and shall contain a summary of the progress of the work, operations in preparation and implementation until the date of delivery of the activities listed on the inception report, difficulties encountered and recommendations and next steps.

5.3 A draft of the final report of the consultancy will be submitted for review at the end of the consultancy to the PPCR Regional-Track Steering Committee. The draft report should contain a summary of the status of activities undertaken by the consultant, areas of difficulty and any outstanding activities. A final version of the report will be submitted ten (10) working days after receiving the comments to the draft. The consultancy report format shall be agreed with the supervisor at the IDB (see section 7.1). The consultant shall keep a record of all primary and secondary information that is used to prepare such reports.

VI. COORDINATION

6.1 The consultant will work under daily coordination of Dr. Neville Trotz, CCCCC Belize in close collaboration with the PPCR Regional Program Steering Committee, and under the supervision of the IDB PPCR Caribbean Coordinator, Mr. Gerard Alleng.

[2] All reports must be delivered to the Bank electronically in a single file that includes main page, the main document and annexes. (Files ZIP will not be accepted as final reports, due to the file management section regulations). Text, tables, graphics, sources of information and literature must be submitted in Word, written letter size 12, normal interlineal separation of a space. Boxes and graphics that are inserted in the text must be submitted also separately in excel by citing the respective source of information.

Annex 2: Work Breakdown PPCR Regional Track Programme, Phase I

Task No.	Task Name	Duration	Start	Finish	Predecessors
1	**Regional Pilot Program for Climate Resilience (PPCR)**	**116 days**	**Mon 1/10/11**	**Mon 6/20/11**	
2	***Module I: Support to Strengthening of Data Management Capacities***	***79 days***	***Mon 1/10/11***	***Thu 4/28/11***	
3	**Support to Strengthening of Data Management Capacity**	**59 days**	**Mon 2/7/11**	**Thu 4/28/11**	
4	***Evaluation of data collection and management systems and processes***	***47 days***	***Mon 2/7/11***	***Tue 4/12/11***	
5	Prepare TOR	7 days	Mon 2/7/11	Tue 2/15/11	
6	Contract Consultant	10 days	Wed 2/16/11	Tue 3/1/11	5
7	Oversee Analysis	30 days	Wed 3/2/11	Tue 4/12/11	6
8	*Climate Monitoring and Modeling Needs Workshop*	*44 days*	*Mon 2/28/11*	*Thu 4/28/11*	
9	Plan Workshop with UWI, CIMH and 5Cs	10 days	Mon 2/28/11	Fri 3/11/11	
10	Prepare TORs for Facilitator, including output	5 days	Mon 3/14/11	Fri 3/18/11	9
11	Logistic Arrangements-contract venue, catering and make travel arrangements	25 days	Mon 3/21/11	Fri 4/22/11	10
12	Execute Workshop	4 days	Mon 4/25/11	Thu 4/28/11	11
13	***Identification of Data Needs***	***30 days***	***Wed 3/2/11***	***Tue 4/12/11***	
14	Identification of bathymetric, hydrometric and topographic data critical to climate monitoring and modeling	7 days	Wed 3/2/11	Thu 3/10/11	6
15	Stock take of available and required national and regional level bathymetric, hydrometric and topographic data.	10 days	Fri 3/11/11	Thu 3/24/11	14
16	Identification of possible approaches for collection of bathymetric, hydrometric and topographic data	8 days	Fri 3/25/11	Tue 4/5/11	15
17	Analysis of options on basis of cost, sustainability and potential for technology transfer	5 days	Wed 4/6/11	Tue 4/12/11	16
18	***Information Sharing and Exchange of Best Practices***	***30 days***	***Mon 1/10/11***	***Fri 2/18/11***	
19	Assess need for additionality to Information Clearing House	30 days	Mon 1/10/11	Fri 2/18/11	
20	***Module II: Advocacy and Policy Development***	***64 days***	***Tue 2/1/11***	***Fri 4/29/11***	
21	***Regional Policy Dialogue***	***17 days***	***Tue 2/1/11***	***Wed 2/23/11***	
22	Confirm Dates of Key Meetings	5 days	Tue 2/1/11	Mon 2/7/11	
23	Arrange participation in key meetings with organizers	10 days	Tue 2/8/11	Mon 2/21/11	22
24	Make travel arrangements	12 days	Tue 2/8/11	Wed 2/23/11	22
25	***Stakeholder Consultations***	***25 days***	***Tue 2/22/11***	***Mon 3/28/11***	***23***
26	***Development and Piloting of Climate Risk Screening Toolkit***	***60 days***	***Mon 2/7/11***	***Fri 4/29/11***	
27	Preparation of TOR	10 days	Mon 2/7/11	Fri 2/18/11	
28	Contracting of Consultant(s)	10 days	Mon 2/21/11	Fri 3/4/11	27
29	Oversight of Analysis/Consulting	40 days	Mon 3/7/11	Fri 4/29/11	28
30	***Module III: Scoping, Coordination and SPCR Preparation***	***116 days***	***Mon 1/10/11***	***Mon 6/20/11***	
31	***Coordination and National Programs Interface***	***100 days***	***Mon 1/10/11***	***Fri 5/27/11***	
32	Coordination Meetings	5 days	Mon 3/14/11	Fri 3/18/11	
33	CIF Meeting	5 days	Mon 3/14/11	Fri 3/18/11	
34	*Participation in Joint Mission*	*29 days*	*Mon 2/14/11*	*Thu 3/24/11*	
35	SVG-Second Joint Mission	2 days	Mon 2/14/11	Tue 2/15/11	
36	Grenada-Second Joint Mission	2 days	Wed 2/16/11	Thu 2/17/11	35
37	St Lucia-Second Joint Mission	2 days	Mon 2/21/11	Tue 2/22/11	
38	Dominica-First Joint Mission	2 days	Wed 2/23/11	Thu 2/24/11	37
39	Jamaica-Second Joint Mission	2 days	Mon 3/21/11	Tue 3/22/11	
40	Caribbean Regional-Second Joint Mission	2 days	Wed 3/23/11	Thu 3/24/11	39
41	Refinement and Monitoring of Regional Results Framework	20 days	Mon 2/21/11	Fri 3/18/11	
42	PPCR Coordination and Transition to Phase II	100 days	Mon 1/10/11	Fri 5/27/11	
43	***Gap Analysis of Climate Resilient Systems***	***18 days***	***Mon 1/31/11***	***Wed 2/23/11***	

Annex 2: Work Breakdown PPCR Regional Track Programme, Phase I

Task No.	Task Name	Duration	Start	Finish	Predecessors
44	Refinement of Gap Analysis Objectives	5 days	Mon 1/31/11	Fri 2/4/11	
45	Organization of Gap Analsysis Working Meeting	10 days	Mon 2/7/11	Fri 2/18/11	44
46	Participation in Workshops	3 days	Mon 2/21/11	Wed 2/23/11	45
47	***SPCR Drafting and budgeting***	***83 days?***	***Thu 2/24/11***	***Mon 6/20/11***	
48	*Initial Draft: First Cut SPCR*	*36 days?*	*Thu 2/24/11*	*Thu 4/14/11*	
49	Incorporate results of gap analysis	8 days	Thu 2/24/11	Mon 3/7/11	43
50	Incorporate and build on results of stakeholder consultation	5 days	Tue 3/29/11	Mon 4/4/11	21,25
51	Circulate SPCR Draft	1 day	Tue 4/5/11	Tue 4/5/11	50
52	Draft Review	7 days	Wed 4/6/11	Thu 4/14/11	51
53	*Second Draft*	*54 days*	*Wed 4/6/11*	*Mon 6/20/11*	
54	Incorporate First Draft Feedback	8 days	Wed 4/6/11	Fri 4/15/11	51
55	Incorporate results of climate risk screening pilot	5 days	Mon 5/2/11	Fri 5/6/11	26
56	Incorporate results of final round of joint missions	8 days	Mon 5/30/11	Wed 6/8/11	31
57	Circulate Second Draft	1 day	Thu 6/9/11	Thu 6/9/11	56,55
58	Draft Review	7 days	Fri 6/10/11	Mon 6/20/11	57
59	*Third Draft*	*2 days*	*Fri 6/10/11*	*Mon 6/13/11*	
60	Incorporate suggestions on revised draft	1 day	Fri 6/10/11	Fri 6/10/11	57
61	Circulate Third and Final Draft	1 day	Mon 6/13/11	Mon 6/13/11	60

Annex 3: Draft Framework for PPCR Gap Analyses

1. The PPCR gap analysis is intended to achieve items a and b listed immediately below, which are respectively requirements (c) and (e) of the Terms of Reference for the Implementation of Activities on the Regional-Track of the PPCR in the Caribbean.[3] The results of the two will inform and/or be incorporated into the PPCR Strategic Plan for Climate Resilience (SPCR), which is the key output of the PPCR Phase I initiative.
    a. A needs assessment to identify tools, training and data gap analysis for implementing PPCR, including how existing and new regional activities can support countries' objectives for strengthening climate resilience, both in the PPCR pilot countries and more widely in the region.
    b. Identification and analysis of institutional capacities, existing knowledge, studies, research and assessment of gaps for the implementation of the PPCR regional track.
2. In order to fulfill the requirements above, assessment will be undertaken of the following framework tools: (i) policies, plans and strategies, (ii) institutional and individual capacities (iii) knowledge products and data. Furthermore, the assessment will be undertaken in the following PPCR priority areas.
    a. Agriculture and Food Security.
    b. Coastal Zone Planning/Management.
    c. Infrastructure.
    d. Land Use Planning and Human Settlement.
    e. Water Resource Management.
    f. Tourism.
3. Assessment of policies, plans and strategies will involve the following-
    a. Inventory of current policies, plans and strategies in the areas listed at 2(a) through 2(f) above, and/or the treatment of these issues in any comprehensive national plan in the six PPCR pilot countries.
    b. Identification of reference to and treatment of climate risk in policies, plans and strategies identified at 3 (a) above.
4. Assessment of institutional and individual capacities will be undertaken as follows-
    a. Institutional assessment via
        i. Identifying the technical knowledge, skills and functions required for achieving resilience through or in the PPCR focus areas identified at 2(a) through 2(f) above-
        ii. Identifying national and regional institutional arrangements for the execution of climate change related functions with respect to the thematic areas at 2(a)(i) above.
    b. Assessment of Individual capacities at 4(a)(iii) above via inventory of
        i. Established positions per technical/functional areas
        ii. Long term volunteers/fellows in technical/functional areas and

[3] These objectives are also consistent with PPCR regional level priorities of (1) monitoring and climate modeling activities and (2) facilitating enabling policy and institutional framework for climate resilience.

iii. Unfilled positions in technical/functional areas.

c. Identification of Institutional and functional Gaps via

i. Comparison of role and functions within each institution with the required roles and functional areas for climate resilience in or through areas at 2(a)(i) above.

ii. Identification of gaps in individual and institutional functions based on the results of activity at 4(c)(i) above.

iii. Rationalization of appropriate level—national or regional—for placement of required functions at 4(c)(ii) above.

5. Assessment of knowledge products will involve the following

a. Inventory of published and publicly available studies, tools and guidelines in the areas at 2(a) through 2(f) above.

6. Assessment of data needs

a. Assessment of the types of data required for climate resilience in the PPCR priority areas.

b. Determination of existing baseline and historical/trend data.

c. Assessment of most cost effective approach to acquiring baseline data and for regularly collecting updated data. Assessment will factor impact and sustainability.

Annex 4: Schedule of Caribbean Thematic Meetings for Potential Intervention on Climate Resilience

2011 DATES	EVENT	LOCATION
Feb 15-16	***PPCR Joint Mission, St. Vincent***	***St. Vincent***
Feb 17-18	***PPCR Joint Mission, Grenada***	***Grenada***
Feb 24 (am)	Meeting of Prime Ministerial Sub-Committee on CSME	Grenada
Feb 24 (pm)	Meeting of Prime Ministerial Sub-Committee on external negotiations	TBD
Feb 25	Twenty-second intercessional meeting of CARICOM Heads of Government of the Caribbean Community	Grenada
Feb 21 – 25	Red Cross Disaster Risk Reduction Strategy Meeting	Santo Domingo, Dominican Republic
Feb 21 - 25	Regional Workshop on Commitments of Multilateral Environmental Agreements (MEAs) Capacity-Building for the Use of Integrated Environmental Assessments and for Mainstreaming MEAs into Policy Development and Implementation	Suriname
Last Week in February	Sixth CARICOM-UN General Meeting	Guyana
Mar 1 – 3	GEF Caribbean Constituency Meeting	Belize
Mar 1 – 4	UNEP Caribbean Ozone Officers Meeting	Antigua and Barbuda
Mar 3-6	Caribbean Conference on Sustainable Tourism Development	Bermuda
Mar 6 & 7	IDB Climate Change and Water Resources Workshop	Trinidad and Tobago
Mar 14	Annual Caribbean Tourism Summit	
Mar 14 – 17	2nd ISDR Regional Platform Meeting for the Americas	Nuevo Vallarta, Mexico
Mar 19 – 27	UWI/CERMES Study Tour	Belize
Mar 21 – 25	Special Meeting of the Council for Trade and Development (COTED) on Energy	TBD
Mar 22 – 24	UNEP/EU ACP CDM DNA Workshop	Havana, Cuba
Mar 28 & 29	EU/CARICOM Adaptation Meeting	Belize
TBD	OECS Consultation on CARICOM Investment Code	
Apr 3 – 8	UNFCCC AWGs Meetings	Bangkok, Thailand
Apr 27-29	IPCC Workshop on Scientific Writing for SIDS	Belize
May 8-13	UN/ISDR 3rd Session of the Global Platform for Disaster Reduction	Geneva, Switzerland
May 10 - 11	Caribbean Hotel and Investment Conference	TBA
May 10-13	33rd Session of the IPCC	Abu Dhabi, United Arab Emirates
May 16 May – Jun 3	16th WMO Congress	Geneva, Switzerland
Jun 5 - 11	Caribbean Week in New York	New York City
Jun 6-17	UNFCCC Subsidiary Bodies Meetings	Bonn, Germany
June 21 - 25	5th Biennial Caribbean Environmental Forum and Exhibition	Montego Bay, Jamaica
July 3-9	Caribbean Food Security and Climate Change Conference	Barbados
July 17-21	29th West Indies Agricultural Conference; "*Agribusiness as the Path to Sustainable Agricultural Development in the Caribbean*"	St. Vincent and the Grenadines
Nov 28–Dec 9	UNFCCC COP 17 & CMP 7	Durban, South Africa

Note: Shaded events represent potential events for PPCR outreach and stakeholder consultation. Target sectors for consultation include the private sector and representative of key cross-cutting issues such as gender and poverty.

2. CARIBSAVE PROJECTS 2011

Source: http://caribsave.org/index.php?id=5 sourced 24 January 2011.

Projects

Modelling the Transformational Impacts and Cost of Sea Level Rise in the Caribbean

This study provides the most detailed analysis to date of the damages and costs associated with SLR for the CARICOM nations, and builds on work completed in Phase I in 2009, previous economic studies as well as recent developments identified in the Economics of Climate Change Working Group (ECA) study in estimating impacts due to climate change. The methodology incorporates top-down and bottom-up approaches (i.e., macro, meso- and micro-scales analyses) to model impacts on the economies of each CARICOM country individually. A unique strength of this economic study is that it is based on the most detailed geographic reality of coastal geomorphology and development that determine vulnerability to SLR.

The economic implications of the impacts of climate change and required adaptation are being increasingly quantified to better inform international negotiations regarding adaptation assistance.

Such in-depth information is essential for the Caribbean States, SIDS and LDCs to strategically reduce vulnerability through investment, insurance, planning, and policy decisions, and inform negotiations regarding adaptation assistance under the Copenhagen Accord that was agreed at COP15 in Copenhagen.

The CARIBSAVE Climate Change Risk Atlas (CCCRA)

Phase One of this project involves 15 countries across the Caribbean and is identifying the impacts of climate change in individual countries on key sectors as they relate to tourism and livelihoods. The project is using climate models, examining sectoral vulnerabilities, assessing adaptive capacity and developing practical response strategies with the countries across the region. CARIBSAVE is working with regional organisations and the governments, communities and private sector in The Bahamas, Barbados, Jamaica, St. Lucia, St Kitts, St Vincent and the Grenadines, Suriname, Nevis, Grenada, Belize, Dominican Republic, Antigua, Dominica, Turks and Caicos and Anguilla. The project includes significant capacity building initiatives for coastal management agencies in the countries, the analysis of sea level rise, the impact of climate change on coastal communities and is funded by UKAID (formerly DFID) and AusAID.

Climate Change Film Series

CARIBSAVE is producing a series of high quality short films for awareness raising, education and capacity building in communities and governments across the region. The films focus on three core themes; climate change and tourism, climate change and disaster management, and climate change and coastal resources. Dissemination of the films will take place on local and regional television and in communities across the region. This project is funded by UKAID, the Travel Foundation and the British Foreign and Commonwealth Office (FCO).

J-Fish Fund Feasibility Study

This project is funded by the Travel Foundation and Virgin Holidays. The aim of this project is to assess the feasibility of establishing a fund to provide sustainable financial assistance to the fish sanctuaries from revenues obtained from selected tourism activities and the sale of local crafts. This approach is recognised as a cornerstone to protecting and enhancing the resilience of vital natural resources in the Caribbean against the pressures of climate change.

Economies of Climate Change on Tourism

The International Institute of Environment and Development (IIED) and Oxfam are funding a project to examine the impact of climate change on the economics of tourism in Jamaica. The project also examines the issues of gender and agriculture in the context of economics and climate change. CARIBSAVE is working in collaboration with agencies in Jamaica and regional experts to assess these impacts using a methodology developed by IIED, enhanced with a Delphi type process. Simultaneously, under a separate initiative, UNECLAC are funding CARIBSAVE staff to conduct a study in Barbados using econometric models. This project is in coordination with work in other countries including Aruba, the Netherland Antilles. The Bahamas, St Lucia and Montserrat.

Fish Sanctuary Awareness and marker Bouys

This project involves capacity building and the construction and installation of 50 marker buoys to demarcate the boundaries of the fish sanctuary at Bluefields Bay, Jamaica. CARIBSAVE is working with the Bluefields Bay Fishermen's Friendly Society to assist in the training of how to build and install marker buoys that will also raise awareness of the importance and relevance of protecting fish stocks to enhance vital resources in the face of climate change and other pressures.

Capacity Building with the University of the West Indies

As part of The CARIBSAVE Partnership's capacity building initiatives across the Caribbean, the organisation is funding a number of staff at University of West Indies (UWI) Campuses across the region in Jamaica, Barbados and Trinidad.

Funding of two Research Fellows at UWI, Mona Campus, Jamaica; one in Climate Studies and one in Gender and Development Studies.

Funding of two Research Scientists one at UWI, St Augustine, Trinidad Campus focusing on health and water; and one, based at CARIBSAVE's headquarters, attached to CERMES at Cave Hill, Barbados Campus focused on Coastal Resources and Biodiversity.

Other appointments in the region and beyond have been made to enhance the capacity building process and to further examine the issues, and develop and implement strategies surrounding climate change, livelihoods, tourism and environment and other associated sectors including: water, energy, agriculture, health, biodiversity, infrastructure and settlement, comprehensive disaster management.

UNDP - an overview of Modelling Climate Change Impacts in the Caribbean Region with Contribution from the Pacific Islands:

CARIBSAVE Climate Change Risk Atlas:

Modelling the Transformational Impacts and Cost of Sea Level Rise in the Caribbean

This study provides the most detailed analysis to date of the damages and costs associated with SLR for the CARICOM nations, and builds on work completed in Phase I in 2009, previous

economic studies as well as recent developments identified in the Economics of Climate Change Working Group (ECA) study in estimating impacts due to climate change. The methodology incorporates top-down and bottom-up approaches (i.e., macro, meso- and micro-scales analyses) to model impacts on the economies of each CARICOM country individually. A unique strength of this economic study is that it is based on the most detailed geographic reality of coastal geomorphology and development that determine vulnerability to SLR.

The economic implications of the impacts of climate change and required adaptation are being increasingly quantified to better inform international negotiations regarding adaptation assistance.

Such in-depth information is essential for the Caribbean States, SIDS and LDCs to strategically reduce vulnerability through investment, insurance, planning, and policy decisions, and inform negotiations regarding adaptation assistance under the Copenhagen Accord that was agreed at COP15 in Copenhagen.

3. Environmental Legislation List

ST. VINCENT AND THE GRENADINES

LEGISLATION RELATING TO POLLUTION CONTROL AND PUBLIC HEALTH
Environmental Health Services Act, No. 14 of 1991
Oil Pollution (Liability and Compensation) Act, 1997
Oil in Navigable Waters Act

LEGISLATION RELATING TO COASTAL AREA MANAGEMENT
Fisheries Act, No. 8 of 1966
Beach Protection A
Maritime Areas Act, No. 15 of 1983

LEGISLATION PERTAING TO LANDUSE
Town and Country Planning Act, No. 45 of 1992
Crown Lands (Sale) Regulations, 1983

LEGISLATION RELATING TO WATERSHEDS
Central Water and Sewerage Authority, No. 6 of 1978
Forest Resource Conservation Act, 1992
Forests Act

LEGISLATION RELATING TO ENVIRONMENT AND CONSERVATION
National Parks Act, 2002
Marine Parks Act, 1997
Wildlife Protection Act, 1987
St. Vincent and the Grenadines National Trust Act, 1969

4. Disaster Vulnerability Reduction Project Description

SVG Component 1 and 2 Project Description

Component 1 - Prevention and Adaptation Investments (US$12.9 M)

This component is designed to reduce physical vulnerability and pilot adaptive measures to build resilience to current and future climatic changes. It includes a broad set of works activities, such as drainage improvements, rehabilitation, reconstruction and retrofitting of bridges and roads, retrofitting of critical public buildings (including schools and emergency shelters), investments in satellite emergency centers, and adaptive watershed to reef system measures. Civil works will be executed to include construction and rehabilitation of existing infrastructure in order to reduce their vulnerability to natural hazards and climate change. Works will focus on priority public infrastructure including transportation systems, educational facilities and public utilities and will include activities rehabilitation or construction of emergency shelters, re-enforcement of river and coastal defenses that protect key infrastructure and realignment, and rehabilitation of bridges. In the case of the Arnos Vale and Georgetown Watershed to Reef systems, civil works will be complimented by soft activities designed to comprehensively build resilience throughout the identified systems.

Included under works is the potential for the design, development and preparation of priority works construction projects such as a new hospital complex to assist the Governments in engaging construction financing available from other donors in the region. Other infrastructure works include construction of two Satellite Community Warehouses in identified sites and stockpiling of gabion baskets in order to ensure a reliable stock in case of future river and/or coastal defense malfunction.

The project will fund supporting studies required for the development of works and soft activity packages such as hydrologic/hydraulic investigations, geotechnical investigations and associated pre-engineering and engineering activities required to support engineering design and safeguard compliance. During the execution of the identified activities, comprehensive measures will include the integration of building code requirements and land use planning according to coastal and river contours in the project development process and will introduce hazard/risk analysis and climate change impact analysis to assist in the design and construction of resilient systems.

Sub-Component 1.1 – Disaster Risk Mitigation Infrastructure Investments

Aging and unmaintained infrastructure coupled with changing climatic conditions has facilitated the deterioration of existing public infrastructure – resulting in high levels of vulnerability to natural hazards. Historically, designs did not take into account impacts from anticipated changes in future land use and climate changes, and were based on a limited analysis of past hazard events. Additionally, existing vulnerabilities related to landslip, rock fall and flooding left unattended will continue to exacerbate the iterative deterioration of critical infrastructure. Finally, under this sub component, the community emergency shelters of Kingstown and Dorsetchire Hill Government School will be retrofitted and satellite warehouses for Rose Hall and Sandy Bay will be constructed to improve community resilience and increase localized capacity to disaster and climate change events.

The majority of works are relatively small in nature and the project will support the technical studies required to produce engineering designs that integrate risk reduction and climate change effects in order to improve the long-term performance of the selected structures. Additionally, this sub-component will provide for the necessary studies to support the relation of the National Milton Cato Memorial Hospital to a safer location. Specific activities identified under this sub-component are summarized in the following table:

#	Project Component and Activities	Construction and Engineering Support (USD)	Equipment/ Goods	Estimated Cost (USD)	Funding Source
1.1.1	**Retrofitting/Rehabilitation of Public Buildings**				
	Studies for the relocation of the Milton Cato Memorial Hospital	$2,000,000		$2,000,000	IDA
	Retrofitting of Emergency Shelters: Kingstown Government	In-house	$250,000	$250,000	IDA
	Retrofitting of Emergency Shelters: Dorsetshire Hill Government School	In-house	$150,000	$150,000	IDA
	Satellite Warehouse for Communities: Phase 1 – Sandy Bay and Ross Hall	$700,000	$800,000	$1,500,000	IDA
	Generators for shelters/schools Phase 1	In-house	$100,000	$100,000	IDA
	Sub-Total	**$2,700,000**	**$1,300,000**	**$4,000,000**	**IDA**
1.1.2	**Rehabilitation and Risk Reduction of Transportation Infrastructure**				
	Rehabilitation South River Rd Bridge, Kingstown	In-house	$300,000	$300,000	IDA
	Rehabilitation of bridges: Fenton Road Bridge 1 - Dauphine	In-house	$300,000	$300,000	IDA
	Rehabilitation of bridges: Fenton Road Bridge 2 - Green Hill	In-house	$700,000	$700,000	IDA
	Slope Stabilization: Dark View	$150,000	$1,200,000	$1,350,000	IDA
	Sub-Total	**$150,000**	**$2,500,000**	**$2,650,000**	**IDA**

Sub-Total Component 1.1	**$6,650,000**	**IDA**

1.1.1. Retrofitting/Rehabilitation of Public Buildings

Background: The government has identified critical, life-line structures in need of immediate retrofitting to improve disaster resilience. These structures include public shelters and emergency response support structures such as satellite warehouses. Under this sub component, the project will support the analysis and evaluation of site-specific building performance with respect to expected hazards and retrofit the structures accordingly.

Satellite warehouses are to be designed, constructed and equipped under this sub component. A total of two (2) community satellite warehouses will be established under the project at Rose Hall and Sandy Bay to store emergency equipment and supplies in close proximity to the respective communities. These facilities serve as community coordination centers and afford the opportunity to pre-position disaster response equipment at the local level.

Two (2) emergency shelters will be retrofitted under the project – complimenting the three (3) emergency shelters funded under the Hurricane Tomas Emergency Recovery Project. The project will fund the complete retrofitting of Dorsetshire Hill and Kingstown Government School with installation of Emergency equipment, sanitary facilities and improved drainage.

Additionally, under this component, the project will support the required designs to relocate the existing, aging Milton Cato Memorial Hospital in Kingstown to a new hospital complex.

Satellite Warehouses

Rational: Saint Vincent and the Grenadines is a multi island state, and due to its rugged topography, communities such as Sandy Bay and Rose Hall can easily become isolated in major disasters. The objective of this activity therefore is to construct satellite warehouses in specific communities, to provide them with the capacity to respond to disasters at the community level.

Proposed Investments. The satellite warehouses will include a small office and washroom that can be use for meetings and converted into a Community Emergency Operations Centre, and storage facility for critical disaster response equipment. The warehouses will be managed by the local or district disaster committees.

Project Beneficiaries. Direct beneficiaries of the proposed satellite warehouses include the members of the community in Sandy Bay and Rose Hall – particularly persons in sub-standard housing and person with social or environmental vulnerability to disaster, and NEMO.

Retrofitting of Emergency Shelters

Project Rationale. The Government of Saint Vincent and the Grenadines, under the auspicious of the National Emergency Management Organization (NEMO), operates various emergency shelters throughout the main island of Saint Vincent and also select population centres in the Grenadines. Each year, NEMO, in collaboration with a host of partners, conducts a shelter inspection process aimed at identifying suitable structures (private and government owned) to be used as emergency shelters. While there continue to be challenges, the need to have these buildings available and in the good condition remains a top priority for the NEMO. Accordingly, NEMO has designated a total of 141 emergency shelters throughout St. Vincent and the Grenadines 10 2010, an average of 9 per constituency.

During and after the passage of Hurricane Tomas in October of 2010, for example, over 1,000 individuals were housed in these various shelters. A number of shelters were identified for retrofitting in an effort to make them better able to withstand natural disasters and better protect persons seeking refuge after a disaster event. Shelters will also be outfitted with generators as back-up power supply.

Proposed Investments. The retrofitting of the Dorsetshire Hill and Kingstown Government School emergency shelters will include the installation of emergency equipment, sanitary facilities and drainage improvements. These works are limited to replacement, rehabilitation and improved disaster resistance capabilities. Specifically for the Kingstown Government School, which serves the communities of Lodge Village and Redemption Sharpes, among others, additional site–specific proposed works include: repairs to the roof, replacement of doors and windows and the installation of commercial grade manual shutters among other things. Site specific works are due to the fact that the School was constructed in constructed in (***), and has deteriorated extensively although maintenance has ensured its continued operation. As for the Dorsetshire Hill Government School, the proposed retrofitting will include the refurbishment of a new roof, windows, doors as well as upgrades to bathroom facilities (toilets and showers), kitchen facilities and road access.

Project Beneficiaries. Direct beneficiaries of proposed interventions include the school children and teachers of Dorsetshire Hill and Kingstown Government School (approximately 700 students), the communities of Dorsetshire and Kingstown (given that the buildings serve a dual purpose of primary school and community shelter), the Ministry of Education, and NEMO. It must be noted that the Dorsetshire Hill Government School is the only shelter available to the residents (approximately 1,064) in this community and is considered in less than disaster-ready condition.

Studies for the Relocation of the Milton Cato Memorial Hospital

Rational: PAHO conducted a *Safe Hospital* study which highlighted that the Milton Cato Memorial Hospital was structurally unsound (vulnerable to category 1 Hurricane, flooding and had other critical issues) and that operational conditions were below accepted standards. The study underlined the dire structural inefficiencies of the building and operational conditions of the main General Hospital - the only one on Saint Vincent island. The study, therefore, recommended the need to build a new Hospital with higher construction standards at a new location.

Proposed Investments. Based on the number and scale of the issues uncovered in this study, the most feasible option appears to be the construction of a new hospital in a different location, with higher structural standards. Accordingly, the intervention has been proposed under the Project which will undertake activities including the completion feasibility studies, design and other pre-construction activities for the new hospital.

Project Beneficiaries. The feasibility studies, design and other pre-construction activities for the new hospital will eventually benefit the entire population of Saint Vincent island. The mitigation works also will indirectly improve the quality of care for all future patients of the main populations center's only hospital.

1.1.2. Rehabilitation and Risk Reduction of Transportation Infrastructure

Background. Under this sub component the actions will be aimed at the rehabilitation of bridges and landslide stabilization in order to reduce the vulnerability of existing infrastructure considering the increase in intensity and frequency of storms and hurricanes affecting the Caribbean region. Technical designs for interventions will take into account parameters related to the hydrological and geotechnical characteristics specific to each of the zones.

Identified critical infrastructure includes the rehabilitation of bridges at:

- South River (Bridge Road),
- Fenton Road (Dauphine), and
- Fenton Road (Green Hill).

South River Bridge is located in the city of Kingstown within an area of commercial activity. Because the intersection of two tributaries of the river just before the bridge, during the rainy season the river level and flow stream increasing considerably, this has led to the weakening of the bridge. This bridge connects Long Lane Upper with South River Road and allows the pass of light and heavy vehicles helping the mobility of people and the commercial activity.

Fenton Road has been selected by the Government as an essential route to improve mobility between Kingstown and Arnos Vale. This only road has performed as a bypass to Kingstown on several occasions. The road has two bridges which have deteriorated to the degree that they have rendered the route unsafe for use. This project seeks to replace these bridges to improve the long-term performance of the selected structures.

Slope Stabilization: Dark View (road realignment and coastal defense)

Dark View landslide usually affects Leeward Highway during the rainy season, disrupting traffic on the Northern communities such As Fitz-Hughes, Petit Bordel and the town of Chateaubelair, which are only accessible by this route. In addition there is evidence of coastal erosion that can affect the stability of the road.

Project Rational. The rehabilitation of bridges and landslide risk mitigation are oriented at reducing the vulnerability of existing infrastructure face of increased of the amount of water in the

rainy season and hurricanes causing floods and landslides, with increasing frequency and intensity. These interventions allow improve population mobility and reduce socio-economic effects caused by traffic disruption or congestion.

Project Beneficiaries. Directly the beneficiaries of these interventions are the people and businesses in the Kingstown area (South River), the population of Arnos Vale and Northern communities (rural fishing community) such as Fitz-Hughes, Petit Bordel and the town of Chateaubelair. Indirectly these interventions help the general population due to improved mobility between different areas of Kingstown and the rest of the island. Moreover, they have implications on the ability of persons to evacuate the capital or access critical services in the event of a disaster.

Proposed Investments. The design for each intervention will be done at home by the Ministry of Transport and Works. Improvement of South River Bridge and Fenton bridges specifications, should consider hydrological studies to define the design parameters in terms of maximum river level and flow stream. The proposed intervention for Dark View will address two issues; first, extensive coastal erosion that threatens the main road artery from Northern communities. Secondly, it will address a severely unstable upper embankment of this roadway and the roadway realignment. The proposed interventions include the construction a sea wall in the first former case and terracing of the embankment in the latter. Dark View landslide interventions need previous geotechnical characterization studies (shear strength parameters), rainfall levels and pluvial hydrology to determine appropriate engineering solutions. For all intervention sites, topographic surveys should be conducted and rainfall and earthquake conditions must be analyzed as instability triggers. According with information from Ministry of Works in Dark View there is one house will require land acquisition and compliance with Bank Resettlement safeguards.

Sub-component 1.2 – Climate Adaptation Infrastructure Investments

The government has identified a number of national priority adaptation measures designed to strengthen national climate resilience through the demonstration of integrated climate change adaptation activities. The key to this approach is the comprehensive integration of physical works, policy development and implementation, preventive measures and other soft options. Activities will be focused within two vulnerable watershed-river-coastal systems. The two pilot areas will implement and test a broad spectrum of ideas and interventions to build resilience within the identified systems.

Physical investments include reinforced river defense systems at targeted vulnerable sections of Warrawarrow River, drainage improvements in Arnos Vale, coastal defense infrastructure at Georgetown Administrative Centre and provisions for stockpiles of gabion baskets to support future flood mitigation reinforcement needs. Additionally, under this sub component, the project will support the analysis and evaluation of defense mechanism performance with respect to expected hazards and reinforce/climate proof targeted investments accordingly. Activities to be financed under this sub-component include:

#	Project Component and Activities	Construction and Engineering Support (USD)	Equipment/ Goods	Estimated Cost (USD)	Funding Source
1.2.1	**Arnos Vale Watershed to Reef System**				
	Stockpile of gabion baskets (total of 12,000)	In-house	$300,000	$300,000	IDA
	River defense: Construction of gabion/reinforced concrete for the Warrawarrow River system including drainage improvements for Arnos Vale	In-house	$2,000,000	$2,000,000	CIF
	Rehabilitation of river crossings (5 fords/culverts): Fenton River system	$200,000		$200,000	CIF
	Geology assessment of Arnos Vale as a single drainage basin inclusive of soil testing, ground water assessment and monitoring	$30,000		$30,000	CIF
	Forestry management activities inclusive of silviculture along with bio-engineering works	$15,000	$50,000	$65,000	CIF

	and other soil and conservation measures				
	Designation and delineation of drainage channels and buffer zones in the Arnos Vale watershed	In-house		$0	
	Application of relevant effluent regulations/standards at the coastal area of Arnos Vale (Indian Bay and Vila Beach)	$35,000		$35,000	CIF
	Warraworrow/Greathead beach management (beach and delta breaching of berm, sediment removal)	In-house	$10,000	$10,000	CIF
	Sub-Total	**$2,280,000**	**$860,000**	**$3,140,000**	**CIF/IDA**
1.2.2	**Georgetown Watershed to Reef System**				
	Conduct Forestry management activities inclusive of silviculture along with bioengineering works and other soil and water conservation measures	$15,000		$15,000	CIF
	Designation and delineation of drainage channels and buffer zones in the Georgetown watershed	In-house			
	Testing and monitoring of the enforcement of new building code provisions, including training of building inspectors	$15,000		$15,000	CIF
	Appropriate numerical and physical modeling to determine optimum shoreline stabilization techniques for the Georgetown pilot area, including ecosystem	$100,000		$100,000	CIF

	conservation, and reduction of downstream impacts				
	Coastal Defense (civil works): Georgetown	$1,900,000		$1,900,000	CIF
	Assessment of Climate Change impacts on Coastal and Marine Ecosystems and Commercial Fisheries	$1,200,000		$1,200,000	CIF
	Sub-Total	**$3,230,000**	**$0**	**$3,230,000**	**CIF/IDA**
			Sub-Total Component 1.2	**$6,370,000**	**CIF/IDA**

1.2.1 Arnos Vale Watershed to Reef System

Background. Arnos Vale and neighbouring communities such as Fountain, Villa and Belair, have undergone significant developments in recent years including the construction of a number of major infrastructural projects. As a result of this development, flooding of the Warrawwarrow River has increased in recent years - threatening residents and a number of critical infrastructures including the E.T. Joshua Airport Arnos Vale Sporting Complex. Previous flood mitigation interventions have focused on sets of gabion walls along the river banks, which have experienced structural failures leading to dramatic changes in flow, threatening their ability to adjust to and absorb disturbances. This has led to an increased in flood flows. Without any intervention, this will continue to threaten the lives and properties of residents, commercial enterprises and a number of critical infrastructures along and near the river system.

Project Rational: The continuous trend being observed and projected is the increase of global air temperature between 1.5 and 2.0 degrees Celsius and the decrease in precipitation quantity. The projections are for a 7-8 percent decrease in the length of the rainy season by 2050, while there is a 6-8 percent increase in the length of the dry season being projected for the same period. In addition, the frequency of intense rainfall is already up an average of 3 percent and this is projected to increase to 20 percent by 2050 and the number of consecutive days of heavy rainfall events is increasing. Due to the above trends, disturbances leading to influxes in flooding experienced in recent years in the Arnos Vale Watershed and Warrowarrow River system will be exacerbated. It is therefore imperative to develop and implement a comprehensive model for managing watershed-river-coastal systems inclusive of physical works, legislation, and implementing an integrated watershed management and coastal zone management strategy geared towards sustainable development and economic prosperity. The technical design and construction of risk mitigation works and adaptation measures to mitigate flooding and promote river erosion control will reduce damage to public and private property, improve the mobility of population and other socio-economic effects caused by road blockage generated by water from floods. Moreover, comprehensive river management plans will reduce the environmental impact caused by the inadequate garbage disposition at rivers and channels.

Project Beneficiaries. Direct beneficiaries of these interventions are the area covers the current E. T. Joshua Airport, VINLEC power station, Arnos Vale Playing Field, the residents and commercial business enterprises of Arnos Vale. The mitigation works will indirectly improve the quality of life of vulnerable groups, including women, children and the elderly, living along the river system and targeted vulnerable coastal areas. Beneficiary ministries include the Ministry of Agriculture, Physical Planning, NEMO, the Ministry of Transport and Works, Lands and Statistics-MoFEP).

Proposed Investments. This project is designed to measurably reduce the negative impacts to life, the environment, private property and critical public infrastructure which may result from flooding in Arnos Vale. Activities will aim to mitigate the risk of flooding through the improvement or construction of river defenses. The designs for interventions take into account parameters related to the technical characteristics with which to incorporate the appropriate use of land and the effects of climate change. In additional to the issues with the river, there are also other drainage concerns in the Arnos Vale basin which need to be addressed as well.

The design for each intervention will be done at home by the Ministry of Transport and Works. Preliminarily has been defined that construction works include the installation of gabion baskets in Warrawarrow River and drainage improvements in Arnos Vale. For the design and construction river defense should be carried out at least hydrological and hydraulic assessments in order to identify possible solutions and specific designs. It is advisable to review other technical solutions as it has been shown that the use of gabions baskets may not be as effective. Additionally, it will be necessary to have a maintenance plan that includes activities related with periodical drainage clean and educational programs to change human behavior in relation with garbage management.

The main activities of the project include:

- Installation of gabion walls at the Warrawarrow river
- Construction of 350 metres of concrete lined drainage channel
- Construction of 2 detention ponds, and
- Construction of cross culvert

In addition, some technical work in the form of soil testing, geological assessment, and ground water assessment and monitoring will be done through a consultant or regional training institution. This activity will be done in the Arnos Vale Catchment, Warrowarrow River and related coastal outlets system.

1.2.2 Georgetown Watershed to Reef System

Background. Georgetown is a rural coastal community on the north eastern coast of Saint Vincent. It is the service centre for the windward communities, particularly those north of the Rabacca Dry River. In recent years, the government has made several large investments in the area including the construction of an orphanage, reconstruction of the Georgetown Police Station and in 2010 the completion of the School for Children with Special Needs. In addition, a Modern Medical Complex is being constructed which will provide diagnostic, surgical, laboratory, and dialysis services among other modern hospital services, and will significantly improve health care in Saint Vincent and the Grenadines. There are also advanced plans to construct a multi-million dollar facility to house the Town Board Office, Revenue Office, Post Office, a branch of the National Commercial Bank, Restaurants, and medium sized shops in the vicinity of the proposed site. This will generate much needed economic activity and assist to further decentralize critical services to benefit these areas.

Project Rational: This project is designed to measurably reduce the risk to life, the environment, private property and critical public infrastructure which may result from coastal erosion in the Georgetown community. The Georgetown coast has suffered extensive erosion in recent years. At the site of the proposed works, this erosion threatens the main windward highway; the only playing field in Georgetown; other critical public infrastructure; private residences and a number of restaurants and shops along the coast. The problem has been exacerbated by damage sustained by the passage of several hurricanes including Tomas in October 2010 and now requires immediate attention

Project Beneficiaries. Direct beneficiaries include the entire community of Georgetown. The coastal defense works and associated activities will also benefit neighboring communities and inhabitants surrounding the river systems outlets of the Georgetown area. Beneficiary ministries include the Ministry of Physical Planning, NEMO, the Ministry of Transport and Works.

Proposed Investments. The main activity of this project is the construction of a reinforced concrete, stepped sea wall. This activity will be complimented by:

- Designation and delineation of drainage channels and buffer zones in the Georgetown watershed;
- Testing and monitoring of the enforcement of new building code provisions in the Georgetown community;
- Appropriate numerical and physical modeling to determine optimum shoreline stabilization techniques for the Georgetown pilot area, including ecosystem conservation, and reduction of downstream impacts
- Assessment of Climate Change impacts on Coastal and Marine Ecosystems and Commercial Fisheries

In addition, a concerted effort will be aimed at the households and businesses located less than five meters from the coastline. People in these areas will be a part of a comprehensive disaster preparedness program that will be significantly improved by the provision of a pilot early warning system.

Component 2 - Capacity Building for Disaster Response, Climate change Awareness, Hazard and Risk Evaluation and Applications for Improved Decision Making (US$ 5.33M)

The project will support improving the national capacity to evaluate, assess and integrate natural hazard and climate change risk reduction into the national development policy, improved engineering design, and inform the development decision making process. Improvements in risk analysis capacity will support future programs in new construction and retrofitting of existing infrastructure, disaster risk mitigation, and disaster preparedness planning. This improved capacity will allow SVG to prioritize investments and improve risk management across sectors promoting the use of a variety of tools including cost-benefit analysis, life cycle analysis, hazard and vulnerability modeling.

The risk modeling and data management tools and strategies directly serve the disaster risk reduction agenda reducing the impacts of disasters as setbacks to development and economic growth of the country.

Improvements in risk analysis capacity will support future programs in new construction and retrofitting of existing infrastructure, disaster risk mitigation, and disaster preparedness planning. This improved capacity would allow Grenada to prioritize investments and improve risk management across sectors promoting the use of a variety of tools including cost-benefit analysis, life cycle analysis, hazard and vulnerability modeling and land planning.

Three key elements are required to advance the integration of risk management strategies in the development process. These are data development and analysis, better understanding of hazard risk and climate change impacts, and capacity building for better risk management.

The institutionalization of risk management activities within the national development planning process is a critical element for the long-term integration of disaster and climate resilience strategies in development activities.

Sub-Component 2.1 – Improved understanding of natural hazards and climate change impacts

Varying levels of information about exposure to natural hazard and the impacts of climate change are available at the national level in Saint Vincent and the Grenadines. Despite the fact that the available information is lacking in several areas and is in need of improvement, existing information is only incorporated in national development activities on a limited scale. In order to take advantage of current information, as well as positioning GoSVG to be able to incorporate future analytical works, this component of the project will conduct institutional strengthening to allow for better integration of knowledge products into physical development activities. The main IDA-financed activity within this component will focus on the Ministry of Transportation and Works – which is responsible for all public works and conducts civil and structural engineering analysis and design. Further activities, financed by non-IDA sources, will focus on improving the quality of hazard and climate impact analysis for Saint Vincent – as well as continued strengthening of local capacity for practical applications of such knowledge.

#	Project Component and Activities	Estimated Cost (USD)	Funding Source
2.1.1	**Institutional Strengthening of the Ministry of Transportation and Public Works**		
	Sub-total	$250,000	IDA
2.1.2	**Hydro-Meteorological Capacity Building**		
	Installation of hydro-meteorological sensor equipment.	$583,910	CIF
	Capacity building of Met Office	$225,000	CIF
	Capacity building of CSWA	$40,000	CIF
	Technical training on areas in support of climate resilience	$75,000	CIF
	Sub-total	$848,910	
2.1.3	**Climate Change Risk Assessments**		
	Coastal Inundation Impact Modeling	$100,000	CIF
	Community Based Climate Risk Base Maps	$17,500	CIF
	Expansion of Social Risk Assessment	$7,500	CIF
	Training of Community Risk Monitors	$7,500	CIF
	Sub-total	$132,500	
2.1.4	**Public Education and Community Outreach**		
	National education program on community based risk and resilience	$300,000	CIF
	National curriculum development for secondary schools in climate change and disaster risk reduction	$150,000	CIF
	Development of information packages for individuals in high-risk areas	$55,000	CIF
	Sub-total	$505,000	
2.1.5	**Information and Data Management Capacity Building**		
	Development of National Spatial Data Infrastructure	$270,000	CIF
	GIS Training	$20,000	CIF

	Information Management Training	$30,000	CIF
	Equipment and Goods for Information and Data Management	$197,000	IDA
	Sub-total		
2.1.6	**Natural Hazard and Climate Risk Model Improvements and Capacity Building**		
	Sub-total	$800,000	GFDRR
Sub-Total Component 2.1		**$2,056,410**	

2.1.1 Institutional Strengthening of the Ministry of Transportation and Works (IDA)

Project Rationale: The Ministry of Transportation and Works (MoTW) has the responsibility for public infrastructure including the design and engineering studies. The MoTW has been working to establish technical lab for data collection and conducting analysis in support of engineering designs – such as soil analysis. The ministry has vital intellectual capacity and trained engineers that are crucial to proper development in Saint Vincent and the Grenadines. However, the ministry is lacking crucial testing equipment, GIS capacity, and training in certain areas. The ministry currently only has the tools for rudimentary analysis in support of works projects - particularly drainage, slope stability, bridges, culvert and road design - and as a result there is a tendency to build vulnerability into their projects. Through this activity the goal is to strengthen the capacity of MoTW to conduct more effective engineering designs and be able to incorporate natural hazard and climate risk information into their engineering design processes and civil works planning activities.

Project Beneficiaries: This project will directly support the capacity of the individual engineers and the Ministry of Transportation and Works as a whole to better complete its mandate of responsibility for the public infrastructure in Saint Vincent and the Grenadines. Through this increased capacity the entire population of Saint Vincent will eventually benefit through higher quality designs of infrastructure and public facilities – as well as having to experience lesser negative impacts of adverse natural events due to more resilient infrastructure. Furthermore, through designing less vulnerability public works the costs for maintenance and future retrofitting will be reduced.

Project Investments: The project will provide the MoTW a variety of needed goods and trainings in order to be able to conduct higher quality engineering analysis. The goods will include different field testing equipment to fill the needed gaps in their Lab – such as soil testing instruments, and GIS software and hardware to support planning activities. The activity will also provide for training on the provided tools and in areas needed to support the project objectives. Specific line-item purchases have been discussed with the ministry and are to be detailed in the procurement plan with review of the World Bank project team.

2.1.2 Hydro-Meteorological Capacity Building (CIF)

Project Rationale: Proper availability and collection of hydro-meteorological information and its analysis is of significant importance for long-term climate change adaptation and natural hazard risk planning and mitigation activities. It provides the fact-based understanding of the environment for issues such as hurricane, saturation-induced landslide, flooding and other natural hazards – which have changing levels of exposure due to climate change. This project will build on previous activities within Saint Vincent and the Grenadines in order to take advantage of economies of scale as well as previous successes – such as the capacity building, instrumentation and analysis that was conducted under the EU-funded "National Water Resource Management Project," which, in addition to strengthening water resource management on the island, identified certain future needs of which certain issues are being addressed with this project. This project activity will significantly strengthen the existing hydro-meteorological network (both physical equipment and human capacity) throughout the country and will provide training and capacity building for in-country use and integration of data into development and risk management planning.

Project Beneficiaries: A wide series of government stakeholders will benefit from the increased capacity – including direct and significant training for the Met Office and CWSA, as well as training and coordination development with Ministry of Agriculture, NEMP, Forestry, VINLEC, Ministry of Transportation and Works, NEMO, National Parks, Ministry of the Environment and others. This project will help build the scientific and fact based decision making needed for long-term climate change adaptation activities and for mainstreaming climate change into development within Saint Vincent and the Grenadines. Furthermore, the project will have in-direct benefits to the public through stronger hydro-meteorological and climatological capacity on the island – such as better weather forcasting for farmers and increased capacity for hydro-metrological natural hazard early warning and forecasting. The project will also benefit to international climate change scientific analysis community by providing a rich set of scientific data of a small island developing state that is experiencing the impacts of climate change – allowing a better international understanding of the impacts of climate change.

Project Investments: This project will include a series of investments within the government to strengthen hydro-climatologically monitoring, analysis and understanding. Strengthening capacity of the Met Office for forecasting and intergovernmental coordination including marine forecasting, communications equipment, planning for linkages to global systems of climate tracking, in close collaboration with regional organizations and initiatives. This includes a strategy for inter-governmental capacity building, and relationships between Agriculture, NEMP CWSA, Forestry, VINLEC, National Parks, Environment and other ministries. The project will also provide specific and technical training and capacity building for Met Officers. Strengthening capacity for CSWA for hydrology, drainage and waste water management. In-house training and exchanges will occur for CWSA utilizing Caribbean (CIMH) experts over a period of two years. Training may include experts from other ministries. The project will provide technical training for officials in various sectors on specific technical capacity and monitoring programs in support of climate resilience (e.g. climatology, marine meteorology, coastal zone monitoring, hydrology, geomorphology, and agronomy).

2.1.3 Climate Change Risk Assessments (CIF)

Project Rationale: The vulnerability of Saint Vincent and the Grenadines has been increasing and will continue to increase due to climate change. However, despite the fact that this general idea is well understood on the island – the specific impacts of climate change are primarily based on either crude regional and planetary scale climate models, or based on best guesses of possible impacts.

This lack of local level understanding is a significant hindrance to the countries mainstreaming of climate change adaptation into its development activities. It is through scientific analysis as well as community and social engagement on climate change risks that the population of Saint Vincent and the Grenadines can plan for and adopt climate change adaptation strategies. This will be a valuable vehicle for development of community-based approaches to building resilience, awareness and hazard mapping.

Project Beneficiaries: The project will benefit both government officials engaged in climate change adaption planning and implementation as well as community members through increased understanding of climate change risks.

Project Investments: The project will take a two-pronged approach to climate change risk assessment through both scientific analyses of climate impacts (i.e. costal inundation impact modeling) as well as through a social and community approach – including, community-based risk mapping, expansion of social risk assessments, and training of community leaders and disaster management committee members in community leadership as well as risk monitoring and climate resilience.

2.1.4 Public Education and Community Outreach (CIF)

Project Rationale: The education of the public in their exposure to natural hazards and the impacts of climate change can have significant results in reducing their vulnerability to such adverse natural events. The public, especially the poorest and most vulnerable, are on the front lines of the battle against adverse impacts of climate change and natural hazards and their understanding and engagement of adaptation and mitigation is an important component of a comprehensive vulnerability reduction strategy. It is through this project that there will be a series of public engagement and education activities with the goal of increasing this understanding and engagement.

Project Beneficiaries: The direct beneficiaries of this activity are the public within Saint Vincent and the Grenadines – especially secondary school students and those living in high risk coastal areas which will specifically targeted certain activities.

Project Investments: The project will engage in three different public education and community outreach activities, including: a three-year public education program to build community based climate risk and resilience understanding; the development and implementation of a national curriculum, including training of teachers, on climate change and disaster risk reduction; the creation and distribution of information packages for families living in high-risk coastal zones.

2.1.5 Information and Data Management Capacity Building (CIF & IDA)

Project Rationale: Disaster risk management, risk assessment and climate change adaptation activities are rooted in having access to proper data and having capacity to analyze and interpret that information. Risk analysis requires the integration of geographic and environmental data in order to identify vulnerabilities and assist with the development of resilient land use strategies. While government of SVG has already invested in these some of these capabilities, in order to take

advantage of improvements in risk modeling systems and advance government capacity for improved risk assessment, this project provides for expanded investments in equipment, training and analytical support that will allow for improved risk analysis. Currently within Saint Vincent and the Grenadines data and information is not managed in a systematic manner, this causes significant inefficiencies within the government and increases the chances that valuable investments in data collection activities will not be fully utilized. This activity also contributes to assist government of SVG with taking advantage of ongoing regional efforts and supports SVG with the acquisition of key training and equipment needed to support ongoing and future planning and risk analysis needs.

Project Beneficiaries: The principal beneficiaries of this sub-component are the NEMO, Ministry of Planning, Town and Country Planner, Ministry of Works, Department of Land and Surveys and other government individuals working with geospatial and scientific data. Activities are designed to provide key equipment and personnel training to expand the departmental capacities for risk analysis and land planning activities.

Project Investments: The project will provide for purchase of needed goods and trainings to create the technical capacity within the country for comprehensive data and information management. The project will also support the development of an enterprise national spatial data infrastructure through implementation of policies, standards and best practices which will allow for systematic management of geospatial information throughout the Government of Saint Vincent and the Grenadines.

2.1.6: Risk Modeling Improvements and Data Collection (GFDRR)

Project Overview: This co-financed activity will support the transition of the Government of Saint Vincent and the Grenandines to current best practices for disaster and climate risk modeling and analysis within development processes. This grant funded activity will leverage regional activities and economies of scale to support updating of risk models for the country. The project will continue building national capacity to integrate assessment of natural risk into policy and decision making in various sectors operations including development investments, disaster risk mitigation, and disaster response planning. The project will work with a variety of governmental sectors to applying risk modeling results into operational risk understanding analysis within their respective areas of development responsibility. The highly scientific portions of modeling development will occur at a regional level – where this capacity will be improved and relationships built in parallel activities so that applying risk modeling tools can become common practice within relevant sectors. The models will be built upon existing hazard and vulnerability studies in the region such as CCRIF and UWI risk atlas project. This co-financed project will help support the overall project goals that have been outlined within this document.

Sub-Component 2.2 – Capacity Building for and Application of Natural Hazard Risk and Climate Change Impact Management

This sub-component is designed to address the need for practical natural hazard risk and climate change impact management activities to be conducted within Saint Vincent and the Grenadines. Such activities require sufficient capacity for implementation, as well as having proper procedures,

legislation, guidelines and practical experience amongst the government and community members engaged in disaster risk management and climate change adaptation. This sub-component will strengthen specific institutions which have important roles within these activities – such as the National Emergency Management Organization, the Physical Planning Unit, the Ministry of Transportation and Works, the Ministry of Health and the Environment, the Ministry of Finance, Economy and Planning, and others. There will be a comprehensive review of governance and institutional issues surrounding climate change adaptation as well as specific intervention to address a specific number of those issues. Finally, the sub-component will conduct a pilot climate change adaptation implementation on Union Island within the Grenadines, this pilot will improve the resilience of Union Island but will also serve as a tool for the actors responsible for climate change adaptation and disaster risk management within Saint Vincent and the Grenadines to gain practical experience in a comprehensive and cross-sectoral approach to these issue and allow them to pilot different intervention methods and the process of strategic long term planning of future adaptation measures.

#	Project Component and Activities	Estimated Cost (USD)	Funding Source
2.2.1	**Capacity building of National Emergency Management Organization (NEMO)**		
	Development of a National Shelter Management Policy (gender sensitized) and enforcement support	$20,000	IDA
	Assessment and development of DRM training program for government agencies.	$30,000	IDA
	Completion of national emergency communications network	$300,000	IDA
	Planning and development of early warning system	$60,000	CIF
	Institutional Strengthening of NEMO for community engagement and climate change adaptation	$140,000	CIF
	Sub-total	$550,000	
2.2.2	**Strengthening Enforcement of Building Codes**		
	Sub-total	$100,000	IDA
2.2.3	**Community-based Water Resource Management**		
	Water Conservation and Management in the Grenadines	$75,000	CIF

	Guidelines for Commercial Fishing and Recreational Boating	$50,000	CIF
	Agrochemical Use Awareness for Farmers and Local Communities	$15,000	CIF
	Sub-total	$140,000	
2.2.4	**Institutional Capacity Building For Climate Change Adaptation**		
	Climate Change Adaptation Institutional Strengthening for MoFEP, MoHE, MoTW, Physical Planning	$450,000	CIF
	Booklet on Climate Change Governance	$35,000	CIF
	Draft Policy and Legislation of Mainstreaming Climate Resilience	$200,000	CIF
	Strategy for Public-Private Partnership on CCA	$10,000	CIF
	Institutional Exchange with Caribbean Partners	$90,000	CIF
	Sub-total	$785,000	CIF
2.2.5	**Climate Change Adaptation Pilot Area: Union Island**		
	Implementation of Numerical and Physical Modeling within Pilot Area	$300,000	CIF
	Geological Assessment of Union Island	$30,000	CIF
	Mangrove Replanting and Coastal Management	$85,000	CIF
	Drainage Designs for Union Island	$65,000	CIF
	Sub-total	$480,000	
Sub-total Component 2.2		$X	

2.2.1 Capacity building of National Emergency Management Organization (NEMO) ***(IDA & CIF)***

Project Rationale: The National Emergency Management Organization (NEMO) is the key agency tasked with emergency response and disaster risk management activities for Saint Lucia and the Grenadines. NEMO has a decent level of capacity, but there are several areas in which there is a need for additional capacity and strengthening to allow the organization to carry out its mandate – and a selection of those issues are being addressed within this project component. The monetarily largest task ($300K USD) within this activity is the completion of the national emergency communications network. The emergency communications network is designed to allow for communication within the government during times of emergency. The National Shelter Management Policy has been drafted by NEMO but needs further expertise for completion and the provision of support for enforcement of the policy. The shelter policy provides the framework for which the emergency shelter network within the country operations and is of importance for high-quality emergency response capacity. The project will also provide a range of trainings and goods that are needed for proper disaster risk management operations. Further activities for the strengthening of NEMO will be co-financed under funding from the CIF through the PPCR program, they will provide additional capacity on-top of IDA funded activities – such as further training of NEMO officials for climate change adaptation. Furthermore, the planning of an early warning system will be conducted as current early warnings sent via cell phone networks are not well understood and have not been as effective as they should. This project activity will allow for NEMO to have stronger capacity to coordinate and conduct emergency response and disaster risk management throughout the country.

Project Beneficiaries: The immediate beneficiaries of the project are the staff of NEMO through further training and equipping of needed goods to allow them to better carry out their duties and responsibilities. However, the project will benefit the entire population of Saint Vincent and the Grenadines through having a more effective emergency management organization which can serve them and increase their resilience to natural disaster and adverse impacts of climate change.

Project Investments: The project will finance a series of activities, including the completion of the national emergency communications network. A portion of the network was previously established but needed additional funding for completion – the specifics of the needs were identified in the "Status Report on the Implementation of the National Emergency Telecommunications System" – and this project will provide for the needed goods and services for completion of the network. This project will also finalize the National Shelter Management Policy and provide enforcement support which will have a strong consideration of gender issues during crisis situations. Furthermore, the activity will provide for designing training on disaster risk management to be delivered by NEMO to other agencies within the Government and the public, as well as training for emergency response officials on complex search and rescue activities. Specific goods will be acquired for NEMO which will allow it to more effectively carry out its duties – such as search and rescue equipment. Finally, the CIF portion of the project will provide technical training in Climate Change (Specialist) and enhancement of local Community Disaster Management Committees (e.g. training, computers, public education). Additionally, a review of all possible and necessary early warning systems will be undertaken, including a review of regional examples and strengthening of the cell phone network.

2.2.2 Strengthening Enforcement of Building Codes (IDA)

Project Rationale: Proper building codes and their enforcement is a vital activity for building resilience within Saint Vincent and the Grenadines to adverse natural events – which are projected

to get more extreme in the future due to climate change. The government has adopted the 2008 building codes for the country but there is currently limited capacity for enforcement. Therefore creating an environment in which building codes are frequently ignored and not understood by the public. This activity will allow for more effective enforcement and through such strengthened capacity allow for the government in the future to adopt and integrate into development activities new building codes as are needed – such as through incorporation of expanded understanding of natural hazard exposure and climate change impacts.

Project Beneficiaries: The project would directly benefit the Physical Planning unit through increasing is enforcement capacity for building codes. It will indirectly benefit the public of Saint Vincent and the Grenadines through improved standards for building construction and therefore reduced vulnerability to adverse natural events.

Project Investments: The project will provide technical support to build capacity and streamline the process within the Physical Planning Department for the enforcement of building codes.

2.2.3 Community-based Water Resource Management (CIF)

Project Rationale: The engagement of end-users can be a high-effective method of water resource management through increasing understanding and changing water-usage behaviors. Within the Grenadines there are significant water resource management issues and it is an area that is highly vulnerable to water issues which will likely be exacerbated through future climate change. Engagement on water conservation and management allow for adaptation and reduction of vulnerability in a cost-effective and efficient manner. Furthermore, other communities within Saint Vincent and the Grenadines have significant impacts on water resource management and through targeted engagement of commercial fisheries, recreational boaters, farmers and community members will result in more efficient management of scarce water resources.

Project Beneficiaries: The direct beneficiaries of this project activity will be the community members who are currently exposed to a high level of vulnerability from water-resource issues, as well marine ecosystems and other areas that are directly affected by poor water resource management and water contamination issues.

Project Investments: The project will conduct a series of three interventions on community based water resource management including; a program of water conservation and management within the Grenadines; preparation of guidelines for commercial fishing and recreational boating on issues such as disposal of solid waste, and grey and black water management; finally there will be an awareness and education program for farmers and community members within the identified pilot areas on the use of agrochemicals and its implications for surface freshwater contamination.

2.2.4 Institutional and Governance Capacity Building for Climate Change Adaptation (CIF)

Project Rationale: Governance and institutional capacity is particularly significant in the early stages of mainstreaming climate change considerations into national development planning. All government departments and ministries need to know their role, that of others, as well as the responsibilities of government, the business community and individual citizens in building resilience and awareness. Furthermore, the government needs to have the capacity to be able to fulfill its responsibilities and to incorporate climate change adaptation into their planning and operational activities. It is through strengthening these processes and the understanding of their

importance that this project activity will increase the mainstreaming of climate change adaptation through Saint Vincent and the Grenadines.

Project Beneficiaries: The direct project beneficiaries are the various governmental departments, ministries and staff that are engaged in climate change adaptation activities. It will indirectly benefit the entire population of Saint Vincent and the Grenadines through more effective governance and institutional capacity to reduce their vulnerability to adverse climate change impacts.

Project Investments: The project will engage in a series of interventions and investments in increasing institutional and governance capacity for climate change adaption. It will conduct institutional strengthening of the MoFEP, MoHE, Ministry of Works, and Physical Planning to increase in-house climate change adaptation capabilities – such as strengthening of EIA processes, revised land use zoning plans, revision of building codes, guidelines on drainage issues, and additional specific activities. There will be the development of draft policy and legislation in support of mainstreaming climate change resilience into development – including the National Physical Development Plan, Data Management Policies, the National Emergency Management Plan, EIA regulations, finalization of the Environmental Management Act, revision of the Disaster Management Act, the National Economic and Social Development Plan, drafting a Marine Pollution Act and Effluence Limitation Guidelines – all of which will occur through comprehensive stakeholder consultations. The project will also develop a strategic plan for establishment of Public-Private Partnerships for combating the adverse impacts of climate change. Finally, the project will support an exchange of research, capacity building, training, policies and practices with other actors in the Caribbean region to increase collaboration and access to capacity for Saint Vincent and the Grenadines.

2.2.5 Climate Change Adaptation Pilot Area #X: Union Island (CIF)

Project Rationale: Union Island, the southern-most grenadine island, is an area that is highly vulnerable to climate change impacts and therefore was chosen as one of the three pilot areas within the project to engage in a comprehensive climate change adaptation intervention. The complex nature of the adverse impacts of climate change necessitates a comprehensive approach to adaptation interventions. This need has lead to the approach of conducting a series of interventions throughout the Union Island watershed. The pilot will allow for a more comprehensive understanding of the climate change profile and impacts for the island as well as conduct certain specific interventions to reduce vulnerability – such as mangrove replanting. The pilot will create designs for a series of future interventions that would allow for a fully comprehensive adaptation intervention on Union Island.

Project Beneficiaries: The direct beneficiaries of this project will be the population of Union Island which will have a reduced level of vulnerability to climate change impacts due to the pilot – as well as being prepared for further future vulnerability reduction activities. Additional beneficiaries include the various government agencies and ministries who will be involved in the pilot who will gain invaluable practical experience and lessons in practical and comprehensive climate change adaptation which they can replicate in other locations within Saint Vincent and the Grenadines.

Project Investments: Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring. Test the application of Union Island's Integrated Coastal Zone Management plan and the community awareness strategy. Implement numerical and physical modeling techniques for Union Island on climate change

adaptation – including accounting for downstream impacts, shoreline stabilization and the development of specific engineering projects for Union Island. Implement forestry management activities and other soil and water conservation measures, such as, the replanting of mangroves and other plant species in select areas, establishment of flying nurseries, possible establishment of terraces and sedimentation traps, supporting best practices in Agriculture and Agro-forestry, and other activities. Finally the project will design and delineate drainage channels and buffer zones on Union island and engage in definition of the legal and legislative implications of drainage channels for various communities as well as GIS mapping to record the drainage systems.

5. List of Preidentified Stakeholders

Agency/Organisation	Point Persons	Position	Email	Telephone	Related Sector
Ministry of Works	Mr. Brent Bailey	Chief Engineer	office.transport@mail.gov.vc	4572031	Infrastructure; Coastal Zone Management; Disaster Vulnerability
	Mr. Louis De Shong	Permanent Secretary	office.transport@mail.gov.vc	4572031	Infrastructure; Coastal Zone Management
Bridges Roads and General Services Authority (BRGSA)	Mr. Brian George	Chief Executive Officer			Physical Infrastructure
Ministry of Health and the Environment	Mr. Lanceford Weekes	Permanent Secretary	officehealth@mail.gov.vc mohesvg@vincysurf.com	4561111-ext 511 4500511	Coastal Zone Management; Water Resource Management; Natural Resource Management; Biodiversity
	Mr. Edmund Jackson	Director of Environmental Management Department	edmund_jackson2000@yahoo.com svgenv@vincysurf.com	485-6992	Coastal Zone Management; Water Resource Management; Natural Resource Management; Biodiversity
	Ms. Yasar Belmar	Environmental Resource Analyst Environment Management Dept.	yasa.belmar@gmail.com svgenv@vincysurf.com	485-6992	Coastal Zone Management; Water Resource Management; Natural Resource Management; Biodiversity
	Ms. Nyasha Hamilton		nyakkh@googlemail.com	485-6992	Coastal Zone Management; Water Resource Management; Natural Resource Management; Biodiversity
	Mr. Allan Alexander	Permanent Secretary	office.agriculture@mail.gov.vc	456-1410; 4561111-ext 311	Agriculture; Forestry Resources

Ministry of Agriculture Forestry and Fisheries	Mr. Reuben Robertson	Chief Agricultural Officer	office.agriculture@mail.gov.vc	456-1410; 4561111-ext 311	Agriculture
	Mr. Fitzgerald Providence	Senior Forestry Supervisor	forestrysvg93@yahoo.com	4562738	Forestry Resources; Biodiversity; Water Resources
	Mr. Raymond Ryan	Chief Fisheries Officer	fishdiv@vincysurf.com	4562738	Marine Resources; Coastal Zone Management
	Mr. Kris Isaacs	Research Analyst, Fisheries Division	kris.isaacs@yahoo.com	Ext 881	Marine Resources; Coastal Zone Management
Ministry of National Mobilisation, Social Development Etc	Mrs. Rosita Snagg	Permanent Secretary	rsnagg@hotmail.com	456-1111 ext 395	Gender; Social Development
	Mr. Eli Francis	Director of Social Development	efrancis_svg@ymail.com	456-1111 ext 400	Gender; Social Development
	Mrs. Sandra Augustus	Gender Affairs Division	sandraaug@hotmail.com	456-1111 ext 395 or 396	Gender; Social Development
	Mr. Roger Young	Community Development Supervisor	rogeraly@hotmail.com	456-1111-ext 501	Social Development
Ministry of National Security	Mr. Godfred Pompey	Permanent Secretary	office.natsec@mail.gov.vc		Coastal Zone Management
	Mrs. Doreen Simmons	Senior Assistant Secretary	office.natsec@mail.gov.vc	4561703	Coastal Zone Management
St. Vincent and the Grenadines Coast Guard	Lieutenant Commander. Brenton Cain	Lt. Commander	office.coastguard@mail.gov.vc	4574578	Coastal Zone Management
	Lieutenant Henry	Lieutenant	office.coastguard@mail.gov.vc	4574578	Coastal Zone Management
St. Vincent and the Grenadines Maritime Association	Mr. David Robin	Head	svgmarad@gmail.com	4561378	Coastal Zone Management
St. Vincent and the Grenadines Fire Services				4571211	Forestry Resources

Energy Unit	Mr. Leonard Dean	Head		4500369	
National Emergency Management Organisation (NEMO)	Mrs. Michelle Forbes	Director of NEMO	nemosvg@gmail.com	456-2975	Physical Infrastructure; Coastal Zone Management; Natural Resources; Disaster Vulnerability
	Mrs. Houlda Peters	Training Officer	nemosvg@gmail.com	456-2975	
Ministry of Tourism	Mrs. Lavern Grant		tourism@vincysurf.com	4571502	Tourism Resources
	Ms. Vida Bernard		tourism@vincysurf.com	4571502	Tourism Resources
	Ms. Faylene Findlay-Scrubb		tourism@vincysurf.com	4571502	Tourism Resources
National Parks, Rivers and Beaches Authority	Mr. Andrew Wilson		nationalparks@vincysurf.com	4531623	Natural Resources, Coastal Zone Management; Marine Resources; Biodiversity; Water resources
	Mr. Hayden Billingy	Superintendent of Rivers, Beaches and Recreation sites	nationalparks@vincysurf.com haydensvg2003@yahoo.com	4531623	GIS; Natural Resources; Coastal Zone Management; Water Resources
	Andrew Lockhart	Superintendent of Marine and Terrestrial parks	nationalparks@vincysurf.com	4531623	Marine Resources; Biodiversity; Natural Resources; Forest Resources; Water Resources
Ministry of Housing, Physical Planning, Land and Informal Settlements	Mr. Kenwick Glynn	Permanent Secretary	office.housing@mail.gov.vc	4562050	Physical Infrastructure
	Mr. Hudson Nedd	Chief Technical Officer	hnedd@gov.vc	4562050	GIS; Physical Infrastructure
	Mr. Anthony Bowman	Town Planner	ppuhilp@yahoo.com	457-1588	Physical Infrastructure, GIS
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	Mr. Dwayne Allen	GIS Officer	ppuhilp@yahoo.com	457-1588	GIS
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St. Vincent and the Grenadines Meteorological Office			svgmet@gmail.com metoffice.airport@mail.gov.vc		Legal Affairs

International Airport Development Corporation (IADC)	Dr. Rudy Mathias				Physical Infrastructure
	Mr. Jeffery Cato				Physical Infrastructure
Basic Needs Trust Fund (BNTF)	Mr. Kenneth Douglas				Physical Infrastructure; Social Infrastructure
Central Water and Sewage Authority	Mr. Garth Saunders	General Manager	cwsa@vincysurf.com		Water Resources; Physical Infrastructure
	Mr. Marco Audain	Engineer	cwsa@vincysurf.com		Water Resources; Physical Infrastructure
Ministry of Finance and Economic Planning	Mr. Maurice Edwards	Director General of Finance and Planning			
	Mrs. Laura Anthony Browne	Director of Planning	cenplan@vincysurf.com		Economic Analysis; Investment Promotion; Water Resource Management
	Ms. Decima Corea	Deputy Director of Planning (ag)	cenplan@vincysurf.com joiedeci@yahoo.com		Economic Analysis; Disaster Vulnerability
	Ms. Ingrid Fitzpatrick	Accountant General			Economic Analysis; Budgeting; Investment Promotions
	Mr. Edmond Jackson	Budget Director			Economic Analysis; Budgeting; Investment Promotions
	Ms. Deidre Anthony	Senior Economist, Economic Research and Policy Unit			Economic Analysis, Debt Management
	Mr. Berisford George	Senior Economist, Economic and Social Policy Unit	berisg@gmail.com	457-1746	Economic Analysis; Agriculture; Social Analysis
	Mr. Trelson Mapp	Economist; PPCR Coordinator	trelmapp@gmail.com;	457-1746	Economic Analysis; Disaster Vulnerability; Social Analysis
	Ms. De Anna Ralph	Social Analyst	delralph@gmail.com	457-1746	Social Analysis; Gender
	Ms. Joel Warren	Social Analyst	gdjwarren@yahoo.com	457-1746	Social Analysis; Gender
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	Ms. Marcelle Edwards-John	Coordinater, Project Coordination Unit	svgpcu@vincysurf.com		Disaster Vulnerability; Economic Analysis
	Mr. Maurice John		svgpcu@vincysurf.com		Disaster Vulnerability;

					Physical Infrastructure; Coastal Zone Management
	Mr. Sheik Kadir	Head European Development Fund Project Coodination Unit (EDFPMCU)	edfstatus@gmail.com edfpmcu@vincysurf.com		Disaster Vulnerability; Physical Infrastructure; Water Resources
St. Vincent and the Grenadines' National Trust	Ms. Rachel Moses		svgntrust@vincysurf.com	451-2921	
Grenadines' Affairs	Mr. Herman Belmar		humpback1952@yahoo.com	458-3510	
SANDWATCH	Ms. Joan Stowe				
Sustainable Land Management	Mrs. Lystra Culzac-Wilson				
St. Vincent and the Grenadines' Hotel and Tourism Authority	Ms. Francelia Marksman		svghotels@vincysurf.com chicconcepts@yahoo.com	458-4379	
Private Climate Change Activists	Mr. Morrison Baisden	Self-Employed expert on climate Change		456-9222	
	Mr. Andrew Simmons		jimpy_simmo@yahoo.co.uk kingshill.reserve@gmail.com	456-9533	
St. Vincent and the Grenadines' Chamber of Industry and Commerce				4571464	
Social Investment Fund	Mr. Bentley Browne	CEO		4566853	
St. Vincent and the Grenadines Electricity Services Ltd	Mr. Thornley Myers	Managing Director	vinlec@vinlec.com	4561701	Energy, Water resources

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EC regional	N/D (2003)	Comprehensive Disaster Management, Strategy and Programme Framework 2007-2012	Baastel-ESL (Canada-Jamaica) Co

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EC regional	1996	Manual for Caribbean Electric Utilities Addressing the issue of the Mitigation of Damage Caused by Natural Hazards to Civil Works	Gibbs, T. OAS CDMP
EC regional	2002	Natural Hazard Management in the Caribbean, Good Practices and Country Case Studies	World Bank
EC regional	2009	NATURAL HAZARDS AND DISASTERS, LANDSLIDES IN THE WINDWARD ISLANDS	Unit for Disaster Studies, UWI Mona, Jamaica,http://www.mona.uwi.edu/uds/Land_Windward.html
EC regional	2009	NATURAL HAZARDS AND DISASTERS_ LANDSLIDES IN THE LEEWARD ISLAND	http://www.mona.uwi.edu/uds/Land_Leewards.html
EC regional	N/D/ (1988)	Comparison of Caribbean and North American Seismic Provisions	Myron W. Chin and S. J. Pantazopoulou
EC regional	1991	Socioeconomic and Political conatraints on disaster Preparedness in the Eastern Caribbean	Keith Rowley
Global	2009	2009 Global Assessment Report on Disaster Risk Reduction, Risk and Poverty in a changing Climate	United Nations
Grenada	2003	Status of Hazard Maps, Vulnerability Assessments and Digital Maps: Grenada, Country Report	Caribbean Disaster Emergency Response Agency (CDERA)
Grenada	2003	Grenada, National Hazard Mitigation Policy 2003	CDB and CDERA, Spencer, L
Grenada	2005	Survey on the Status of Disaster Preparedness in Grenada	Arturo López-Portillo Contreras under Canadian International Development Agency (CIDA).
Grenada	1998	Vulnerability Assessment of Selected Buildings Designated as Shelters, grenada	Tony Gibbs, USAID-CDMP & OAS ECHO
Grenada	2006	National Hazard Mitigation Plan, Grenada	Jeco Caribbean, for CEDERA & CDB
Grenada	2005	National Disaster Plan	Government of Grenada
Grenada	2005	Country Report, Legislative Review and Institutional Capacity Assessment for Hazard Mitigation Within the Framework of the Post-Ivan Reconstruction Program	CDERA & CDB
Grenada	2003	Grenada, National Hazard Mitigation Policy	Grenada National Hazard Miatigation, Policy Development Committee, L. S. Thomas, under

			CDERA & CDB
Grenada	1987	Emergency Powers Act, 1987	Government of Grenada
Grenada	2006	Development of Coastal Erosion Hazard Maps, Grenada	CEAC Solutions Inc.
Grenada	2005	GENERATION OF A COMMON DIGITAL DATABASE FOR USE IN HAZARD MAPPING AND Vulnerability Assessment Country report Grenada 2005	Opadeyi, J., UWI
Grenada	1987	Grenada Emergency Powers Act, 1987	Government of Grenada
Grenada		Grenada: Macro-Socio-Economic Assessment of the Damages Caused by Hdurricane Ivan, Sefpt. 7, 2004	OECS
International	2005	The Economics of Disaster Mitigation	OAS
International	2009	Database, EMDAT November 2009	
St. Kitts and Nevis	2003	The Federation of St. Kitts and Nevis, Natyional Assessment of the BPOA +10, 1994-2003	Government of St. Kitts and Nevis
St. Kitts and Nevis	2003	Status of Hazard Maps, Vulnerability Assessments and Digital Maps: St. Kitts Report	Caribbean Disaster Emergency Response Agency (CDERA)
St. Kitts and Nevis	2009	St.Kitts-Nevis Disaster Risk Reduction Initiatives, ISDR Report	Nema St. Kitts, Government of St. SKN
St. Kitts and Nevis	2007	Lessons Learnt from Recent Cyclone Activity, St. Kitts-Nevis (PPT)	Nema St. Kitts, Government of St. SKN
St. Kitts and Nevis	2001	St. Kitts and Nevis, Hazard Vulnerability Assessment: Final Report	OAS, Edwardo M. Mattenet
St. Lucia	2003	Status of Hazard Maps, Vulnerability Assessments and Digital Maps: St. Lucia, Country Report	Caribbean Disaster Emergency Response Agency (CDERA)
St. Lucia	2006	Vulnerability Assessment of Critical Facilities, Saint Lucia, West indies	CIPA
St. Lucia	2005	Country Report, Legislative Review and Institutional Capacity Assessment for Hazard Mitigation St. Lucia	CDERA and CDB
St. Lucia	1997	OECS Building Code St Lucia 1997	Caribbean Community Secretariat And OECS, Gibbs, T.

St. Lucia	2009	NATURAL HAZARDS AND DISASTERS, LANDSLIDES IN St. Lucia	http://www.mona.uwi.edu/uds/Land_St_Lucia.html
St. Lucia	2006	Disaster Management Act, #30, 2006	Government of St. Lucia
St. Lucia	2007	Saint Lucia National Emergency Management Plan 2007	Government of St. Lucia
St. Lucia	1995	Emergency Powers Act (Disasters), 1995	Government of St. Lucia
St. Lucia	2000	Disaster Preparedness and Response Act, #13, 2000	Government of St. Lucia
St. Lucia	2009	Interim national progress report on the implementation of the Hyogo Framework for Action	Government of St. Lucia
		2001 Population and Housing Census Report	Government of St. Lucia
St. Vincent	2003	Status of Hazard Maps, Vulnerability Assessments and Digital Maps: St. Vincent and the Grenadines, Country Report	Caribbean Disaster Emergency Response Agency (CDERA)
St. Vincent	2006	Implementation Completion Report, Emergency Recovery and Disaster Management Project, St. Vincent and the Grenadines	The World Bank
St. Vincent	2009	NATURAL HAZARDS AND DISASTERS, LANDSLIDES IN St. Vincent and the Grenadines	Unit for Disaster Studies, UWI Mona, Jamaica http://www.mona.uwi.edu/uds/Land_Windward.html
St. Vincent	1979	Scientific Observations at Soufriere Volcano, St. Vincent from April 16-19, 1979	Tombin, J. UWI
St. Vincent	2009	State of Disaster Management in SVG PM address	Gonsolves, R
St. Vincent	2006	SAINT VINCENT AND THE GRENADINES NATIONAL EMERGENCY AND DISASTER MANAGEMENT ACT, 2006	Government of St. Vincent
St. Vincent	2005	St. Vincent and the Grenadines National Disaster Plan	Government of St. Vincent
St. Vincent	2009	Correspondence - Country_Status Report_St_Vincent to CDERA	NEMA, Government of St. Vincent
St. Vincent	2009	Correspondence - NEMA CWork plan 2012	NEMA, Government of St. Vincent
St. Vincent	2009	SVG NEMO CDEMA Country Report St. Vincent 2009.doc	Government of St. Vincent NEMO St Vincent and the Grenadines

St. Vincent	2003	Report to the Regional Consultation on SIDS Specific Issues, St Vincent and the Grenadines, 2003	Lystra Culzac-Wilson, BPOA
St. Vincent	N/D (1998)	Hurricane Vulnerability and Risk Analysis of the VINLEC Transmission and Distribution System	OAS, USAID, UNDP

CIF & PPCR Documents

Date	Title	Author
2009	Proposal prepared by Inter-American Development Bank and World Bank Group for PPCR Regional Program for the Caribbean	
2010	CIF Knowledge Management - Creating the Capacity to Act	Joint Meeting of the CTF and SCF Trust Fund Committees
2010	Pilot Programme on Climate Resilience (PPCR): Financing Modalitiies	CIF
2009	The Selection of Countries to Participate in the Pilot Programme for Climate Resilience: Report of the Expert Group to the Sub-Committee of the PPCR	CIF; Expert Group
2009	Guidance Note on PPCR Regional Programs	
2010	Mozambique: Proposal for Phase 1 funding	Meeting of the PPCR Sub-Committee
2009	GUIDELINES FOR JOINT MISSIONS TO DESIGN PPCR PILOT PROGRAMS (PHASE I)	CIF
N/D	Developing Nepal's Strategic Program for Climate Resilience (SPCR) : Prioritisation Planning Process (DRAFT)	Governement of Nepal
2009	PROGRAMMING AND FINANCING MODALITIES FOR THE SCF TARGETED PROGRAM, THE PILOT PROGRAM FOR CLIMATE RESILIENCE (PPCR)	CIF
2008	THE PILOT PROGRAM FOR CLIMATE RESILIENCE UNDER THE STRATEGIC CLIMATE FUND	
2010	A Strategy to Engage the Private Sector in Climate Change Adaptation in Bangladesh	Asian Tiger Capital Partners
2010	Strategic Program for Climate Resilience - Bangladesh	CIF: Meeting of the SPCR Sub-Committee
2010	CIF Joint Mission Reporting Requirements and Procedures	MDB Committee CIF
2010	Pilot Program for Climate Resilience Caribbean Regional Proposal	Inter-American Development Bank
N/D	Pilot Program for Climate Resilience Caribbean Regional-Track Background Document - Regional Framework	Inter-American Development Bank and World Bank
2009	Supplemenetary Report of the PPCR Expert Group	PPCR Expert Group; CIF

CCCCC & UNECLAC Documents

2010	Economics of Climate Change in Latin America and the Caribbean	Barcena, A., Prado, A.,Samaniego, J., Malchik, S.	2010 Economics of Climate_Change
2009	Climate Change and the Caribbean: A Regional Framework for Achieving Development Resilient to Climate Change (2009-2015)	Caribbean Community Climate Change Centre 2009	Regional Framework for Resilience CCCCC

World Bank Documents

Date	Title	Author
2004	RAPID ONSET NATURAL DISASTERS: THE ROLE OF FINANCING IN EFFECTIVE RISK MANAGEMENT	Gurenko, E., Lester, R., World Bank Policy Research Working Paper 3278;
2010	Cost Benefit Analysis in World Bank Projects	IEG World Bank, IFE, MIGA; Fast Track Brief, 2010.
2010	REGIONAL PARTNERSHIP STRATEGY FOR THE ORGANIZATION OF EASTERN CARIBBEAN STATES FOR THE PERIOD FY10-FY14	Caribbean Country Management Unit, International Finance Cooperation, Latin America and the Caribbean
2006	Project Appraisal Document for Implementation of Adaptation Measures in Coastal Zones Project	Environmentally & Socially Sustainable Development Sector Management Unit, Caribbean Country Management Unit, Latin American and Caribbean Region
2007	Impact of Sea Level Rise on Developing Countries: A comparative Analysis	Dasgupta,S., Laplante, B. Meisner, C. Wheeler, D. & Yan J. World Bank Policy Research Working Paper 4136;
	Implementation Completetion Report on EMERGENCY RECOVERY AND DISASTER MANAGEMENT PROJECT	Finance Private Sector and Infrastructure Department

7. Brainstorming Workshop Summaries January 2011

Minutes of the meeting of the Technical Working Group
Of the
Pilot Programme for Climate Resilience
(PPCR)
Of
St. Vincent and the Grenadines
Wednesday 5th January, 2010

In attendance were:

Yasar Belmar	Environmental Resource Analyst; Environmental Management Unit
Hayden Billingy	Superintendent of Rivers Beaches and Recreation Sites; National Parks, Rivers and Beaches Authority
Samantha Bullock	Economist; Central Planning Division
Scott Cunliffe	Lead Consultant/PPCR; World Bank
Michelle Forbes	Director (ag) National Emergency Management Organisation (NEMO)
Nyasha Hamilton	Environmental Educator; Environmental Management Unit
Dornet Hull	GIS Officer; Ministry of Housing, Physical Planning, Land informal settlements etc.
Edmund Jackson	Director, Environment Management Department
Trelson Mapp	Economist; Central Planning Division
Francelia Marksman	St. Vincent and the Grenadines Hotel and Tourism Association
FitzGerald Providence	Senior Forestry Supervisor; Ministry of Agriculture, Forestry and Fisheries
Tashana Providence	GIS Mapping Officer; Central Planning Division
De Anna Ralph	Social Policy Coordinator; Central Planning Division
Grace Warren	Technical Assistant Social Development; Central Planning Division
Roxanne Williams	Administrative Cadet; National Emergency Management Organisation (NEMO)

Agenda Items:

1. **Opening Remarks and Brief Update of PPCR progress**
   The PPCR Coordinator, Mr. Trelson Mapp in his opening remarks congratulated the members of the Technical Working Group on a job well done in formulating the PPCR Phase 1 proposal for St. Vincent and the Grenadines. Mr. Mapp further indicated that this proposal was accepted by the Climate Investment Funds with little criticisms from the donor countries of the PPCR, on November, 22nd 2010.

Mr. Mapp also spoke briefly about the procurement process of hiring the lead consultant for the PPCR. He then conveyed that the progress on phase 1 was momentarily challenged by slow expressions of interest from potential candidates for the other positions, particularly GIS/Data Management Specialist and Legal Specialist.

Mr. Mapp also reported on his visit to Washington, District of Columbia during the week on November 9th to 13th 2010 for a series of PPCR related meetings with the World Bank, the Inter-American Development Bank, members of the PPCR trust fund committee and other PPCR countries.

2. Introductions

Mr. Mapp then introduced the Lead Consultant of the PPCR in St. Vincent and the Grenadines, Dr. Scott Cunliffe. Dr. Cunliffe then expressed his excitement in being awarded the contract and his desire to be involved in such an integral assignment.

3. Outline of meeting agenda/purpose

Dr. Cunliffe outlined the purpose of the meeting and gave a brief outline of the workplan for the Phase 1 of the PPCR. He highlighted the intention to have three (3) half-day workshops as part of the process. The intention according to him, to host one on each of the following themes:

- Social Vulnerability
- Economic Vulnerability
- Environmental/Disaster vvulnerability

Dr. Cunliffe then outlined that, "***Understanding Vulnerability is the Key to Building Resilience***". In his presentation, he further declared that the assignment would be guided by four (4) principles:

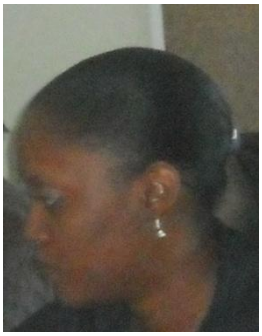
- Make use of available materials;
- Avoid duplication;
- Respect the team effort; and
- Never lose sight of families and communities. The aim is to minimize the impact of disasters on families and communities.

4. Rapid Brainstorm

Members at the meeting were divided into three groups, namely, environmental, social and economic, using simple random sampling. A brainstorm exercise was conducted in each group to list areas that are vulnerable in each sector **(See attached).**

5. **Presentation of Priorities outlined in Brainstorm Exercise**
   - Ms. De Anna Ralph presented for the social group;

   - Ms. Tashana Providence presented for the economic; and



   - Ms. Yasa Belmar presented for the environment group. (see attached also).

6. **Questions and Answers**

Mr. Edmund Jackson enquired about whether proposed sectors in the phase 1 proposal would be lost using the approach outlined by Dr. Cunliffe of having three (3) half day workshops, for environmental, social and economic sectors, respectively.

Dr. Cunliffe replied that we must in the end, design the PPCR around the sector contributions; this is what will make it 'real'. Any proposed project or programme in the Phase I PPCR will necessarily fall under one or more sectors (in this case a sector meaning say Transport, Health, Public Works etc.). Whether we arrange the workshops around; a) social, economic and environmental issues, vulnerabilities and priorities, or whether we structure them around the sectors (Coastal Mgt., Watershed Mgt., Legal and Legislative Aspects, and GIS / Data Management), in the end we results will likely be the same. Given the prior use of these more general 'sectors' as in b) above, then we should stay with that for the workshops.

ADDENDUM:

In follow-up meetings with the Ministry of Health and Environment, the above discussion was re-opened. The following summarises the proposed arrangement of the Workshops:

a. We will retain the sectoral approach, there will therefore be four half-day Workshops, co-hosted by the Ministry of Finance and the Ministry of Health and Environment:
    i. Coastal Mgt.,
    ii. Watershed Mgt.,
    iii. Legal and Legislative Aspects, and
    iv. GIS / Data Management)
b. The purpose of the Workshops will therefore be to i) have a practical presentation from the specialist consultant, ii) outline/discuss/understand what exists (including gaps), and iii) Review institutional arrangements, public education opportunities and training needs (again noting gaps).

This information will be prepared in detail to outline the respective Workshops, attendees, venue, dates etc. It will be important that the specialist consultants are on board to participate.

7. Any Other Business, Adjournment

The meeting was adjourned at 11:30 am.

Pilot Project for Climate Resilience

SAINT VINCENT AND THE GRENADINES

PHASE ONE

December to March 2011

Technical Working Group

Meeting: 5 January 2011

Dear TWG members:

The following is a brief summary of the brainstorming we did last Wednesday. Thanks to those who were able to attend and contribute.

As promised we are working on an outline for the follow-on three half day workshops that will occur in the next two weeks. This will be forwarded for your inputs shortly. We are also looking at ways and means of engaging private companies and organizations to be active partners in building climate change resilience in SVG.

Also, after further discussions with the Ministry of Health and Environment, it was suggested that we not lose that 'sectoral' focus that has been with the development of the proposal throughout. This will be the basic structure of the Workshops: to then match practical, implementable projects and programmes to the priorities for transforming national policies and development to be increasingly resilient to the changing climate.

Your continued assistance and contributions will be critical to the quality and success of the project. It is in our collective interest to make this the best PPCR in the Caribbean!!!

An update from recent discussions with the other PPCR countries nearby (St. Lucia and Grenada) will be sent through shortly FYI. We will also set dates for the next TWG meeting. The additional consultants for the Team have been selected, and are going through the contract procedures right now; we hope to have some of them on the ground late next week.

Regards, PPCR team.

Date	*Organization/Location*	*Who*	*Purpose*
Wednesday 5 Jan 0930-1100hrs	TECHNICAL WORKING GROUP (TWG), Ministry of Finance and Economic Planning – Central Planning Division	SEE ATTENDANCE LIST INCLUDED IN A SEPARATE REPORT IN THE ATTACHMENTS	Introduction and Brainstorming on Vulnerability and priorities, progress update on Project

Meeting Notes:

1. SEE SEPARATE REPORT ON THE RESULTS OF THE BRAINSTORMING FROM THIS SUBSTANTIVE MEETING.
2. A **brainstorming** session was facilitated to focus on vulnerabilities and priorities in three areas: social, economic and environmental vulnerabilities to a changing climate.
3. There were 15 members present coming from a variety of government and non-government organizations. The meeting was very productive. More time for discussion will be allowed in future meetings.
4. There will be three follow-up **Workshops** (half-day each, focussing on social, economic and environmental vulnerabilities), utilizing the results of this brainstorming, to drill down to specifics, to the Sectoral implications of how to address the vulnerabilities identified, costs, benefits, responsibilities and resource requirements, in as much detail as possible.
5. The results from the Workshops, together with guidance provided by the TWG, will significantly shape the PPCR and subsequent investment plan.
6. It was agreed that the TWG should meet again at or prior to key milestones or within two to three weeks maximum during the PPCR preparations. A Schedule for TWG meetings will be prepared by SC.

End

Brainstorming

Technical Working Group

Pilot Project for Climate Resilience

Vulnerabilities

Four groups – SOCIAL
ECONOMIC
ENVIRONMENTAL
DISASTERS

- ✓ Much has been done on various vulnerabilities in St. Vincent and the Grenadines.
- ✓ This exercise is deliberately short, just do as much as possible in the time !!!
- ✓ …. your knowledge and your experience will guide your Group's work
- ✓ We will not capture everything, but we will get the major items.
- ✓ More detailed and specific information will come from three later Workshops

The Job:

- ❑ In these Sectors, brainstorm amongst the group, then write down (list) the most important things, places, people, groups, organizations etc. that you think are vulnerable to the impacts of a changing climate (in your Group's SECTOR).

You may wish to list these vulnerabilities as IMMEDIATE, or LONG TERM, or Priority ONE, Priority TWO or just list what you believe as most vulnerable aspects of Vincentian community, society, life in general, livelihoods, economy and physical environment. HOW WILL CLIMATE CHANGE AFFECT YOU?

THI DOES NOT HAVE TO BE SCIENTIFICALLY CORRECT!!!
…have fun…

THE WORLD BANK

Tuesday 4 January 2011

ENVIRONMENTAL

VULNERABILITIES AND PRIORITIES

LIVELIHOODS AT THE CENTRE *… this is largely a coastal culture and society…*

BIO-DIVERSITY:

- ⑥ FORESTS
- ⑥ MARINE
  - o FISH
  - o TOURISM
    - ▪ RECREATIONAL AREAS
    - ▪ PROTECTED AREAS
    - ▪ COASTAL ENVIRONMENTS/ECOSYSTEMS
- ⑥ NATURAL LNADSCAP/SEASCAPE
- ⑥ WATER
- ⑥ FOOD

AGRICULTURE:

- ⑥ WATER

- FISHERIES
- CROPS AND LIVELIHOODS
- LAND RESOURCES

FORESTS:

- **INDIGINOUS SPECIES**
- **FOOD**
- **WILDLIFE**
- **WATER**

HEALTH

- **HUMAN HEALTH**
- **ENVIRONMENTAL HEALTH**

INFRASTRUCTURE

- **HOUSING**
- **ROADS, BRIDGES**
- **ARIPORTS**
- **5M COASTAL ZONE (***primary focus, key concentrations of people, infrastructure)*
- **SLOPES RIVERS FLOOD PLAINS** *(flash floods)*

ECONOMIC
VULNERABILITIES AND PRIORITIES

THINGS:

- Farmlands – Vegetation/Crops
- Forests
- Housing
- Fishing Industry
- Road Network

PLACES:

- Coastal Zones (lower lying)
- Infrastructure
- Hotels, jetty, restaurants, dive shops
- Commercial areas
- Historical sits
- Fisheries
- Shelters

PEOPLE:

- In sub-standard housing
- Farmers
- Fisherman (folks)
- In service industry
- Marginalized (women, children, elderly, rural areas)

GROUPS/ORG:

- NEMO
- Health canters
- Educational institutions
- NOG's (red cross, etc)
- Religious org.

Social Vulnerabilities

PPCR Brainstorming session

(01.05.11)

Education

School Curriculum (content structure)

Health

- Hospital space

- Diseases resulting from flooding and improper solid waste disposal (Solid Waste Management)

Agriculture

- Food Supply/Food Security

- Safe Water

Poverty

- Increased risk of falling into poverty- climate change would generate new and increase other social vulnerabilities

Housing

- Relocation to interior of the country

Family

- Displacement

- Negatively impact on the structure of families

Gender

- Women who may be in shelter and other safe house are likely to be exposed to issues of violence/abuse

- Men when outside of homes (shelter or safe houses) may not feel they have full control on the family in terms of decision making, protection and provision for their families.

Climate change can impact on the self esteem of both males and females.

Children

- Education get disrupted

- Security

Social Security

Protection – (Family, homes, institutions)

Mental Issues

Stress/Trauma (effect on children, elderly, disabled)

7. Key Meetings and Notes

Pilot Programme for Climate Resilience

SAINT VINCENT AND THE GRENADINES

PHASE ONE

December to March 2011

Meeting Reports

10 January 2011

NB: *The following report presents a summary of meetings with key persons in St. Vincent and the Grenadines over the course of the project. The purpose is to ensure the records of those discussions are available for inclusion in the required reporting processes. Many specific recommendations emerge from these meetings; most are mentioned in the Meeting Notes.*

Not all meetings are noted here, only those sith substantive discussions and results that may contribute to the PPCR.

Following some meetings, these recorded notes have in some cases been forwarded to those in attendance for verification when required, and revised accordingly.

Date	*Organization/Location*	*Who*	*Purpose*
Friday 24 Dec	Ministry of Finance and Economic Planning – Central Planning Division	**Mrs. Laura Anthony-Browne** – Director of Planning; Trelson Mapp – Economist; Scott Cunliffe **	Introduction

** SC = Scott Cunliffe

Date	*Organization/Location*	*Who*	*Purpose*
Wednesday 29 Dec	Ministry of Finance and Economic Planning – Central Planning Unit	**Mrs. Decima Corea** – Deputy Director of Planning, Scott Cunliffe	Discussion of National Economic and Social Development Plan 2011-2025

Meeting Notes:

1. National Economic and Social Development Plan 2011-2025 (NESDP) is in draft form at present, not for distribution.
2. The recent elections held up finalization of the plan for endorsement by the Prime Minister. The preparation of the Budget will now take precedence over the NESDP finalization. The Budget will be completed before the end of January at which time, work on the NESDP can restart.
3. SC pointed out the significance of the NESDP and the subsequent Sectoral Plans, as a primary document for identifying opportunities to be inclusive of climate resilience guidelines, policies and programmes. At this stage, the generally 'broad-brush' approach of the NESDP, is an ideal opportunity to consider the inclusion of additional climate resilience guidance and strategies. The first stage then will be to screen the document for possible areas and opportunities to mainstream climate resilience into the Objectives and Strategic Interventions.
4. Goal Four (Improving physical infrastructure, preserving the environment and mitigation the impact of climate change) will be the focus of mainstreaming climate resilience considerations.
5. The document is structured around five main goals under which Objectives and Strategic Interventions are detailed. The operationalisation of these Strategic Interventions will occur at implementation, following the development of the Sectoral Plans.

Date	*Organization/Location*	*Who*	*Purpose*
Wednesday 29 Dec	Ministry of Finance and Economic Planning – Central Planning Division	**Mr. Dwayne Allen** – GIS, Ministry of Housing, Physical Planning and Informal Settlements (MHPPIS); Trelson Mapp – Economist; Scott Cunliffe	Mapping capacity assessment and discussion

Meeting Notes:

1. This facility is the man Government mapping facility. There are two plotters and several computers, using ARCView and other software, predominantly mapping site maps for development approval processes and land use planning. Dwayne is on the Technical Working Group (TWG).
2. The computers were down at the time, and have been for some days. Only small-scale pdf versions of maps/plans for development approvals could be generated.
3. Disaster data (impacts, extent of damage, losses – households, buildings, shelters etc.) is provided by NEMO. MHPPIS does not systematically collect this type of data.
4. Immediate needs are substantial in terms of an upgraded mapping capacity to the benefit of National planning and managing developmental processes – hardware and expertise. This should be investigated in detail by the GIS consultant in January.

Date	*Organization/Location*	*Who*	*Purpose*
Wednesday 29 Dec	National Emergency Management Organization – Meeting at Ministry of Finance and Economic Planning – Central Planning Division	**Ms. Michelle Forbes** –Director of National Emergency Management Organization (NEMO), Trelson Mapp – Economist; Scott Cunliffe	Discussion of National Economic and Social Development Plan 2011-2025

Meeting Notes:

1. Established in 2002 following a WB supported project, NEMO has been functional for nearly ten years (10-year celebrations in 2011). National Disaster Management Act came into law in 2006. This is now overdue for significant revisions. The legislation was built on the CEDMA model in 2006, which itself has since been revised. The Act is 24pp. and takes an 'all hazards' approach, focusing on Shelter Management and Vulnerable Areas. There is no mention of climate change, adaptation or resilience. NEMO is mainly active in public education, relief management and recovery and shelter management. Staffing is low and lacks some highly skilled Risk Management expertise. The Annual budget is approximately EC$700,000.
2. No hazard maps or evacuation plans are available. This is an urgent need. A high level of poverty amongst rural and peri-urban populations creates an accentuated vulnerability to disasters in these largely coastal towns along both Windward and Leeward coastlines. Thus the high level of impacts as indicated by Hurricane Thomas in October this year, even though it did not make landfall on SVG.
3. The status of disaster shelters is monitored annually. This is a result of a strong inter-ministerial approach that identifies various appropriate building types (along the coastline mostly) that are subsequently used as hurricane shelters in times of need. The main hurricane events in the last decade are: Ivan 2004, Dean 2007, Omar 2008, Thomas 2010.
4. Marine protection legislation only covers Protected Areas. This is an issue that needs urgent attention; the impacts of recreational boating on marine ecosystems, and the long-term health and welfare of those ecosystems, so valuable to the tourism industry, fishing and coastal management. David Robin is the Maritime Officer to talk to about the legislation to see if climate resilience could be relevant to extending further protection to other areas.
5. The level of awareness and knowledge of early warning systems and basic hurricane protection systems is low at best. The population has become somewhat complacent since there has been no significant hurricane damage and loss for many years.
6. The 2011 Census posed an opportunity to collect data of relevance to protecting coastal populations from likely future impacts of climate change, and to collect relevant climate resilience data. This needs to be investigated urgently.
7. Specific needs of NEMO include: technical staff and expertise (GIS, mapping and other technical capacity); hazard maps (the full extent of disaster risk management mapping); and the need to get other Ministries involved in the management of disaster impacts, preparedness and recovery processes. Public education is currently inadequate. This is not a major expense, rather a matter of having the people in NEMO to deliver. The existing building is n need of urgent basic maintenance and upkeep. Finally, there need to be a thorough evaluation of the organization; overall performance, resource use, capacity assessment, mandate and responsibilities etc.

Date	Organization/Location	Who	Purpose
Monday 3 Jan	Ministry of Finance and Economic Planning – Central Planning Division	**Ms. Ronette Jordan** – Project Coordinator, DVRP	Discussion of Disaster Vulnerability Reduction Project

Meeting Notes:

1. Project focuses on disaster preparations/preparedness, the legal aspects of DRR and critical public infrastructure. Data and data management needs are also addressed.
2. Ronette will provide the PPCR team with all relevant documents from the DVRP (I already have Resettlement Plan, proposed financials)
3. The DVRP has a large investment portfolio (+/- USD$40 m), of which some EC$20m could be used for immediate response should the need arise.
4. The project has been stalled since the needs assessment in February 2010 was followed by the WB Mission (for prioritization), then the Min of Finance review (again for prioritization), then Cyclone Tomas occurred!
5. Current status – in preparation, environmental impact assessment underway, social assessment of activities also underway.
6. SC requested a short (one page) on the status of the project to use in the Inception Report.
7. AVOIDING OVERLAP: key topic of discussion. Eventually the work will be merged – SC to follow this up with Niels and Justin (WB).
8. SC suggested that the DVRP also make clear statements about the relationship to the PPCR and this should be included in the current work/activities, not just the financial plan.
9. There were components of the DVRP we were unable to discuss at the time including: the Resettlement report, the EIA, the social assessment, proposed financial breakdown and other components.
10. This was an initial meeting; we will need to discuss in detail a number of issues as the PPCR nears the mid-point, and after clarification is sought from the WB and discussions with Justin 10-11 January.

Date	Organization/Location	Who	Purpose
Wednesday 5 Jan 0930-1100hrs	TECHNICAL WORKING GROUP (TWG), Ministry of Finance and Economic Planning – Central Planning Division	SEE ATTENDANCE LIST INCLUDED IN A SEPARATE REPORT IN THE ATTACHMENTS	Introduction and Brainstorming on Vulnerability and priorities, progress update on Project

Meeting Notes:

8. SEE SEPARATE REPORT ON THE RESULTS OF THE BRAINSTORMING FROM THIS SUBSTANTIVE MEETING.
9. A **brainstorming** session was facilitated to focus on vulnerabilities and priorities in three areas: social, economic and environmental vulnerabilities to a changing climate.
10. There were 15 members present coming from a variety of government and non-government organizations. The meeting was very productive. More time for discussion will be allowed in future meetings.
11. There will be three follow-up **Workshops** (half-day each, focussing on social, economic and environmental vulnerabilities), utilizing the results of this brainstorming, to drill down to specifics, to the Sectoral implications of how to address the vulnerabilities identified, costs, benefits, responsibilities and resource requirements, in as much detail as possible.
12. The results from the Workshops, together with guidance provided by the TWG, will significantly shape the PPCR and subsequent investment plan.
13. It was agreed that the TWG should meet again at or prior to key milestones or within two to three weeks

maximum during the PPCR preparations. A Schedule for TWG meetings will be prepared by SC.

Date	*Organization/Location*	*Who*	*Purpose*
Wednesday 5 Jan **and Friday 7 Jan** 1400-1600hrs	Social Assessment Team, Ministry of Finance and Economic Planning – Central Planning Division	**Trelson Mapp, De Anna Ralph, Grace (Joel) Warren, Samantha Bullock** (all members of the Central Planning Division, Min of Finance)**, Scott Cunliffe**	Initial discussion of social assessments under both PPCR and DVRP, status of the two TORs, how to merge and avoid duplication. DVRP = Disaster Vulnerability Reduction Project

Meeting Notes:

1. This was an initial meeting following the finalization of the Terms of Reference for the Social Assessment Team contributing to the PPCR. This will be the same team undertaking the social assessment and impact evaluation for the DVRP. The Team were interested to know about the possible **methodologies** and expectations under the PPCR project and how to ensure there is no duplication of effort.
2. Recognition of the very time frame of the PPCR – undertaking **training** for example just may not be possible.
3. Key difference between the two assessments lies in DVRP assessing the impacts of specific proposed activities and interventions; PPCR assessment assesses the potential social impacts of climate related hazards on various sectors of the population.
4. SC covered some general aspects of the assessment process: using the descriptive data and information compilation to provide good analytical argument and analytical presentation of findings; the informal housing sector will provide considerable challenges due to the nature of these communities; different vulnerable groups; finding need to reflect recommendations on how to reduce those vulnerabilities; health and disease (vector and airborne) scenarios may be useful) possible epidemic etc.);accessibility to critical infrastructure needs to be considered (possible loss of road links, airport etc.); solid waste, waste water and climate, pollution etc.; necessary inter-agency collaboration, time consuming but critical; psycho-social impacts of disaster events on the population and pre-disaster preparations to have those requisite skills available local (trained persons, RNs, trauma counselling, etc.); framing recommendations could possibly use "pre-disaster, during disaster and post disaster" as sub-categories; consider curriculum development, skills required for this, possible models, incl. all other possible avenues of building awareness and understanding of climate resilience and the impacts on Vincentian society; record all useful/relevant Knowledge products (books reports and other materials), present findings as much as possible graphically, using maps and graphs to illustrate key points; the development of awareness, knowledge and understanding of climate change, climate resilience and adaptation; communications infrastructure may be affected by climate-related damage; emergency evacuation plans will likely also be a basic common good to be considered as a mitigation measure. Other assorted issues arose; the main discussion was around the relationship to the DVRP. Specific details of the four main activities of the PPCR TOR will be discussed on Friday.
5. DVRP TOR for the social assessment was available in August, work began in November, not much has been completed to date. Thirty-three (33) communities have already been identified under the DVPR. It is likely these communities include those in relative "climate hot-spots" along the windward and leeward coasts of St. Vincent and the islands of the Grenadines.
6. We will meet again on Friday afternoon. The team will prepare the following: a list of the main elements where the TOR for the PPCR deviates from the assessment needs as stated in the TOR for the DVRP; prepare for the discussion of the differences in the TORS and strategy to proceed; an outline methodology for the social assessment and an indication of what the mapping needs of the team may be over the course of the assessment. SC will prepare a comprehensive list of tasks, activities and deliverables based on the Terms of Reference.

Date	Organization/Location	Who	Purpose
Monday 10 Jan **and Tues day 11 Jan** all day	Launch of the Grenada PPCR (morning), Meeting of PPCR teams from St. Lucia, St. Vincent and Grenada with WB.	**Justin Locke (WB), Luvette … Crispin… (St. Lucia), Arun Banjaree, Joyce… Margaret… (Permanent Secretary Environment, Grenada) Trelson Mapp, Scott Cunliffe**	Initial discussion of PPCR progress, constraints and opportunities, commonalities, possible shared resources etc. Meeting Chaired by Joyce: touched on a full range of issues relating to the PPCR preparation.

Meeting Notes:

1. Full report from the PPCR meeting being prepared by Justin Locke.
2. The following additional information was sent to Justin and Joyce the morning of Wednesday 12 January:

COMMONALITIES

- **Climate Risk Analysis x2**

Who will formally request Barbara Carby (or Michael Taylor) to summarise the climate risk analysis we need for i) regional, and ii) national (all three countries)? How do we share such costs?

- **GIS data sharing**

Can I suggest that by Friday 4 Feb. (or before if draft available) we agree to share our respective GIS and data management needs/gap analysis? This should indicate likely actions best undertaken collectively (regional) and those that are country-specific (national).

- **Legislative review**

Having agreed that at there is a common basis of legislative instruments and controls, did we decide such a review could be undertaken for all three countries by someone simultaneously? If so, how can this move forward, asap?

- **Tourism**

Indeed, issues regarding climate change impacts on tourism, tourism locations and tourists behaviour (e.g. arrivals forecasting), and the need to build resilience in this significant economic sector are also likely very similar between the three countries? Can we streamline this sector analysis to share amongst us all?

- **Consultation processes**

While we recognized this area may suffer from the time constraints we have, would it be useful to share an outline strategy of how we propose to achieve an acceptable level of consultation and participation of stakeholders (public and private) in the PPCR planning and development process? Could we do this by say a week from now, Wednesday 19th Jan.?

- **Private Sector**

Personally, I would like to discuss more the options/opportunities for actively and meaningfully engaging the private sector. Trelson and I have some ideas, maybe this goes with the consultation point above.

Finally, Justin: we spoke briefly in DC about setting up a temporary Google project site to which we can upload stuff like the above… can you get this going asap, thanks a lot. IT can be pretty simple, no passwords etc.

Date	Organization/Location	Who	Purpose
Friday 7 Jan 1600hrs	Director of Planning, Ministry of Finance and Economic Planning – Central Planning Division	**Laura Anthony-Browne, Director of Planning,** SC	Discussion on "retroactive financing" to support purchasing a printer/plotter for Statistics Division to start generating maps for the PPCR project.

DVRP = Disaster Vulnerability Reduction Project

Meeting Notes:

1. Mrs. Browne agreed that it would be possible to utilise the retroactive financing mechanism to fast-track the financing of the printer/plotter for Statistics so we can commence making maps for the PPCR project suing Statistics data which is built largely on 2007 aerial photo interpretations.
2. Meeting concluded with her agreement to discuss on Monday with procurement, the appropriate account from which the funds should be drawn.
3. Procurement will need to follow WB procurement requirements.
4. SC also met with the Procurement Team in Central Planning to give them the heads up on this approval and to expect the discussion with Mrs. Browne.
5. In this regard, I have secured specifications for what is required and this has been forwarded to Procurement in readiness.
6. UPDATE: AT THURSDAY 13 JANUARY, NO FOLLOW-UP ACTION FROM THE OFFICES OF THE DORECTOR OF PLANNING AS YET.

Date	*Organization/Location*	*Who*	*Purpose*
Wednesday 12 Jan 1200 - 1330hrs	Director of Environment, Ministry of Health and Environment	**Eddie Jackson, Director, Yasa, Nyasha, Trelson,** SC	First wide-ranging discussion with the other key partner for the PPCR. See Agenda below prepared by SC

Meeting Notes:

1. Meeting was very broad, no specific conclusions or agreement made on agenda items, mostly questions from Eddie about the PPCR development and possible Stage Two administration.
2. In discussion of the Workshops, the term "consultation fatigue" was mentioned, following a comment that NONE of the notes, reports or meeting minutes were passed back to the stakeholders from the numerous meetings and discussions help over the course of the last six months or so, including the First Joint Mission, Hurricane Tomas investigations and most importantly, the range of materials collected for the DVMP project development. **SC to follow up with Justin to see is this material is available.**
3. Meeting Agenda below:

   Agenda Draft - Meeting 12:30pm Wednesday 12 January 2011

   Half-day Workshops

   Regarding the proposed half-day Workshops: it would be great if we could do this jointly; Min of Health and Environment and Min of Finance and Economic Planning. It should be your show, and I will assist where required. I have started to prepare a Workshop outline and will forward it to you prior to our discussions on Wednesday if possible (tentative until you and colleagues confirm).

   These workshops will require thorough preparations so as to be able to achieve solid, practical recommendations for priority, sectoral projects and programmes that should be included in the PPCR for possible funding in Phase II. This is the prime objective. We need to drill down to costs, benefits, sustainability, responsible persons/orgs, affects on legislation if any, mainstreaming opportunities. All proposals will need to indicate clear connection to i) resilience building, and ii) inclusion in national priorities (as reflected in budget and legislation). We therefore need to do the preparations together so that those attending are also thoroughly prepared. We want these sessions to be as productive as we can.

   The other general items for this discussion will be as follows:

   1. DOCUMENTATION

      Summary List of all relevant documentation relating to climate change, adaptation and resilience, disaster risk reduction and preparedness - from say the last five to ten years.

   2. PROJECTS AND PROGRAMMES

Summary list and brief descriptions of all (current and proposed from the immediate past) projects and programmes relevant to building climate resilience in SVG.

3. HALF-DAY WORKSHOPS

(as above) but also to discuss the main objectives and the proposed approach and methodology. How can we make these sessions as productive as possible.

4. AWARENESS BUILDING

What are the main components of a programme to build awareness, understanding and knowledge of climate change, resilience and environmental protection (adults, children, elderly, schools, hospitals, Police, Fire Brigade and other persons associated with critical infrastructure)

5. KNOWLEDGE MANAGEMENT

How can we build an accessible collection of materials for public consumption, who would store it, sustain it... etc. Can this be done, has it been done before, can we do it?

6. HAZARD MAPS

This is a critical need for all concerned with climate change, disaster preparedness, response and recovery. Ideas... strategy.. same issues as above... sustainability, updates... etc.

7. OTHER BUSINESS

... there will be other items from your side....

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Date	*Organization/Location*	*Who*	*Purpose*
Thursday 13 Jan 1200-1300hrs	Social Assessment Team, Ministry of Finance and Economic Planning – Central Planning Division	**Trelson Mapp, De Anne, Grace (Joel), Samantha Bullock** (all members of the Central Planning Unit, Min of Finance), SC	Initial discussion of training component, methodology and results requirements, census questions.

Meeting Notes:

1. Discussion of training requirements for field officers, census questions to include climate change issues.
2. SC revised some questions and we added four new questions relating to climate and climate impacts.
3. The Social Assessment team will follow up with Census team to get questions included.

Date	*Organization/Location*	*Who*	*Purpose*
Monday 17 Jan 0900-1300hrs	Field Officer Training Session with Social Assessment Team, Ministry of Finance and Economic Planning – Central Planning Division	**Field Staff (15) Trelson Mapp, De Anne, Grace (Joel), Samantha Bullock** (all members of the Central Planning Unit, Min of Finance), SC	Training session for numerators/field officers from all parishes, introduction to climate change vulnerability and resilience.

Meeting Notes:

1. Discussion; climate change, resilience and adaptation, importance of the social survey.
2. SC presentation on the project.
3. TM introduction to the PPCR and process.
4. SC Slides of SVG vulnerabilities.

5. Training continued until lunch time.

Date	*Organization/Location*	*Who*	*Purpose*
Monday 17 Jan 1100hrs	Director of Planning, Ministry of Finance and Economic Planning – Central Planning Division	**Laura Anthony-Browne, (LAB) Director of Planning, Trelson Mapp,** SC	Project Update, agenda items as below (not in this order).

Meeting Notes:

1. Mrs. Browne informed the Procurement officer that it would be possible to utilise the retroactive financing mechanism to fast-track the financing of the printer/plotter for Statistics so we can commence making maps for the PPCR project using Statistics data which is built largely on 2007 aerial photo interpretations. (Procurement will need to follow WB procurement requirements)
2. Agreed it would be possible to hire Howie Prince for 2 weeks on project budget, to assist SC with final writing of PPCR (possibly start Thursday 3 February, finish Friday 18 February, total 12 working days).
3. Agreed it would be possible to use project budget to pay for minor incidentals for Field Officers, snacks at meetings etc, and transportation costs.
4. Need clarification from WB on use of and access to these funds.
5. SC gave an update on Grenada visit.
6. Agreed in principle on the Launch idea with PM to lead, details to be prepared by SC, TM to follow-up as required, Mrs. Browne offered additional resources if required for the organization.
7. Agreed to meet with PM (LAB, SC and TM) asap after budget is set to discuss national commitment to CCA and building resilience.
8. Agreed the additional questions for the Census was a good idea.
9. Agreed to link Launch to Second Joint Mission timing (10-11 Feb.) while Justin is in SVG also.
10. Meeting concluded with her agreement to discuss possible dates with the PM to meet with Trelson and myself.
11. SC also met with the Procurement Team in Central Planning to follow up on this approval and determine approximate deliver date (week of 31 January at the earliest).
12. Mrs. Browne no interest in attending CIF Tunisia meeting, Trelson could attend if security situation is OK.
13. Agreed Second Joint Mission should proceed. Tentative dates for Thursday 10th and Friday 11th February. PM to speak at Launch on 11th if available. LAB to follow this up.
14. Agreed Final Planning Workshops to occur Monday 31st, Tuesday 1st and Wednesday 2nd February.
15. Agreed we should proceed with the review of the NESDP as soon as possible, add to the relevant sections where possible, sensitizing the document to climate change and building resilience.
16. LAB will write to MoHE if necessary to provide details of what is required for their assistance to the project. Sc to f/u with the details.
17. Agreed the total for the investment plan would be m$5 for the PPCR proposal, unlikely their would be any concessional loan request.
18. Until the 28th Jan. the budget will be the priority!
19. SC provided and update on consultant schedule, hope for arrival all by Monday 31 January.

FOLLOW-UP ACTIONS REQUIRED

20. Inform Howie Prince, inform WB, send STC to Howie, confirm start date (Thursday 3 January), confirm dates.

21. SC to prepare list of activities/contributions from MoHE this week.
22. SC and TM to prepare detailed outline of the launch. Urgent need to begin this organization to work towards the 11th event, incl. School kids, cultural additions (music), venue on the coast/beach.
23. SC to complete the draft Census questions and forward copy to LAB for comment (hard copy).

Date	*Organization/Location*	*Who*	*Purpose*
Monday 17 Jan 1500-1600hrs	Ministry of Tourism…	**Permanent Secretary, Mrs. Laverne Grant, Deputy Secretary Arlene Lewis,** SC	Introduction, Tourism Master Plan, possible involvement with PPCR

Meeting Notes:

1. Discussion; climate change, resilience and adaptation, importance of tourism to the SVG economy. There is no definitive estimate of the contribution that tourism makes to the SVG economy.
2. SC verbal presentation of the project.
3. Tourism Authority set up in 2009. Ministry retains responsibility for public awareness and training.
4. There is no specific legislation covering the tourism sector.
5. Various Acts cover the privately owned islands and parts of islands (Mustique, Canouan)
6. Hotel and Tourism Authority are the best source of contact information for the main private sector companies.
7. Bequia also as a local Tourism Authority.
8. 2007 National Parks Legislation.
9. Tourism Master Plan now under review. There is virtually no mention of climate change or the impacts of CC on tourism. This was not in the brief to the consultants apparently. Under Toursim related infrastructure, there are a few sentences only on water and solid waste disposal. These are two significant issues for the Grenadines' future and building resilience to CC.
10. There is a National Tourism Sector Strategic Plan (2002-2006), the National Marine Tourism Policy (2005) and the National Tourism Policy (2003).

Date	*Organization/Location*	*Who*	*Purpose*
Tuesday 18 Jan 1000-1200hrs	Consultant team (partial)	**David Smith** (plus 2 colleagues from Jamaica office), **Otis Joslyn, Trelson Mapp,**	Intro, Strategy

Meeting Notes:

1. Introduction to all
2. Update on progress
3. Expectations
4. Q+A

Date	*Organization/Location*	*Who*	*Purpose*
Monday 24 Jan 1500hrs	Director of Planning, Ministry of Finance and Economic Planning – Central Planning Division	**Laura Anthony-Browne, (LAB) Director of Planning, Trelson Mapp, Scott Cunliffe**	Project Update, agenda items as below (not in this order).

Meeting Notes:

1. Financial plan – what has been agreed to date?
    a. (USD) m$10 IDA loan (DVRP)
    b. …likely m$5-7 PPCR
    c. other sources?
2. Approach of the PPCR ?
    a. All projects (DRR and CCA) m$52 ++
    b. Only CCA/Resilience projects m$9.55 (plus soft projects arising from the PPCR)
    c. Only PPCR projects m$5-7 (not an option)
    d. DVRP (current proposal) m$37 (sources of funds > m$10 ?)
    e. ERL (current proposal) m$10 (approved m$13.6 over 3yrs)
3. Only ERL in the 2011 budget – confirm
4. Proposed implementation period
5. PM meeting and interest in joining donors (brief hullo/welcome 15th)
6. Opening and launch on the 16th morning with ministers.
7. Still no confirmation from the Bank on Howie Prince, start date (Thursday 3 January).
8. Census questions completed, revisions to all existing environmental questions as well.
9. Critical dates:
    a. Final Planning Workshops – Tuesday-Thursday 1-3 February
    b. Tuesday 15 February – Second Joint Mission
    c. Wednesday 15 February – Opening/Launch of the SPCR (PM to open)
10. Possible tax incentives for responsible design and construction (water conservation, waste water recycling etc.)
11. "*Green and Clean SVG*" – national campaign, national commitment, high level leadership, women's groups, schools, teachers, etc.
12. "*Climate Change is Everybody's Business*"
13. Tourism Master Plan – missing components
14. Information memo to all stakeholders from LAB:
    a. commitment to CC
    b. events and dates coming up
    c. PM endorsement
    d. Final planning meetings
    e. Opening/launch of the SPCR (dates)
    f. Overall progress, finish dates
    g. Expected outcomes, needed contributions (MoHE, MoT)

Date	*Organization/Location*	*Who*	*Purpose*
Monday 24 Jan 1500hrs	Director of Planning, Ministry of Finance and Economic Planning – Central Planning Division	**Scott Cunliffe**	Project Update, agenda items as below (not in this order).

Meeting Notes: (RESPONSES N ALL CAPS)

1. Financial plan – what has been agreed to date?
    a. (USD) m$10 IDA loan (DVRP)
    b. …likely m$5-7 PPCR
    c. other sources? NONE AS YET
2. Approach of the PPCR ? USD$
    a. All projects (DRR and CCA) m$42 ++ YES THIS APPROACH
    b. Only CCA/Resilience projects m$9.55 (plus soft projects arising from the PPCR)
    c. Only PPCR projects m$5-7 (not an option)
    d. DVRP (current proposal) m$37 (sources of funds > m$10 ?)
    e. ERL (current proposal) m$5 (approved mEC$13.6 over 3yrs = mUSD$5)
3. Only ERL in the 2011 budget – confirm YES
4. Proposed implementation period THREE YEARS
5. PM meeting and interest in joining donors (brief hullo/welcome 15th) POSSIBLE, WILL SPEAK TO PM
6. Opening and launch on the 16th morning with ministers. POSSIBLE
7. Still no confirmation from the Bank on Howie Prince, start date (Thursday 3 January). OK
8. Census questions completed, revisions to all existing environmental questions as well. GOOD
9. Critical dates:
    a. Final Planning Workshops – Tuesday-Thursday 1-3 February
    b. Tuesday 15 February – Second Joint Mission
    c. Wednesday 15 February – Opening/Launch of the SPCR (PM to open) OK DATES
10. Possible tax incentives for responsible design and construction (water conservation, waste water recycling etc.) WILL SPEAK TO DIRECTOR GENERAL OF TAXATION
11. "*Green and Clean SVG*" – national campaign, national commitment, high level leadership, women's groups, schools, teachers, etc. POSSIBLE – WILL TALK TO PM
12. "*Climate Change is Everybody's Business*" AS ABOVE
13. Tourism Master Plan – missing components – WILL CHECK ON STATUS
14. Information memo to all stakeholders from LAB: YES – SC TO DRAFT MEMO ASAP
    a. commitment to CC
    b. events and dates coming up
    c. PM endorsement
    d. Final planning meetings
    e. Opening/launch of the SPCR (dates)
    f. Overall progress, finish dates
    g. Expected outcomes, needed contributions (MoHE, MoT)

FOLLOW-UP ACTIONS REQUIRED

15. SEE ALL CAPS ABOVE

End

Date	Organization/Location	Who	Purpose
Wednesday 3 Feb 1300hrs	WB and MoFEP	Laura Anthony Browne (Director of Planning), Seyoum (WB Procurement) Dianne (WB Engineer), Justin, Ronette, Trelson, SC	Update, financial envelope confirmation, other business

Meeting Notes:

1. See Meeting notes and Aide Memoire from Justin Locke forthcoming.
2. Key item was LAB confirmation of a USD$10 million envelope for the PPCR including m$7.0 grant funding and m$3.0 concessional financing.
3. LAB requested copies of the latest Investment Plan. (Delivered first thing the following morning by Ronette).
4. Brief update on Workshops provided by SC.

End

Date	Organization/Location	Who	Purpose
Tuesday and Wednesday 2-3 February 0900-1300hrs	**Final Planning Workshops:** TECHNICAL WORKING GROUP and private sector, NGO representatives	TWG members (see meeting n	Project Update, presentations, group discussions on Investment Plans

Meeting Notes:

1. Follow-up needed – circulate draft IP for SPCR by next Tuesday or Wednesday for final review.
2. THIS IS CRITICAL AND URGENT.

End

Date	Organization/Location	Who	Purpose
Saturday 5 Feb all day	Team Brainstorming – first draft Investment Programme	Howie, Ottis, Lorna, Winston, SC (Jacob sick – back in Trinidad)	Investment Plan for PPCR

Meeting Notes:

1. First draft completed and circulated by SC 2200hrs Saturday.
2. Need to finalise short and detailed descriptions by Wednesday morning meeting with Chief Engineer.
3. SC to start work on the narrative doc Sunday, send draft for Monday to all.
   End

Date	Organization/Location	Who	Purpose
Friday 5 Feb 1000hrs	FIRST FULL TEAM MEETING	ALL CONSULTANT TEAM (Howie, Lorna, Winston, Jacob and Ottis)	SC big Agenda

Meeting Notes:

1. Contracts 30 days can stop before that time.
2. Need a brochure for the opening
3. Three documents for the SPCR
4. ftp site for docs, calendar, annexes, TOC, need coordination for inputs from team
5. SC upload weekly time sheets excel file, mapping wish list, Annex folder
6. Possible presenters for @ Joint Mission: Lestra and Michelle (Howie to follow this up).
7. Need info on sand mining.
8. Aide Memoir from Bank, check draft.

End

8. Climate Risks in the Caribbean and Saint Vincent and the Grenadines

Climate Risks in the Caribbean

The Caribbean is the most tourism-dependent region in the world with few options to develop alternative economic sectors. The region is one of the most vulnerable in the world to the impacts of climate change including sea level rise, biodiversity loss and impacts on human health[4].

In most of the eastern Caribbean states, for instance, more than 50% of the population resides within 2 km of the coast; the corresponding figure in Barbados is estimated t o be in the region of 60%[5]. These settlements are at risk from projected sea-level rise-which will likely be accompanied by slowly increasing inundation, increased flooding, coastal erosion, and considerable loss of land. This vulnerability is compounded by the locations of critical infrastructure in or adjacent to the coast This infrastructure will be highly vulnerable to the effects of projected sea-level rise, especially during extreme events; this is precisely the situation in Saint Vincent and the Grenadines. Damage to critical infrastructure (coastal roads, bridges, seawalls for example) can lead to secondary and compounding losses due to short-term restricted access to health and medical supplies, water and food supplies etc., and other types of economic, social, and cultural activities.

Small islands are variable in their marine, coastal, and terrestrial biodiversity. The impacts of climate change, in association with human-induced stresses, probably would result in a loss of biodiversity. The establishment of nature reserves (terrestrial as well as marine) therefore is worth consideration as a viable option for arresting the decline in terrestrial, marine, and coastal biodiversity.

[4] http://www.caribsave.org/ opening page, accessed 12 January 2011.

[5] Nurse, 1992.

In many of the small island states in the eastern Caribbean, the annual rainfall regime often is characterized by pronounced wet and dry seasons. Therefore, to the extent that the availability of water resources in these islands is dependent on heavy rainfall events, changes in the occurrence of these phenomena inevitably will impact water supplies[6].

Most Caribbean countries face an annual threat from hurricanes. Saint Vincent is also prone to disruptive volcanic activities. The last major eruption was in 1902 killing over 1500 persons. Virtually all Caribbean countries can be classified as vulnerable to the effects of climate change and sea-level rise, which might include for example; higher incidence of flooding and inundation, beach and coastal land loss, reef damage, salinization of the freshwater lens, and disruption of tourism. Almost all are heavily dependent on groundwater supplies. Tourism is commonly the most vital economic sector. Even a short-term (days or weeks) disruption to tourism or damage to critical infrastructure would create significant economic and social crises.

The Organisation of Eastern Caribbean States (OECS) sub-region currently has nine members, spread across the Eastern Caribbean. Together, they form a near-continuous archipelago across the Leeward Islands and Windward Islands. Like other small island developing states, the members of the OECS have certain inherent characteristics that make them vulnerable to the adverse impacts of climate variability and change. The islands are small (Dominica, the largest of the nine is less than 760 sq. km); so that there is limited reserve capacity for retreat from, or accommodation of natural hazards and severe weather events. The sub-region is located in the path of tropical hurricanes of the Atlantic and Caribbean Sea, and is therefore prone to experiencing periodic disruptions from these systems. Most of the islands' infrastructure is located within the coastal zone, making them particularly vulnerable to the impacts of sea level rise and coastal flooding. These insular states also have exclusive economic zones several times larger than their land area, so that their coastal dependence is further exacerbated.

Caribbean Rainfall and Temperature Variability – Historical: As a consequence of lying between the equator and tropic of cancer the climate of the Caribbean region is one that is distinctly tropical in nature. It is heavily influenced or modulated by tropical features including the northeast trade winds, sea surface temperatures and the effects of transient tropical and extra-tropical systems. Although described as having a rainfall regime that is distinctly bimodal in nature (Chen and Taylor 2002), the size and orientation of the Caribbean Islands with respect to the modulating features heavily influences not only the amount of rainfall but the time in which the maximum precipitation is received (Jury et al 2007). The larger more mountainous Islands of the Greater Antilles often receive rainfall exceeding twice that of the smaller less mountainous Windward Islands (Taylor and Alfaro, 2005).

Temperatures in the Caribbean region are fairly constant and are not very different from the mean of its individual island states. The coolest and warmest temperatures occur respectively during the boreal-winter and early spring (December to April) and the summer months. Variations in temperature for the individual island states are generally small (on average 24°C - 32°C) but strongly vary with altitude.

Peterson et al (2002) investigate historical changes in climate extremes for the region, and show that whereas the maximum number of consecutive dry days experienced throughout the Caribbean has been decreasing, the daily rainfall intensity has also been decreasing (see figure 1a and 1b). This means that the recent tendency has been for the Caribbean to get more frequent rainfall events but of lower intensity thus making for a drier region. Corollary to this is the warming associated with the region. The number of warm days have been increasing while the number of and cool nights have been decreasing, narrowing the diurnal temperature range and making for a much warmer Caribbean (see

[6] IPCC 1996, WG II, Sections 10.1, 10.3, 10.4.

figure 11c and 11d) below.

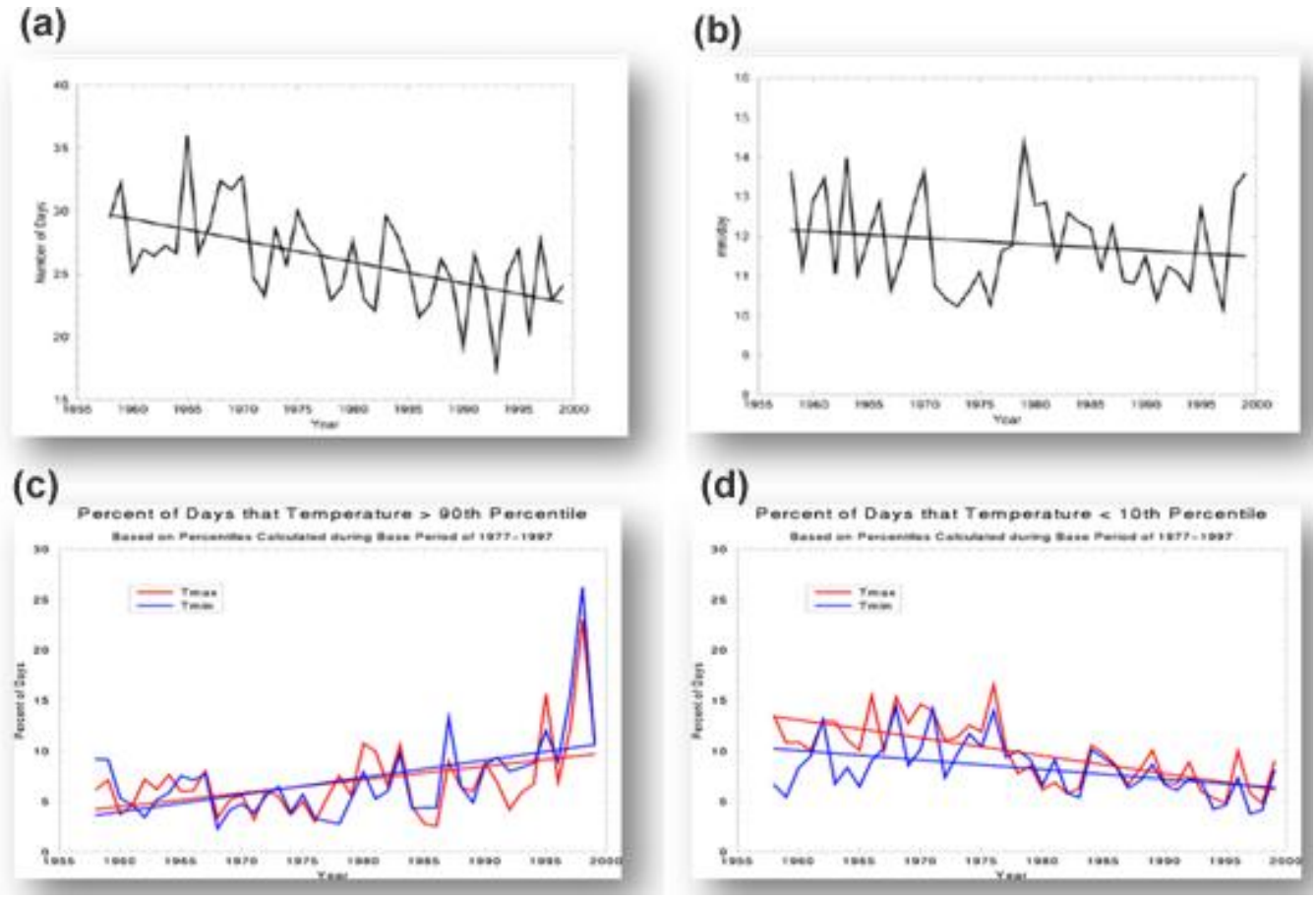


Figure 1: Diagram showing the (a) decrease in the number of consecutive dry days (b) decrease in daily intensity (c) increase in the number of warm days (>90th percentile) and (d) a decrease in the # of cold nights (<10th percentile). Peterson et al, 2002.

Caribbean Rainfall and Temperature Variability – Projected: Recent climate change projections from regional climate models suggest that irrespective of the scenario used, a warming of the Caribbean is expected. The estimated increases in temperature range from a low of 1°C (Under B1 scenario) to a high of 5°C (under A2 scenario) by the end of the century. This warming is consistent with projections for other parts of the globe and far exceeds the recent historical variability of Caribbean temperatures from observational records (Campbell et al. 2010, Taylor et al. 2007).

Projections are that rainfall will be reduced over the Caribbean and OECS by the end of the century. The projected drying lies between 25%-30% of current climatological mean values. The drying also exceeds historically observed variability and is primarily concentrated in the months June to October. i.e. during the Caribbean wet season. This indication is that the OECS will experience an end-of-century wet season with considerably less rainfall (Campbell et al. 2010, Taylor et al. 2007). The regional models also suggest that intervening years through mid century will likely be characterised by increased variability in the prevailing rainfall regimes.

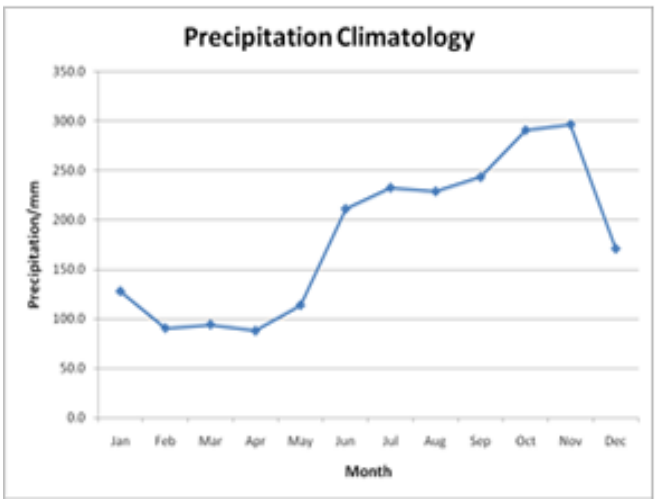
Climate Risks in Saint Vincent and the Grenadines

In Saint Vincent and the Grenadines, we can be sure that our changing climate will have impacts (negative and some positive) on various socioeconomic sectors, including tourism, infrastructure, agriculture, water resources, and human health-all of which are sensitive to fluctuations in rainfall, temperature, and sea level. Drawing on the National Adaptation Programme and the detailed climate-related studies, the following Table summarises the likely impacts of a changing climate in Saint Vincent and the Grenadines, and the opportunities that exist to build resilience and undertake mitigation and risk reduction adaptation actions.

Rainfall and Temperature Variability – Historical

Rainfall on the island averages at 2190 mm per year, placing it among the wetter of the Caribbean islands. Annual rainfall follows a unimodal pattern, with a June-November wet season and January-May dry season. The island experiences nearly 70% of its total rainfall during the wet season and peak rainfall corresponds with peak hurricane activity in the region. Inter-annual variability of rainfall is distinct in the climate records of the island, but there is no statistically significant long term trend towards wetter or drier conditions. Variation in rainfall is also seen with changes in elevation across the islands.

Temperature shows very little mean variation throughout the year, but can reach a maximum of 31^{o}C during summer months and a minimum of 23^{o}C in February. Like rainfall, temperatures also vary on a inter-annual cycle, but show no statistically significant long-term trend. Maximum temperatures, however, are increasing at a faster rate than minimum temperatures. There is also a trend of longer warm spells and more warm days and nights. By contrast the number of cool days and nights are decreasing.



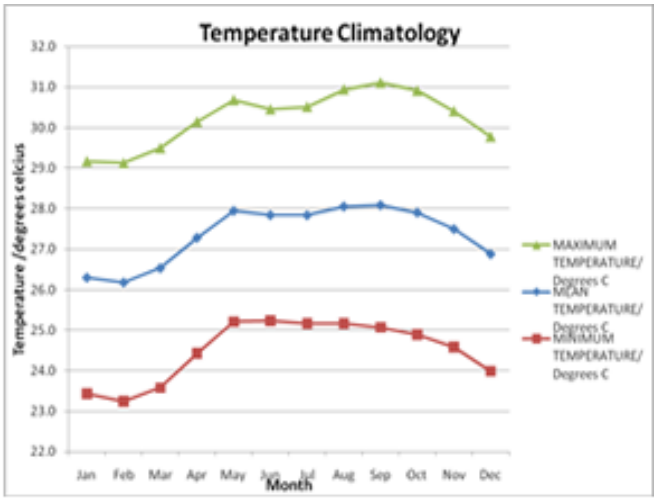


Figure 2: Mean annual monthly rainfall (mm/month and climatology of minimum, maximum, and mean temperature (^{0} C) for Saint Vincent (ET Joshua Airport 1987 -2008).

Projections General circulation models (GCMs) project a reduction in annual rainfall of up to 58% by the end of the century. Greatest seasonal drying is projected for the summer months, but the existing dry season may also become drier. GCMs indicate increases in temperature of nearly 15oC per decade (1.5 oC per annum) over the next century, with greatest seasonal warming occurring in December-February (McSweeney et al, 2008).

Droughts and floods Major droughts in Saint Vincent and the Grenadines have occurred three times in the 21 year period spanning 1987-2008, each lasting more than six months. The Standardized Precipitation Index (SPI) graph below shows that the longest drought lasted around 2 years between 2001 and 2004. Also noticeable is a cyclical pattern of drought and heavy rainfall. Since the country's economy depends on agriculture, a meteorological drought can have adverse effects. For example, the ECLAC report of 2001-2002 states that banana production was down by 27% due partly to leaf spot disease and drought conditions.

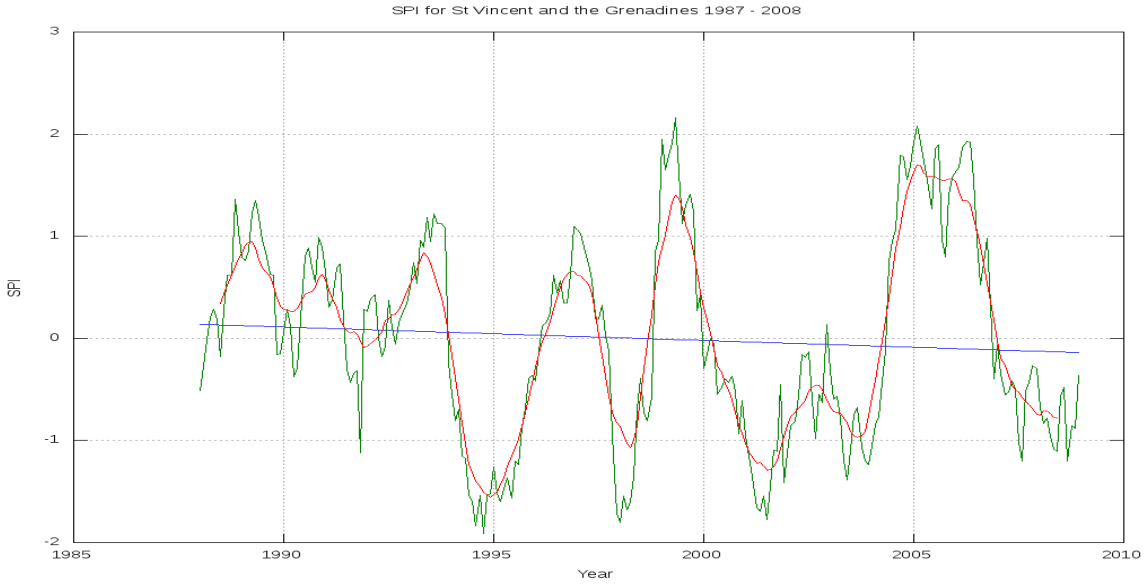


Figure 3: SPI graph for ET Joshua in Saint Vincent and the Grenadines over the period 1987 - 2008. Above zero, the period was wet, the more positive, the wetter. Below zero, the period was dry, the more negative, the drier. The green line is SPI, the blue, the trend line and the red the running mean.

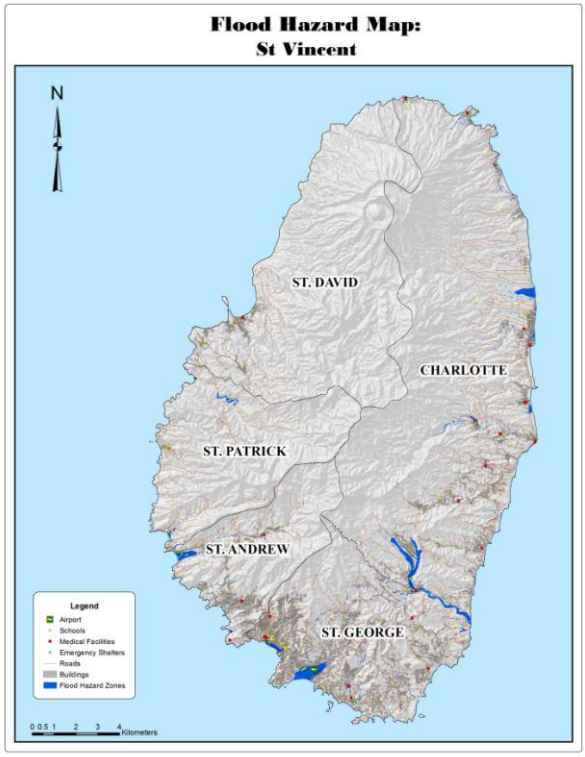


Figure 4: Flood Hazard Map

During the last century, four floods have been classified as major disasters [EM-DAT (WHO Emergency Event Database), 2011]. The worst of these affected 1000 people and cost the country US$5 million in 1987. EM-DAT further reports that the flood of 1992 affected 200 people and killed three. The rarity of this type of event makes the country more vulnerable, as preparation for it is not a priority.

Impacts of Tropical hurricanes In the recent past, few hurricanes have made landfall on Saint Vincent and the Grenadines. Nonetheless, the islands' location at the southern edge of the Atlantic hurricane belt makes them prone to the effect of tropical storm activity. The islands have been impacted by tropical storms such as Lenny (1999) which caused US$142,000 (EC$386,250) in damages (UNFCCC,2000), and Tomas (2010) which caused landslides, devastated crops and displaced many citizens from their homes. In 2002, Tropical Storm Lili caused damage estimated at EC$978,000. Damages from Hurricane Ivan in 2004 amounted to EC$100 million. In 2005, Hurricane Emily caused an estimated EC$10 million dollars worth of damages, while Hurricane Dean caused EC $2.2 million worth of damages in 2007. In 2008, Hurricane Omar caused damages at an estimated cost of EC$5.6 million. This data came from the National Emergency Management Organisation (NEMO).

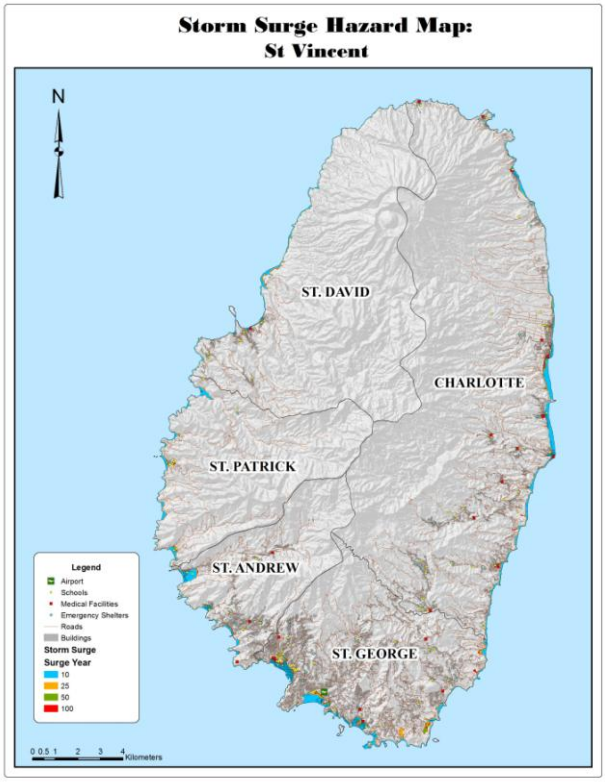


Figure 5: Storm Surge Hazard Map of Saint Vincent

In general, north Atlantic hurricane frequency is characterized by a multi-decadal cycle which yields active and inactive phases lasting 10 or more years (Goldenberg et al. 2001). (See figure 3) It is noteworthy that since 1995, the north Atlantic has swung into an active hurricane phase. Hurricane variability is also influenced by (among other things) ENSO which impacts on hurricane formation, intensity and tracks. In the last decade no fewer than four tropical hurricanes have affected the OECS member states. The systems are namely Hurricane Ivan (2004), Hurricane Emily (2005), Tropical Storm Tomas (2010) and Tropical Storm Nicole (2010). These resulted in costly damage to infrastructure and key socioeconomic sectors and loss of lives and livelihood. For example, Hurricane Ivan made landfall over Grenada as a category 4 hurricane with sustained winds of 140 mph. The impacts counted a total of 28 people killed and the gross costs of the damage were estimated at twice the GDP of the country at the time (US$889 million) (Mimura et al, 2007; ECLAC Economic Survey, 2005).

Based on a range of models, the IPCC (2007) suggests that future hurricanes of the north tropical Atlantic will likely become more intense, with larger peak wind speeds and heavier near storm precipitation. There is however less confidence in model projections of a decrease in the number of relatively weak tropical hurricanes, increased numbers of intense tropical hurricanes and/or a global decrease in the numbers of tropical hurricanes. Some modeling studies attribute the possible global decrease in the number of hurricanes to increased stability of the tropical troposphere (upper atmosphere over the tropics),-due to differential warming in the vertical in a warmer climate- which compensates for the impact of the warmer ocean temperatures.

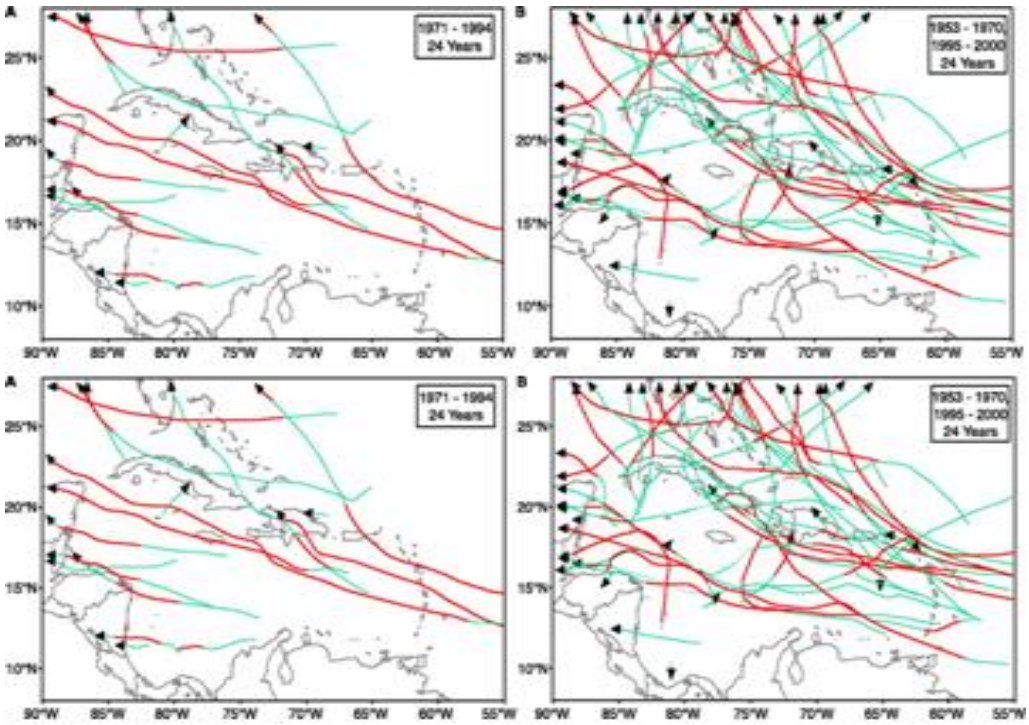


Figure 6: Figures showing hurricane activity in the Caribbean region during a inactive AMO phase (above) and an active phase (below).

Sea level rise

Due to the size, location and limited coastline of the islands, they are highly vulnerable to erosion, inundation and storm surges resulting from sea level rise (SLR). According to Simpson et al (2010) reports, Saint Vincent and the Grenadines are projected to lose 2% of agricultural lands, 67% of sea ports and nearly half the number of airports under a 1-metre rise in sea levels. Being heavily dependent on the agricultural industry and the export of these products, such losses would devastate the economy of Saint Vincent and the Grenadines. The projected loss of 10% of tourist resorts can only worsen this devastation.

Under a 1-metre rise scenario, a 1 in 100 year storm surge event would also cause severe damages to infrastructure and livelihood, since such an event could bring with it surges of 4.5 m and loss of 3% of the population and 7% of agricultural lands. Under a mid-range rise scenario, capital costs of infrastructure and land losses could approach US$445 million in 2050. By 2080 that cost could increase to US$1,290 million. Also associated with SLR is an exacerbation of any tsunamis or sea waves that may result from an eruption of the active submarine volcano Kick 'em Jenny, which is located south of the Grenadines.

Droughts and floods: Drought in the Caribbean is described by Chen et al (2005) as a disruption of the normal seasonal cycle. The primary phenomenon that causes Caribbean rainfall extremes i.e. droughts and floods, is the El Niño Southern Oscillation (ENSO) (Chen et al., 2005). The next major cause is decadal fluctuations in the annual rainfall. Though there are considerable efforts underway to develop seasonal prediction tools for the region (Ashby et al., 2005, Stephenson et al., 2007), there are limitations to their use due to a need to better understand the dynamics of the annual cycle. In the recent past the Caribbean has undergone significant drought events, including major drought events of 1997-98 and 2009-2010.

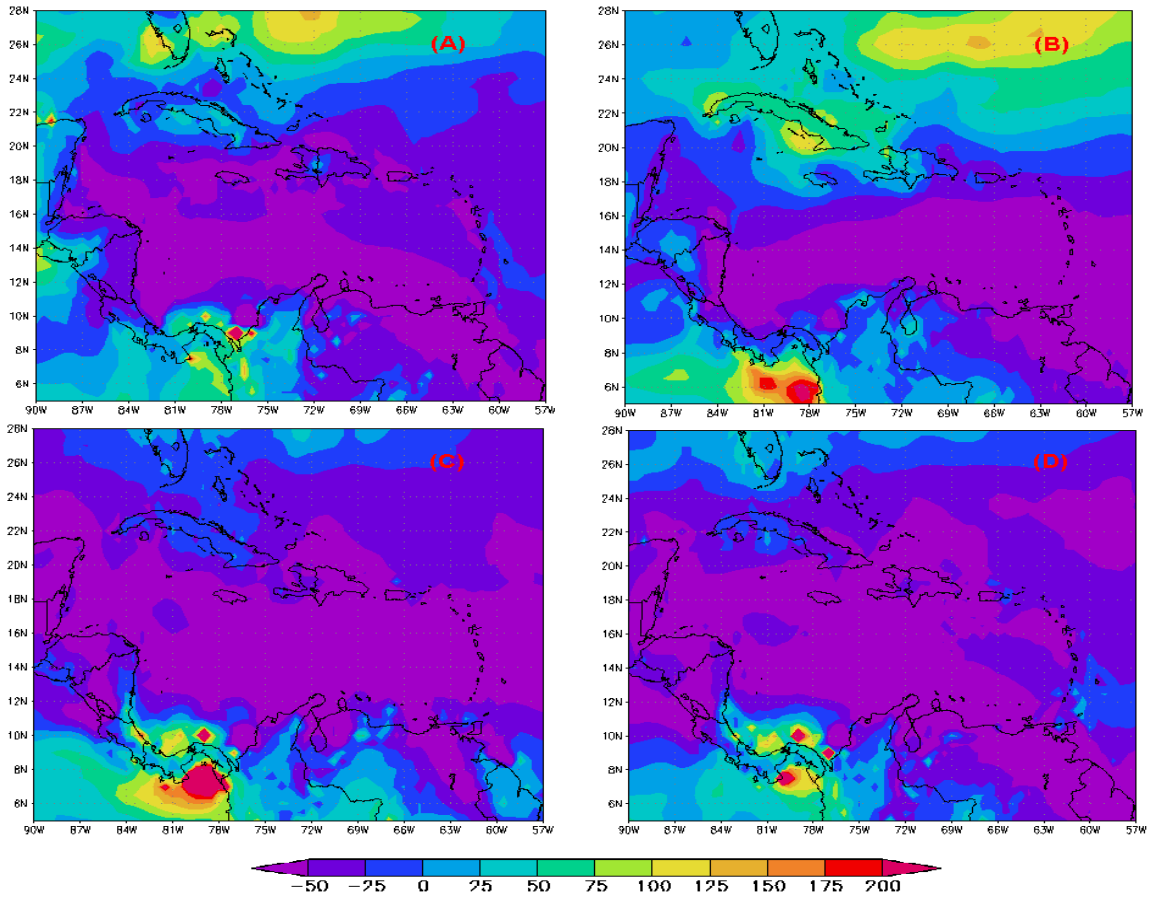


Figure 7: Rainfall projections for 2001-2100 relative to the 1961-1990 baseline under the A2 scenario. Percentage change sis presented. Panels (A0, (B), (C), (D) represent NDJ, FMA, MJJ and ASO respectively.

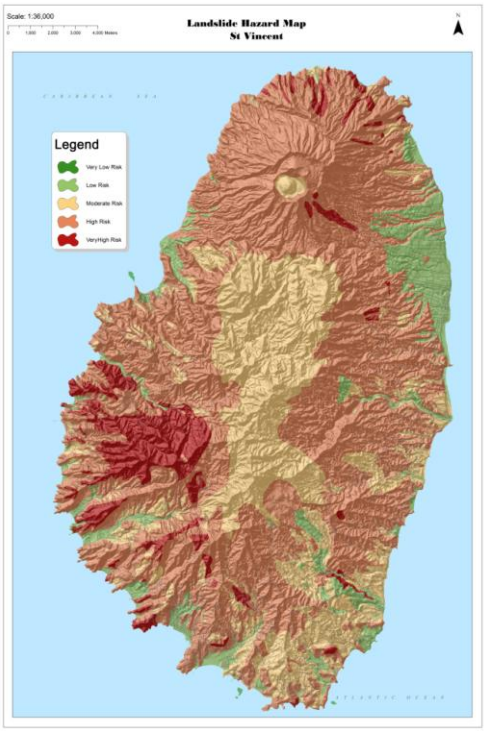


Figure 8: Landslide Hazard Map

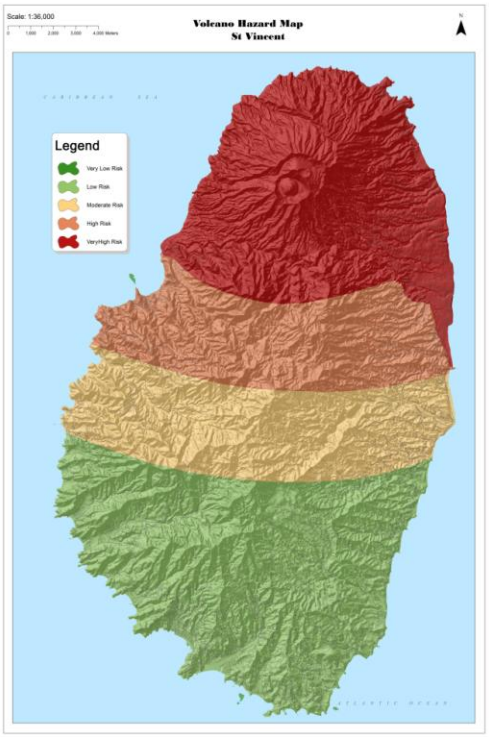


Figure 9: Volcanic Hazard Map

Figure 10: Susceptibility to Soil Erosion

Ocean expansion (due to warming) and the inflow of water from melting land ice have raised the global sea level over the last decade. The IPCC (2007) estimates that between 1993 and 2003 the mean global sea surface rose by 3.1±0.7mm/year. According to the IPCC projections, sea level rise (SLR) in the Caribbean has been near the global mean.

Under IPCC (2007) projections, for the A1B scenario, sea level rise within the Caribbean is projected to be between 0.17 m and 0.24 m by 2050 (IPCC 2007). For comparison, global sea level rise under the same scenario by the end of the century (relative to the period 1980-1999) is projected to average 0.35 m (0.21 to 0.48 m). More recent projection studies are direr and suggest that the Caribbean will experience greater SLR than most areas of the world due to its location closer to the equator and related gravitational and geophysical factors (Simpson et al. 2010). It is important to note, however, that changes in ocean density and circulation will ensure that the distribution of sea level rise will not be uniform across the region.

SLR impacts on the islands of the Caribbean will be both direct and indirect and its threat will be varied, with implications for land use, coastal population and infrastructure, and industry. Small islands such as those in the OECS are at high risk, due in many cases to low elevation and limited coastal areas. Under just 1-metre of SLR, an estimated 110,000 CARICOM nationals will be displaced and tourism and agriculture, the main industries of the Caribbean, adversely impacted. Transportation will similarly be significantly impacted as 1-metre rise is projected to cause inundation of 21 of 64 airports and over 550km of roads within CARICOM. The vast costs incurred by such losses would be difficult for many small islands to recover from, such as the mid-century capital costs exceeding US$ 26,000 million expected under a mid range SLR scenario (Simpson et al. 2010).

SLR however, foreshadows even greater risks when extreme events such as hurricanes or storm surges are considered. A surge event associated with a 1 in 100 year storm, for example, could bring with it surges of up to 5 m under a 1-metre rise scenario. For the Eastern Caribbean, this could result in losses of up to 13% of population and 9% of prime agricultural land in Antigua and Barbuda, 86% of major tourism resorts in Saint Kitts and Nevis, and most airports within the region (Simpson et al. 2010).

A regional study in 2009 (Caribsave[7]) investigated the damages and costs associated with sea level rise for the CARICOM nations[8]. Previous economic studies and recent developments identified in the study, incorporates a modelling of impacts on the economies of each CARICOM country individually[9]. A strength of this economic study is that it is based on detailed geographic reality of coastal geomorphology and development that determine vulnerability to sea level rise.

Such in-depth information is essential for the Caribbean States, and indeed Saint Vincent and the Grenadines to strategically reduce vulnerability through investment, planning, and policy decisions, and inform negotiations regarding adaptation assistance for the region.

Biodiversity and Climate Resilience in Saint Vincent and the Grenadines

The *Caribbean Islands Hotspot, of which Saint Vincent and the Grenadines is a part,* was identified by a Conservation International (2003) survey as the fifth ranking "hotspot" and one of the highest priorities

[7] The CARIBSAVE Partnership (CARIBSAVE) is a Not-For-Profit regional organization based in the Caribbean that works with stakeholders to address the impacts and challenges surrounding climate change, the environment, economic development, tourism and community livelihoods across the Caribbean Basin, using an integrated and holistic approach. It's Headquarters is in Barbados. It was formed in 2008 as a partnership initiative between the Caribbean Community Climate Change Centre (CCCCC) and the University of Oxford.

[8] Economics of Climate Change Working Group (ECA)… date?

[9] http://caribsave.org/index.php?id=5 accessed 24 January 2011.

in any global strategy for biodiversity conservation and sustainable management[10]. Another study classified the Eastern Caribbean Region, to which Saint Vincent belongs as "an unique marine ecosystem of the tropical northwest Atlantic province" and ranked as the highest priority within the province, in terms of its conservation status (most threatened)[11]. The principal ecosystems are dry and humid tropical forests, wetlands and tidal flats, sandy and rocky beaches, coral reefs, sea grass beds, mangroves, offshore islets. The reef, sea grass and mangrove systems of this area are recognized as among the most productive in the world.

9. Complete List of Unfunded Investment Projects ("*Sponsor Wanted*")

(next page)

[10] Conservation International. 2003. State of the Hotspots. (Conservation International. Washington, D.C.)

[11] Sullivan, Sealey and Bustmante, 1999. Setting Geographic Priorities for Marine Conservation in Latin America and the Caribbean. The Nature Conservancy, Arlington, Virginia.

Unfunded Projects									
Project	Project Component #	Activity	Institutional Strengthening			Preliminary Costs (USD)	Implement'n	Beneficiary	Implementing Agency
			Knowledge mgt., Consultants	Works	Goods				
	1	River defense: Buccament		$700,000		$700,000		MoW	MoW
	2	River defense: South River		$560,000		$560,000		MoW	MoW
	3	Villa Beach Restoration: Study to determine the pollution levels of the villa beach	$370,000			$370,000		MoW	MoW
	4	Coastal Defense: Sandy Bay	in-house	$1,000,000		$1,000,000		MoW	MoW
	5	River Defense: Cumberland River	in-house	$120,000		$120,000		MoW	MoW
	6	Rehabilitation of Road to Paget Farm	$550,000	$3,700,000		$4,250,000		MoW	MoW
	7	Slope Stabilization: Chester Cottage		$405,000		$405,000		MoW	MoW
	8	Slope Stabilization: Maroon Hill		$335,000		$335,000		MoW	MoW
	9	Slope Stabilization: Paget Farm		$2,210,000		$2,210,000		MoW	MoW
	10	Slope Stabilization: Fancy		$370,000		$370,000		MoW	MoW
	11	Slope Stabilization: Mt. Pleasant/Peruvian Vale	in-house	$885,000		$885,000		MoW	MoW
	12	Slope Stabilization: Mt. Grennean						MoW	MoW

	13	Slope Stabilization: Spring						MoW	MoW
	14	Slope Stabilization: Baleine		$650,000	$100,000	$750,000		MoW	MoW
	15	Retrofitting /Reconstruction of Government Buildings: Calliaqua Police Station		$6,000,000		$6,000,000		NEMO	MoW
	16	Retrofitting /Reconstruction of Government Buildings: Colonarie Health Clinic		$500,000		$500,000		NEMO	MoW
	17	Retrofitting /Reconstruction of Government Buildings: Marriaqua Health Clinic		$0		$0		NEMO	MoW
	18	Retrofitting /Reconstruction of Government Buildings: Calliaqua Health Clinic		$500,000		$500,000		NEMO	MoW
	19	Retrofitting /Reconstruction of Government Buildings: Kingstown Health Clinic		$500,000		$500,000		NEMO	MoW
	20	Retrofitting /Reconstruction of Government Buildings: South Rivers Health Clinic		$500,000		$500,000		NEMO	MoW
	21	Retrofitting /Reconstruction of Government Buildings: Fancy Health Clinic		$500,000		$500,000		NEMO	MoW
	22	Retrofitting /Reconstruction of Government Buildings: Troumaca Health Clinic		$1,000,000		$1,000,000		MoW	MoW
	23	Retrofitting /Reconstruction of Government Buildings: Overland Health		$500,000		$500,000		MoW	MoW
	24	Retrofitting /Reconstruction of Government Buildings: Stubbs Police Station	$55,000	$1,100,000		$1,155,000		MoW	MoW
	25	Retrofitting /Reconstruction of Government Buildings: Marriaqua Police Station	$55,000	$1,100,000		$1,155,000		MoW	MoW
	26	Satellite Warehouse for Communities: Bequia, Mesopotamia, Rose Hall, Sandy Bay, Peter's Hope, Mayreau, Union Island, Canouan, Colonarie/Georgetown		$3,300,000	$2,350	$3,302,350		MoW	MoW
	27	Generators for shelters/schools - Phase 2			$250,000	$250,000		MoW	MoW
		TOTAL	**$1,030,000**	**$26,435,000**	**$352,350**	**$27,817,350**			