



Strategic Programme for Climate Resilience

SAINT VINCENT AND THE GRENADINES
PHASE ONE

Part Two
Proposed Investment Program
Components for PPCR Funding

2 March 2011

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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 adaptation 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 adaptation 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 Government 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

Project	Project Component #	Component 1: Disaster and Climate Risk Reduction Activities	ERL			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: Rilian 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 Marriagua 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			
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		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.

<i>Ministry/Agency</i>	<i>Discipline/Profession</i>	<i>Type of Resource</i>	<i>National /Int'l</i>	<i>Duration</i>	<i>Est. Cost (US\$)</i>	<i>Source of Funds (Project Number in brackets)</i>
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 experienced 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 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 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
<p>1. Strengthened Community Resilience</p> <p><i>More confident coastal and inland communities better able to cope with the impacts of changing weather systems</i></p>	<p>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.</p>	<p><i>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).</i></p>
<p>2. Increased Socio-economic stability</p> <p><i>Vulnerable communities more knowledgeable of climate resilience, diversified livelihoods and livelihood protection.</i></p>	<p>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.</p>	<p><i>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.</i></p>
<p>3. Increased capacity in Government institutions</p> <p><i>Climate change expertise is available to all ministries, regular information sharing amongst Government departments and Regionally on climate issues.</i></p>	<p>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.</p>	<p><i>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).</i></p>
<p>4. Strengthened knowledge and awareness</p> <p><i>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.</i></p>	<p>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.</p>	<p><i>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.</i></p>
<p>5. Comprehensive hazard maps available to Government and communities</p> <p><i>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</i></p>	<p>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.</p>	<p><i>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.</i></p>

<i>community leaders (incl. shelters)</i>		
<p>6. Gender sensitive disaster risk management designed and implemented</p> <p><i>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.</i></p>	<p>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.</p>	<p><i>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.</i></p>
<p>7. Collaboration, cooperation and support</p> <p><i>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.</i></p>	<p>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.</p>	<p><i>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.</i></p>

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 (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 Warrararrow 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 Warrararra 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 resilience 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	<ul style="list-style-type: none"> <i>i) Due diligence in skilled project management,</i> <i>ii) political will and commitment, and</i> <i>iii) clarity and thoroughness in all TORs and contract documents.</i>

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
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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.
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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
<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▪ 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 <p>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.</p>	
Project Activities: <ul style="list-style-type: none"> • 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 • Conduct one (1) physical model for the most oceanographically complex beach and near-shore system • Workshop for engineers in the Ministry of Works to promote knowledge-based regulation coastal engineering development • Based on numerical and physical modelling outputs, generate a shoreline stabilization plan for Union Island, separated into discrete project segments 	Cost 75,000 150,000 25,00 50,000
Expected Results/Outcomes <ul style="list-style-type: none"> ▪ 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:	<i>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.</i>
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	
<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> ➤ 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. <p>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.</p>	

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
<ul style="list-style-type: none"> • <i>Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring</i> 	<ul style="list-style-type: none"> • USD30,000
<ul style="list-style-type: none"> • <i>Conduct a geology assessment of Arnos Vale Catchment as a drainage basin inclusive of soil testing, ground water assessment and monitoring</i> 	<ul style="list-style-type: none"> • USD30,000
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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	<p>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:</p> <ul style="list-style-type: none"> ➤ 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
<ul style="list-style-type: none"> • 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 • 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. • 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. 	<ul style="list-style-type: none"> • USD85,000 • USD40,000 • USD35,000 • USD45,000
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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	
	<p>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.</p> <p>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.</p> <p>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.</p>	
Project Activities		Cost
<ul style="list-style-type: none"> 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 		<ul style="list-style-type: none"> USD65,000

<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • USD40,000
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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

<p>Objective:</p> <p>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.</p>	
<p>Rationale:</p> <p>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 Warrararrow 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.</p> <p>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.</p>	
<p>Project Activities</p>	<p>Cost</p>
<p>The main activities of the project includes:</p> <ul style="list-style-type: none"> ▪ Installation of gabion walls at the Warrararrow river ▪ Construction of 350 metres of concrete lined drainage channel ▪ Construction of 2 detention ponds, and ▪ Construction of cross culvert 	<p>\$2,000,000</p>
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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:	<i>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.</i>
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	
<p>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:</p> <ul style="list-style-type: none"> ➤ 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. <p>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.</p>	

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
<ul style="list-style-type: none"> • <i>Conduct a geology assessment of Union Island as a single drainage basin inclusive of soil testing, ground water assessment and monitoring</i> • <i>Conduct a geology assessment of Arnos Vale Catchment as a drainage basin inclusive of soil testing, ground water assessment and monitoring</i> 	<ul style="list-style-type: none"> • USD30,000 • USD30,000
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> • SEE PROJECT 1.1.4 		<ul style="list-style-type: none"> •
Expected Results/Outcomes	<ul style="list-style-type: none"> ▪ 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
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	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 <ul style="list-style-type: none"> • 		

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
<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> ▪ 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:	<ul style="list-style-type: none"> • To reduce flooding of residents and businesses located near the banks of the Warrawarra 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:	<p>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.</p> <p>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.)</p>	
Project Activities:		Cost
<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • SEE PROJECT 1.1.4 		
Expected Results/Outcomes	<ul style="list-style-type: none"> ▪ 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
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	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

<ul style="list-style-type: none"> • Monitoring of building codes • Workshops for building inspectors 	<p>\$15,000</p>
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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:	<ul style="list-style-type: none"> 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:	<p>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.</p> <p>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</p>	
Project Activities		Cost
<ul style="list-style-type: none"> Newly trained Coastal Engineer to work with Consultants on numerical modelling for Georgetown 		\$100,000
<ul style="list-style-type: none"> Data collection process jointly by Ministry of Works and Fisheries Division to determine permanency of the programme 		In-house
		\$100,00
Expected Results/Outcomes	<ul style="list-style-type: none"> 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:	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	
Project Activities		Cost
The main activities of the project includes:	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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:	<ul style="list-style-type: none"> 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:	<p>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.</p>	
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	<ul style="list-style-type: none"> 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:	<p>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 scarce 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.</p> <p>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.</p>	
Project Activities		Cost
<ul style="list-style-type: none"> • Acquisition and installation of data collection and monitoring equipment 		\$483,910
<ul style="list-style-type: none"> • Training of personnel in data collection and equipment maintenance 		\$100,000
Expected Results/Outcomes	<ul style="list-style-type: none"> ▪ 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:		
<ul style="list-style-type: none"> • 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:		
<p>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.</p> <p>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.</p>		
Project Activities:		Cost
<ul style="list-style-type: none"> • Development of models (using info from within the region and abroad) and simple web interface developed for capacity building 		75,000
<ul style="list-style-type: none"> • A series of training and capacity building workshops in model interpretation and use for decision making 		25,000
Expected Results/Outcomes		
<ul style="list-style-type: none"> ▪ 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:	<ul style="list-style-type: none"> • 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:	<p>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.</p> <p>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.</p>	
Project Activities		Cost
<ul style="list-style-type: none"> • Acquisition and installation of information and communication technologies 		\$150,000
<ul style="list-style-type: none"> • Development of data management protocols and standards 		\$20,000
<ul style="list-style-type: none"> • Training of personnel in data management 		\$100,000
Expected Results/Outcomes	<p>Open access to key data needed to build climate resilience</p> <p>Improved quality of key datasets</p> <p>Improved quality of decisions</p>	

PROJECT NAME:	Development of draft integrated watershed conservation and
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	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	<p>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:</p> <ul style="list-style-type: none"> ➤ 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. <p>Ultimately, this project will seek to ensure the following:</p> <ul style="list-style-type: none"> ➤ 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
<ul style="list-style-type: none"> • Conduct broad based consultations leading to the development of the policy and action plan 		USD20,000
<ul style="list-style-type: none"> • Develop draft policy and action plan 		USD60,000
Expected Results/Outcomes	<ul style="list-style-type: none"> ▪ 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
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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 resilience 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. <ul style="list-style-type: none"> ▪ 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		
<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> • Training in trends and predictive analyses of climate data 		\$125,000
<ul style="list-style-type: none"> • Acquisition and installation of data collection and monitoring equipment 		\$100,000
Expected Results/Outcomes	<ul style="list-style-type: none"> • 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
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	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
<ul style="list-style-type: none"> Strengthened capacity for CWSA for hydrology, drainage and waste water management 		\$40,000
Expected Results/Outcomes		
<ul style="list-style-type: none"> 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)

<p>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.</p>	
<p>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.</p>	
Project Activities	Cost
<ul style="list-style-type: none"> • Desk review of regional examples • Interviews with relevant stakeholders • Draft text preparations • Stakeholder review • Finalise, print, distribute (repeat distribution in Year Two) 	<p>\$25,000</p> <p>\$10,000 (printing)</p> <p>Total: \$35,000</p>
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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
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	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:		
<ul style="list-style-type: none"> 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
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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 address 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
<ul style="list-style-type: none"> ▪ Develop and legislate a comprehensive water conservation and management policy and action plan for the Grenadines and by extension SVG ▪ Printing and distribution 		<p style="text-align: right;">\$95,000</p> <p style="text-align: right;">\$15,000</p>
Expected Results/Outcomes		
<ul style="list-style-type: none"> ▪ 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:	<p>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 <i>“National 3-year Public Education to Build Climate Resilience”</i> 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</p> <p>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 <i>“Taking the Message of Building Resilience to Every Man, Woman, and Child.”</i></p> <p>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.</p>	
Project Activities		Cost
<ul style="list-style-type: none"> • Train the Trainer (climate change) workshops (some through overseas attachment) 		\$30,000
<ul style="list-style-type: none"> • Training of Local Disaster Risk Management Committees to be leaders and champions of climate change resilience building 		\$20,000
<ul style="list-style-type: none"> • Enhancement of local (communities) capacity to implement and participate in the programme 		\$20,000
<ul style="list-style-type: none"> • Enhancement of training Capacity <ul style="list-style-type: none"> ○ Computers and other training equipment 		\$30,000
Expected Results/Outcomes	<ul style="list-style-type: none"> ▪ 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: <p>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.</p> <p>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.</p> <p>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.</p>		
Project Activities		Cost
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Implementation of a National Public Education Programme (over 3 years) <ul style="list-style-type: none"> ○ Sustained electronic and print media programme ○ Publication of Climate resilience brochures ○ 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		
<ul style="list-style-type: none"> • 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
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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:	<p>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.</p> <p>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).</p> <p>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 "<i>Climate Change For Kids in the Caribbean</i>" prepared by well known SVG child author Storm Halbich.</p> <p>Investment in youth education will realize a tenfold return at the very least.</p> <p>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.</p>	
	Project Activities	Cost
	<ul style="list-style-type: none"> • 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 <i>"Climate Change For Kids in the Caribbean"</i> \$5000 Curriculum dev't testing, etc. \$25,000 Total: \$60,000
	Expected Results/Outcomes <ul style="list-style-type: none"> ▪ 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:	<p>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.</p> <p>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. .</p>	
	Project Activities	Cost
	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ▪ 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:	<p>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.</p> <p>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.</p> <p>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.</p>	
Project Activities		Cost
<ul style="list-style-type: none"> Regional (CIMH) training programmes in climatology and marine meteorology for two technicians in each discipline 		\$12,000
<ul style="list-style-type: none"> Regional exchanges and training programmes in CZM strategies and procedures for five field officers 		\$15,000
<ul style="list-style-type: none"> Training for MoW engineer to conduct regional training in coastal engineering 		\$30,000
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> Training for Ministry of Agriculture Agronomist to incorporate climate change into Agriculture planning and development 		\$5,000
Expected Results/Outcomes	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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:	<p>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 from the initial survey and ensure a complete coverage of the country.</p> <p>This will be a valuable vehicle for the development of community-based approaches to building resilience, awareness building and hazard mapping.</p>	
	Project Activities	Cost
	<ul style="list-style-type: none"> • 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. 	<p>In-house plus \$500/constituency, 15 Constituencies</p> <p>Total: \$7,500</p>
	<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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:	<p>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.</p> <p>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.</p>	
Project Activities		Cost
<ul style="list-style-type: none"> 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"
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Investment Component:	Component 4: Design and Implementation of a public education and capacity building programme	
Project Number	4.9	
Cost	\$55,000	
Objective:		
<ul style="list-style-type: none"> 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:		
<p>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,</p>		
Project Activities		Cost
<ul style="list-style-type: none"> 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		
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> • 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		
<ul style="list-style-type: none"> ▪ 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	<p>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.</p> <p>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.</p> <p>See also Project number 4.1.</p> <p>This project has been incorporated into this National three year public education programme.</p>

Project Activities	Cost
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • • •
<p>Expected Results/Outcomes</p> <ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> • Establishment of a sub-regional action research team <ul style="list-style-type: none"> ○ Travel and accommodation ○ Meeting facilitation • Development of a knowledge-porter for sharing of experience • Semi-annual meeting of key researchers <ul style="list-style-type: none"> ○ Travel and accommodation ○ Meeting facilitation 		<p>\$55,000</p> <p>\$15,000</p> <p>\$20,000</p>
Expected Results/Outcomes	<ul style="list-style-type: none"> • 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
			Knowledge mgt., Consultants	Goods	Works				
		SEE MORE DETAILED PROJECT DESCRIPTIONS BELOW							
	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 vegetation 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 Warrararrow 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	Rehabilitation 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	Warrararrow/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, property owners, local communities	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 communities, 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 communities, 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 consideration gender sensitive issues 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 boaters local communities	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 Warrararrow 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 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)

1.3.1 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
			Knowledge mgt., Consultants	Goods	Works				
		SEE MORE DETAILED PROJECT DESCRIPTIONS BELOW							
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, Ministry 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, Telecommunications	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 resilience 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
			Knowledge mgt., Consultants	Goods	Works				
		SEE MORE DETAILED PROJECT DESCRIPTIONS BELOW							
PPCR	3.1	Integrated Watershed Management Plan	\$80,000			\$80,000	Years 1,2,3	Environment and communities, all line ministries, agencies.	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 and Beaches Authorities, 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 CWSA 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 processes, 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 intergovernmental 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-governmental 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. 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 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 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
			Knowledge mgt., Consultants	Goods	Works				
		SEE MORE DETAILED PROJECT DESCRIPTIONS BELOW							
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, local 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/constituency, 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, businesses 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. (Linked 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 modified 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 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

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

(Linked 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..

