IWEco National Sub-Project 1.5

Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarries and Sand Mining Hotspots on Nevis

ST KITTS AND NEVIS

Appendix 35

COVER SHEET

- Name of small-scale intervention: **Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarries and Sand Mining Hotspots on Nevis**
- Name of Lead Partner Organizations:
  a) Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlement (St. Kitts)
  b) Nevis Island Administration (Nevis)
- Contact person:
  a) Alistair Edwards, Permanent Secretary, Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlement
  b) Ernie Stapleton, Permanent Secretary, Ministry Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment
- IWEco Project focus: Land Degradation
- Total area covered: Targeted interventions over approximately 135 hectares for mitigation of acute land degradation on (1) St. Kitts, associated with poor riparian land management and aggregate mining to reduce sedimentation and flooding and (2) Nevis, associated with intensive mining activities and sedimentation and deterioration of adjacent marine ecosystems.
- Duration of sub-project: 48 months
- Amount of GEF grant: **$999,685** USD
- Amount of Co-financing: **$3,273,775** USD
- Total funding: **$4,273,460** USD

NB: Since receiving the CEO approval in April 2015 and the convening of the First Project Steering Committee Meeting in Jamaica, September 2016, several activities, of a technical and administrative nature, have warranted changes to some of the project activities initially conceived. While these changes may be significant in terms of the quantum of resources allocated to the specific activities, there is no deviation from the overall project goals and objectives. In St. Kitts the major change has to do with the siting of the proposed Retention Pond. In Nevis it relates to the quantum of quarries now available for rehabilitation. Given the fact that an alternative location is under consideration for the location of the Retention Pond, it is not anticipated to result in any material changes to the activities initially proposed. In fact, that change may present opportunities for more economic uses of water collected in the retention pond. Likewise, in Nevis, the unavailability of all of the quarry lands initially identified present an opportunity to engage in the development of more meaningful resource management measures as well as identification of other lands for rehabilitation. While these changes have contributed, to a limited degree in the delays experienced, it does, however, present opportunities for synergistic engagement with other activities which will contribute to the goals and objective of the regional project. The changes referred to above can be seen under each of the respective components of the ProDoc below and the Project budget.

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1 PROJECT IDENTIFICATION

1.1 Project Summary

On **St. Kitts**, the threat of land degradation is potentially high due to the fact that the sandy loams that dominate the island are highly erodible once the vegetation is removed. During the operation of the sugar industry significant tracts of land were under sugar cane, a crop that given its natural characteristics and mode of cultivation, made an excellent cover crop to guard against soil erosion. With the official closure of the industry in 2005, new options for land development opened with the transformation of some of these lands from sugarcane into other agricultural crops and settlement development. With the conversion of lands out of sugarcane and in places where soil conservation measures are not put in place acute erosion has resulted. This is particularly evident at the **College Street Ghaut.** In Caribbean English, a ghaut refers to a small cleft in a hill through which a rivulet runs down to the sea. The College Street Ghaut runs through the Federation's capital, Basseterre. College Street Ghaut watershed covers 662 hectares; the main watercourse originates north of the Olivees Mountain and runs past the west of the airport runway, through to the city of Basseterre, discharging to the sea.

The banks of the ghaut have seen significant encroachment associated with agriculture and settlements along with the indiscriminate disposal of solid and liquid (grey waters) waste. The removal of protective vegetation has resulted in increased erosion rates from the river banks and across the upper reaches of the watershed. The result has been sedimentation of the river channel, heightening the risk of flooding and loss to life and property particularly within the lower watershed reaches that includes the city of Basseterre. Major flood events linked to land degradation and chronic sedimentation have been a frequent occurrence, with the last major event in summer 2013 causing an estimated US$120,000 in damages. With the encroachment of development also comes the increase in land-based pollution. Pollutant contributors include those associated with agriculture from fertilizer and other chemical applications, livestock rearing and effluent discharge, and from settlement areas in the form of grey and black water. Outfalls create a public health risk along the Basseterre beach. There is also evidence of increasing sedimentation of the marine environment in the Basseterre Bay and some impacts to the coral reefs, which are prime recreational dive sites and thus foreign revenue earners.

On **Nevis** the issue of land degradation associated with poor quarry management practices to reduce excessive sediment discharge warrants urgent redress. Currently, quarries are the primary sources of sedimentation in the streams. This is causing offshore reef degradation and the destruction of mangrove swamps. There are seven seasonally active, privately operated quarries on the island, of which five are on land leased from Government, while two are on private land. These quarry sites cover approximately 67 acres of land and are located in the area of Hicks Estate, Butlers Mountain, Indian Castle and Dogwood Estate along the eastern and southern sides of Nevis. The different operations produce boulders, coarse base, fine base, aggregate (range from 1" stones to 3/8" stones and stone dust), various grades of sand, and filling material for road and runway construction, on demand in the burgeoning construction industry.

Nevis has seen over the past years significant growth in the hospitality sector with the construction of high-end properties placing extra demand on the supply of quarry material. The quarry sites are covered by semi-deciduous dry scrub forest, sparsely dense vegetation with a few patches of open canopy. The issue being faced is that most of these operations do not implement measures to stabilize

displaced overburden and mitigate the flushing of sediment into ghauts and into the marine environment during heavy rains. In addition to these quarries, numerous beaches are exploited for sand, despite the fact that sand mining is illegal in the Federation of St Kitts and Nevis. Fishers and tourism stakeholders, e.g. the recreational dive sector, have been raising concern over degraded beaches and the high sedimentation rates that have been occurring on Nevis reefs', particularly Indian Castle and the potential impacts to the coastal fishery and the lucrative dive operations. In fact, the impact is ubiquitous: despite the quarry operations being located on the east and south coast of the island, prevailing coastal currents take silt from the quarries around to marine ecosystems on the west coast, resulting in the death from siltation of most branching corals elkhorn and staghorn etc).

On St. Kitts the project interventions will focus on installation of soil conservation measures within the College Ghaut. These measures will include vetiver contour rows; installation of grey water treatment systems; construction of a retention pond constructed at Shadwell Estate; installation of new and maintenance of existing gabion baskets at the ghaut; stabilization and regular maintenance of existing retaining walls and bridges; and clearing of culverts, drains, outfalls and roads of debris and sediment along the ghaut. On Nevis on-site investments will include stabilization of ghauts and water harvesting systems to reduce quarry run-off into the ocean; replanting of mangroves and other coastal plant species as step towards restoration of coastal wetlands; deployment of artificial reefs at New River, Indian Castle, Dogwood and Long Haul; beach restoration at Indian Castle; and restoration and reforestation of non-productive quarry areas identified using the criteria established in a management plan that will also be produced under the project. For both islands the project will provide support for long-term sustainability and replication through policy, regulatory support, exchange of best practices.

The project will support selected final steps in the legislative drafting of the National Conservation and Environmental Management Act (NCEMA), a federal law, to ensure quarrying and sand mining are adequately covered, as well as development of a Sand Mining and Quarrying Ordinance for Nevis and will introduce sector standards together with a licensing system for quarry operators that is conditional on training and compliance. The project will contribute to forest cover rehabilitation over degraded areas and foster conservation of existing forests to maintain the integrity of ecosystem services over the College Street Ghaut watershed in St Kitts and across the eastern landscapes in Nevis where the majority of land degradation associated with quarrying is occurring. Further downstream, impacted mangroves and wetlands will also be restored. Through on-site land and forest cover investments within 135 hectares over the target watershed areas on both islands, it is expected that an estimated 13,169.5 equivalent tonnes of CO_2 over the life of the project, or an average of 2,633.9 tCO_2eqv/year will be sequestered.

Table of Regional Components, Project Outcomes, and Link to Sub-Project

Regional Component	Project Outcomes
C1. TECHNICAL SOLUTIONS & BENEFITS	C1.1 Measurable **stress reduction at project sites** through appropriate sustainable water, land and ecosystems management interventions that account for climate change.
	C1.2 Enhanced **livelihood opportunities and socio-economic co-benefits** for targeted communities from improved ecosystem services functioning.
C2. MONITORING SYSTEMS	C2.1 Strengthened **national and regional systems for monitoring** of environmental status with respect to key international agreements.
C3. POLICY & CAPACITY	C3.1 Strengthened **policy and legislation** for the effective management of water, land and ecosystems resources that account for climate change.

Regional Component	Project Outcomes
	C3.2 Strengthened **capacity of national and regional institutions** and other stakeholders for water, land, and ecosystems management that accounts for climate change.
C4. KNOWLEDGE MANAGEMENT	C4.1. Improved **engagement and information access** for practitioners and other stakeholders through targeted knowledge sharing networks.

Table of GEF FA Objectives, Project Outcomes and Corresponding Sub-Project Outcomes

GEF Focal Area Outcome	Project Outcomes (above)	Sub-Project Outcomes
National Component 1: To develop and foster the implementation of targeted innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the College Street Ghaut watershed and quarry sites on Nevis.		
IW 1.3, 2.3; LD 3.3, BD 2.1	C1.1 Solutions	National Outcome 1.1 Measurable stress reduction at Measurable stress reduction achieved in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.
LD 3.2; BD 2.1	C1.2 Benefits	National Outcome 1.2 Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning
National Component 2: To strengthen Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystems Monitoring and Indicators frameworks in Saint Kitts and Nevis		
IW 2.1; BD 2.1	C2.1 Monitoring	National Outcome 2.1 Outcome: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.
National Component 3: To strengthen policy, legislative and institutional reforms and capacity building to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystem services management taking into consideration climate change resilience building in Saint Kitts and Nevis.		
IW 1.1, 1.4, 2.1	C3.1 Policy	National Component C3.1 Outcome: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.
LD 3.1, 3.2; SFM 1.1, 1.2	C3.2 Capacity	National Component C3.2 Outcome: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.
National Component 4: To enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Kitts and Nevis		
SFM 1.3	C4.1. Knowledge	National Component 4.1 Outcome: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks

Table of Sub-Project Outputs and GEF funding and co-finance

Outputs	Sources of funding		
	GEF funding (US$)	Co-financing/ counterpart (US$)	Total Cost (US$)
National Component 1.1 Innovative Solutions	515,800	1,305,925	1,821,725
Output 1.1.1: Banks of College Street Ghaut stabilized	211,800	194,137	405,937
Output C1.1.2: On-site treatment of grey water on private and commercial properties in greater Basseterre area	-	400,000	400,000
Output C1.1.3: Retention pond constructed at Bayford's Estate (West of Ogee's Village)	82,000	300,000	382,000
Output C1.1.4: Restoration and reforestation plan for abandoned quarry at Hick Estate	-	173,638	173,638
Output C1.1.5: Restoration and reforestation of non-productive quarry areas identified using the criteria in the above plan, and economic analysis and management plan of the wetland/pond at Cades Bay and Bath Bogs/ Wetland	204,000	108,150	312,150
Output C1.1.6: Deployment of artificial reefs at New River, Indian Castle, Dogwood and Long Haul.	8,000	70,000	78,000
Output C1.1.7: Beach restored at Indian Castle	10,000	60,000	70,000
National Component 1.2 Socio-Economic Benefits	55,800	681,741	737,541
Output C1.2.1: Determine the feasibility of sand mining in Nevis and undertake a cost-benefit and feasibility study for sustainable sand extraction for St Kitts	30,000	173,638	203,638
Output C1.2.2: Plumbers/building contractors, septic service providers, home-owners and business people on St Kitts aware of importance of grey water treatment	10,000	5,000	15,000
Output C1.2.3: Access to safe drinking and ambient water for women and men as well as disadvantaged groups	15,800	503,104	518,904
National Outcomes under C 2.1: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.	180,000	1,024,276	1,204,276
Output C2.1.1: Adoption into national accounts of IW and LD, and BD-related indicators of process, stress reduction, and environmental and socioeconomic status to monitor improvements in the management of land and water resources and wastewater	108,000	708,413	816,413
Output C2.2.1: A monitoring protocol for periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders	72,000	315,864	387,864
National Outcomes under C 3.1: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.	62,085	74,000	136,085
Output C3.1.1: National reviews of water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation	9,600	10,000	19,600
Output C3.1.2: New and/or revised legislations, policies and regulations on water supply and sanitation based on the IWRM Roadmaps (and IWRM/WUE	29,985	27,000	56,985

Outputs	Sources of funding		
	GEF funding (US$)	Co-financing/ counterpart (US$)	Total Cost (US$)
strategies where they may exist), National Plans of Action for SLM and ecosystem conservation in all participating countries by Year 4. Develop quarrying ordinances for Nevis.			
Output C3.1.3: Support to legislative drafting of NCEMA (federal legislation) to ensure quarrying and sand mining are adequately covered. Update the Nevis Zoning Plan and Nevis Zoning Map.	10,000	10,000	20,000
Output C3.1.4: National Integrated Water Resource Management/ Water Use Efficiency strategies/plans integrates ICZM and BD conservation issues.	5,000	15,000	20,000
Output C3.1.5: Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.	7,500	12,000	19,500
National Outcomes under C 3.2 Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.	90,000	65,133	155,133
Output C3.2.1: National Environmental Committee/Commission	45,000	31,800	76,800
Output C3.2.2: Programmes for cross-sectoral sensitization and awareness-raising for all relevant stakeholders on LD and watershed management, integrating SLM & ecosystem management, IWRM/WUE and ICZM management issues to support mainstreaming and implementation	15,000	13,333	28,333
Output C3.2.3: Programmes for training and capacity building to support the implementation on LD and watershed management, integrating SLM & ecosystem management, IWRM/WUE and ICZM management issues to support mainstreaming and implementation throughout the relevant government, private sector agencies and civil society organizations	10,000	10,000	20,000
Output C3.2.4 Training manual of best quarry layout and extraction practices	10,000	5,000	15,000
Output C3.2.5: Quarry operators are informed about and aware of site layout and extraction practices in order to facilitate subsequent restoration/reforestation	5,000	-	5,000
Output C3.2.6: Increased public awareness on alternative construction materials and the effect on sand mining on beaches of St Kitts and Nevis	5,000	5,000	10,000
National Outcomes under C 4.1: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks	96,000	122,700	218,700
Output C4.1.1: Saint Kitts and Nevis contribute to suite of best practices and lessons, in common pool of knowledge, that are exchanged with other SIDS in SLM/ecosystems management and related projects	24,000	33,000	57,000
Output C4.1.2: Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project	40,000	29,700	69,700
Output C4.1.3: Participate in or convene at least 2 major technical conferences and symposia to showcase the innovative solutions	27,000	50,000	77,000
Output C4.1.3: Research articles, books, other awareness materials through various media	5,000	10,000	15,000
TOTAL (in PIF)	N/A	N/A	N/A
TOTAL (revised if applicable)	**999,685**	**3,273,775**	**4,273,460**

2 PROJECT DESIGN

2.1 Background and Context

St. Kitts: The College Street Ghaut watershed covers some 662 hectares (1,635.8 acres; Figure 2b). The principal water course begins to the north of the Olivees Mountain and then through Fountain Estate, to the west of Monkey Hill, through the Glen area, to the immediate west of the airport runway, through College Street in Basseterre, discharging to the sea. The watershed has a complete range of features from upland natural forest through former sugar cane lands and through intensive urban development. The area is experiencing urbanization pressure which will continue. A portion of the lands previously dedicated to sugar cane production has been switched to other agricultural pursuits and non-agricultural activities, including housing. These increasing pressures have resulted in more rapid surface water runoff following rainfall events. In the Monkey Hill area, just North of Basseterre, a number of properties located close to the riverbanks could be seriously affected by bank failure. The failure can be triggered by the erosive forces accompanying high velocity flows in the watercourse and/or by overland drainage spilling down on the face of these steep slopes[1].

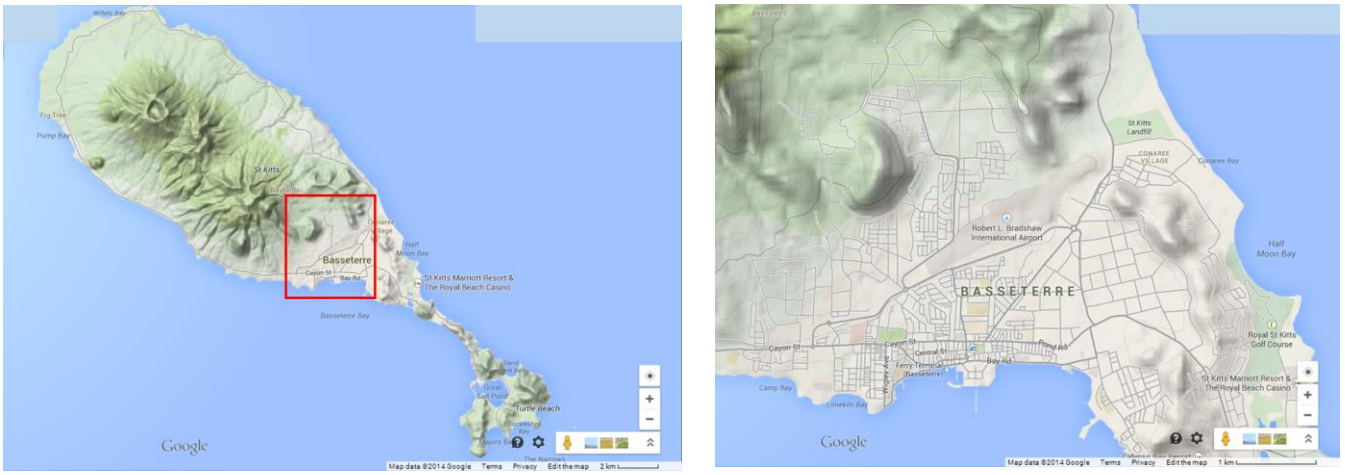


Figure 1. Island of St. Kitts and College Ghaut project area (source: Google Maps)

[1] Williams, P.I. (2013) St. Kitts and Nevis Situational Analysis Report. GEF-IWEco National Sub-Project Development, Ministry of Sustainable Development, Basseterre, St Kitts.

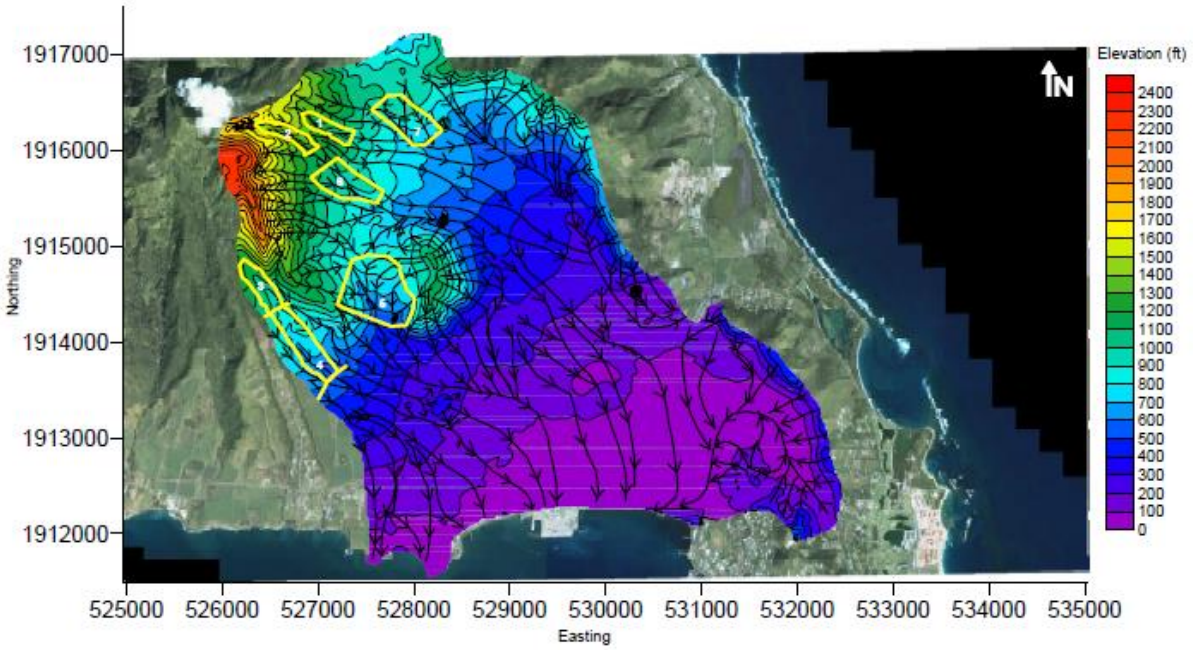


Figure 2a. Basseterre Valley Watershed elevation with proposed storm water retention area (yellow lines)

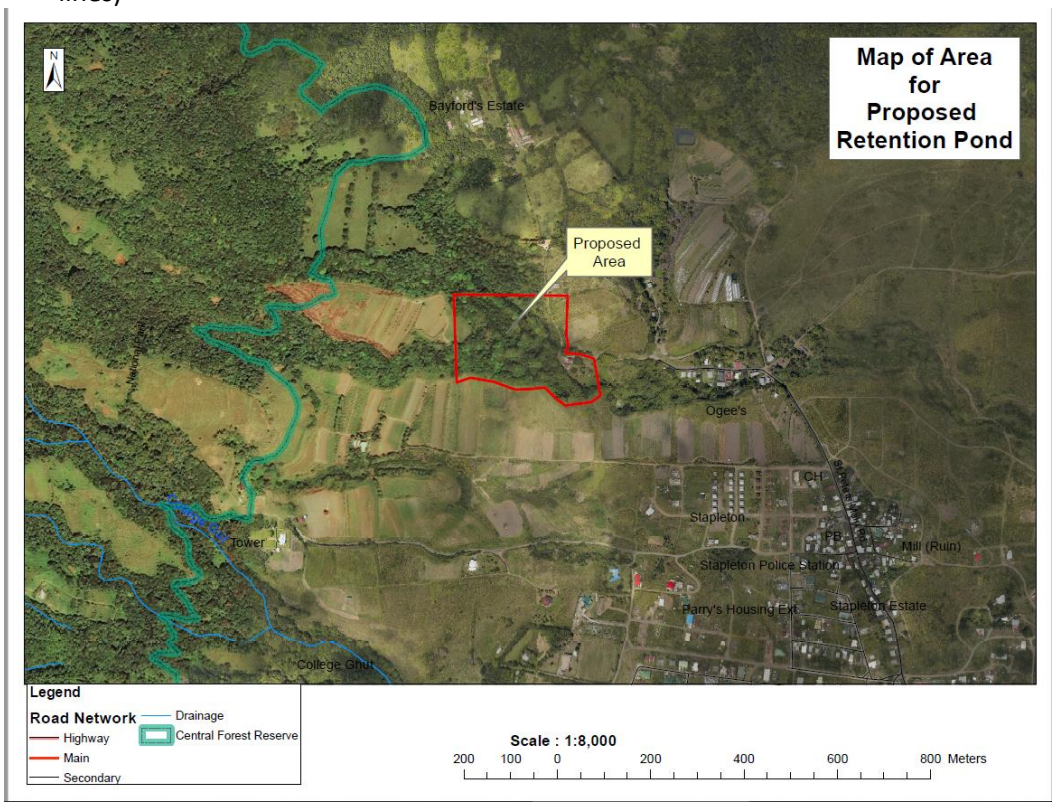


Figure 2b. College Street Ghaut with retention pond proposed under IWEco.

The history of flooding along College Street Ghaut goes back more than 250 years. This trend has in recent times been aggravated by increased non-sugar agricultural activity in the upper reaches of the watershed and by housing developments in the lower reaches. Vegetation clearance for farming and construction activities close to the banks of College Street Ghaut removes the natural "sponge" for rainfall, resulting in the dislodging of loose sediments and water percolation into the ground at a rate faster than the capacity of the substrate to absorb it. The net result becomes an increase in water available for run-off as well as loss of plants and animal habitat. Increased sediments in the nearshore water could impact the use of traditional hauling grounds by net, line and pot fishers. Areas with excessive erosion include the beach at Frigate Bay, Pinney's Beach, Halfway and New Guinea Coasts, College Street Ghaut, lower Monkey Hill, Wades Garden, Old Road Bay, Brimstone Hill area, and the Southeast Peninsula.

Fast moving floodwaters, exacerbated by the routing of storm drainage, and an increase in impermeable surfaces along College Street Ghaut watershed, rush down in the ghaut enter adjacent buildings and represent a great risk to people, cars, buildings and contents. These changes have, in recent times, resulted in more frequent and more severe floods, with the last major event in summer 2013 causing an estimated US$120,000 in damages (Ellis Hazel, pers. comm.). It is mandatory that upstream run-off be controlled. In addition to the flooding problem, the College Street Ghaut also presents a water quality problem. Solid waste within the ghaut results in blockages, contamination and unsightliness. There is no storm or sanitary sewers serving the College Street Ghaut area and gray water from individual houses is collected along the street in open channels[2].

Under the GEF-funded project ***Integrating Watershed and Coastal Area Management in Caribbean Small Island Developing States*** **(GEF-IWCAM),** the Water Services Department (WSD) of the Ministry of Public Works, Utilities, Transport and Post, Government of St. Kitts and Nevis developed an integrated water resources management project within the Basseterre Valley and demonstrated the proper management and protection of the Basseterre Valley Aquifer and well field using a three pronged approach (Figure 2a):

1. Mitigation of threats from contaminants,
2. Protection of the aquifer, well field and supportive ecosystem
3. Improvement to the user resource management interface

Relevant outputs were[3]:

- Delineation of the basin's hydrologic boundary
- Definition of the underlying geology and aquifer units
- thorough hydrological survey
- Development of a Water Resource Management Plan for the Basseterre Valley Aquifer

The two issues recommended as management priorities for land use planning and resource management and stated in this IWCAM report are:

- *Water Quality*: Improper waste disposal practices: agricultural pollution (pesticides, fertilizers, soil erosion), sewage and wastewater from the expanding urban populations, industrial effluent discharges;

[2] Williams (2013) *ibid*

[3] The Ocean Earth Technology Consortium (2009). Rehabilitation and management of the Basseterre Valley as a Protection Measure for the Underlying Aquifer. Prepared for the St Kitts Water Department, Executive Summary for Vols 1,2, & 3

- *Quantity*: Threats to the recharge areas from improper land usage and insufficient development planning; associated with this is degradation of the watershed itself and deforestation, which exacerbates the overland flow and loss of water out of the system within a context of climate change and protracted periods of drought conditions.

Nevis: Since 1990, construction has emerged as one of the strongest sectors within the Nevis economy. There are 11 registered construction companies in Nevis, which employs 455 persons on a full-time basis. Factors such as the expansion of the tourism and real estate sectors have greatly contributed to the recent buoyancy of this sector. The number of new housing applications averaged 170 per annum in the period 2002-2012. It is the buoyant construction sector that has had positively impacted the quarrying and sand mining sectors in an economic sense. But it is the very same construction sector that has negatively impacted the Nevis environment.

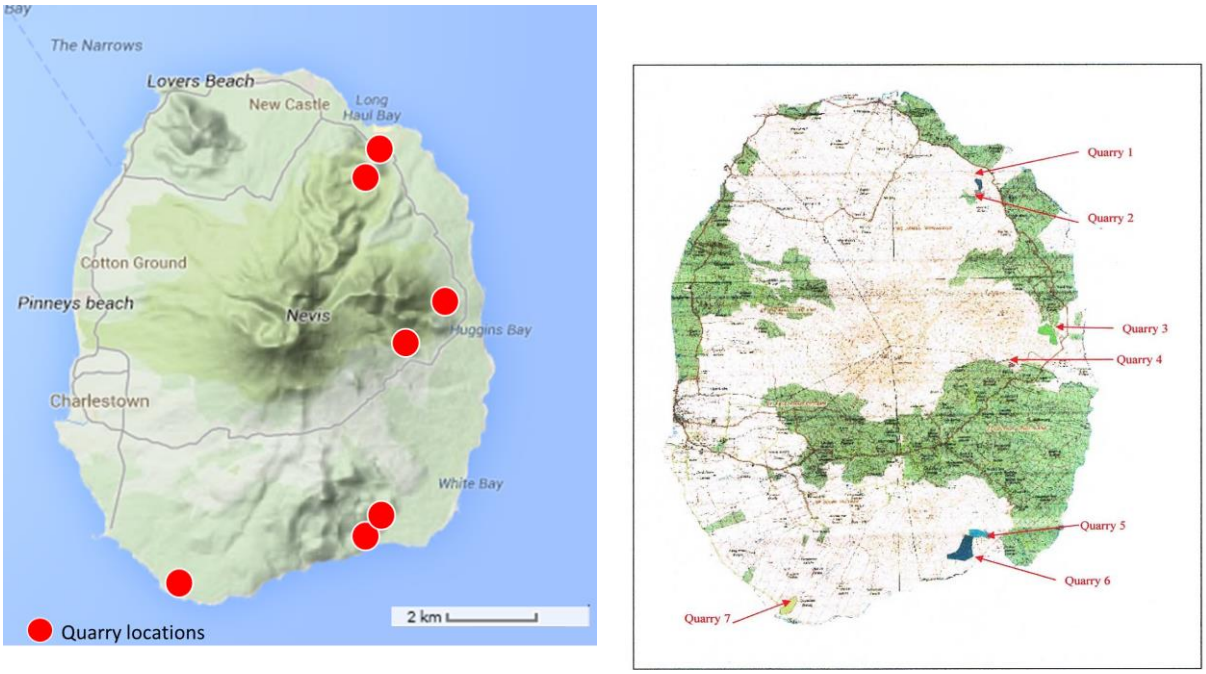


Figure 3a. Maps showing the topography and locations of quarry sites on the island of Nevis

At present, **quarrying** is the single largest industrial activity on the island of Nevis and seven seasonally active quarries employ approximately thirty persons. These quarry sites cover approximately 27 hectares acres of land and are located in the area of Hicks Estate, Butlers Mountain, Indian Castle and Dogwood Estate along the eastern and southern sides of Nevis (Figure 3a). Most of these quarries operate rock crushing equipment and derive their raw materials from the excavation of hillsides, ghauts and fields. The different procedures produce boulders, coarse base, fine base, aggregate (range from 1" stones to 3/8" stones and stone dust), various grades of sand, and filling material for road and runway construction, on demand in the burgeoning construction industry[4].

[4] Williams (2013) *ibid*

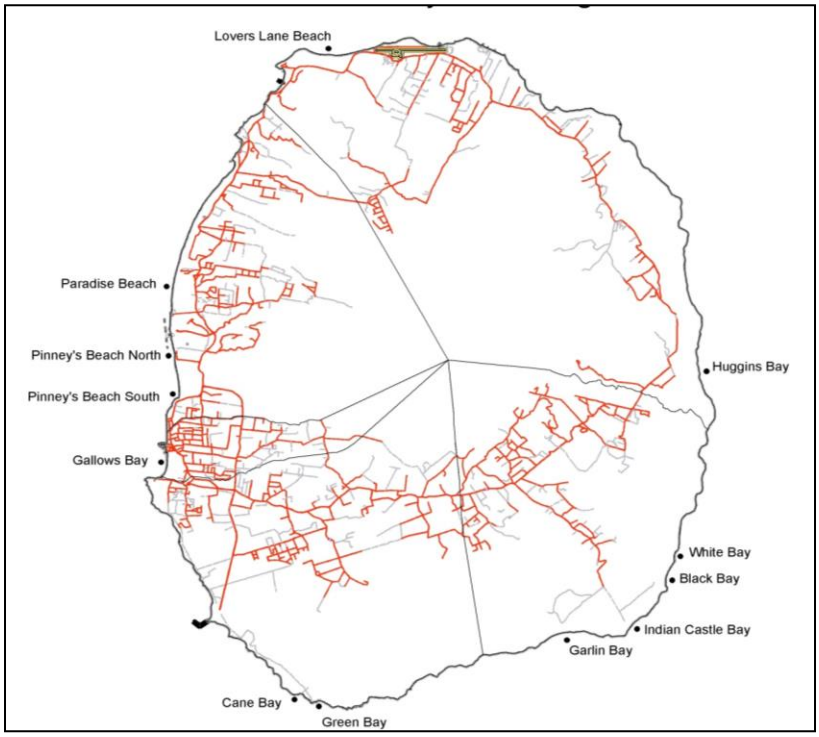


Figure 3b. Nevis beaches affected by sand mining

Operational procedures at quarries over the years have resulted in land degradation, affecting both terrestrial and marine ecosystems. A **Quarry Management Bill**, if enacted, would provide the legislative foundation for the development of regulations to govern quarry operations on Nevis, including environmental management and performance standards. At present, the quarry sites are covered by semi-deciduous dry scrub forest, sparsely dense vegetation with a few patches of open canopy. Areas of concern are site planning and staging, removal and storage of overburden, protection of vegetation, storm water management, site sealing and revegetation. Other issues that have developed include sedimentation of ghauts and the nearshore marine environment, including coral reefs and seagrass systems and the spawning fish they harbour, significant loss of bushland vegetation, absence of recovery plans with subsequent slope failure, and degraded and unsightly quarry lands.

Table 1: General information on Nevis quarries (Source: Williams, 2013)

Quarry No.	Age (years)	Size (Acres)	Location	Land ownership
1	19	12	Hick Estate	Government/Private
2	16	5	Hick Estate	Private
3	16	10	New River	Government
4	14	10	New River	Government
5	23	7	Indian Castle	Government
6	16	13	Indian Castle	Government
7	25	10	Dogwood Estate	Private

Another concern that has arisen from the expansion of the construction industry is the growth in **beach sand mining**. Sand mining in the Federation of St. Kitts and Nevis is an illegal activity, unless permission

is granted by the Minister responsible for the Environment Section 26 of the National Conservation and Environment Protection Act (NCEPA), and today, beach sand mining is strictly prohibited on Nevis. In recent years, the issue of sand mining on Nevis has escalated. Figure 3 shows beaches on Nevis that have been impacted by the indiscriminate removal of beach sand and where the resulting beach erosion has reduced the natural capacity of the sand to minimize the impact of storm surges.

Other negative impacts include the destruction of the nearshore habitats, and coastal ecosystems, such as wetlands and ponds and their associated fauna and flora[5]1. For example, the indigenous and VU-rated West Indian whistling-duck (*Dendrocygna arborea*) (IUNC, 2012) depends on coastal wetlands, a very limited habitat in the Caribbean, which is furthermore severely degraded, where still in existence, by the cutting of mangroves and swamp-forest, as well as pollution.

Legislative, regulatory and policy instruments in St. Kitts and Nevis relevant to IWECO

Relevant legislative instruments in St. Kitts and Nevis include the:

- **National Conservation and Environmental Protection Act** (NCEPA of 1987) is a comprehensive environmental statute providing for, *inter alia*, 1) the establishment and management of protected areas; 2) preparation of coastal zone management plans; 3) forestry, soil, and water conservation; and 4) protection of wild animals. The 1996 Amendment provides for the entry into force of various multinational environmental agreements (MEAs), such as the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), the UN Framework Convention on Climate Change (UNFCCC) and the UN Convention on Biological Diversity (CBD). Sand mining is regulated by this Act.

- The draft **National Conservation and Environmental Management Act** (NCEMA) would update and modify the NCEPA. Among other things it provides for the development of coastal zone management plans. Section 38 of the NCEMA requires the DPPE to prepare a coastal zone management plan which indicates "the strategy which the Department proposes to adopt for the management of land and marine areas within the coastal zone." Coastal zone management plans should illustrate the coastal zone management strategy; allocate land or marine areas or combination thereof as protected areas; and create buffer zones around protected areas, if appropriate.

- **Development Control and Planning Act** (DCPA). This law provides for the orderly, efficient, and equitable planning, allocation and development of the resources of St. Kitts. The DCPA's definition of "land" includes submerged land extending to seaward limit of territorial sea, which the Maritime Areas Act sets at 12 miles seaward of a landward baseline. A Board is responsible for preparing development plans, which may provide for zoning, allocate land for the protection of marine life, and or protect the coastal zone (defined as extending to seaward limit of the territorial sea. Management plans may plan for protection of marine flora and fauna, specifically allowing for regulation of hunting and fishing to achieve this purpose.

  The DCPA is the parent legislation that guides the implementation of the **St. Kitts and Nevis Building Regulations, Code and Guidelines** of 2000 (commonly referred to as the Building Code), although various provisions of the Code are tied with those of other instruments such as NCEPA, the Forestry Ordinance, the Solid Waste Management Corporation Act and the Public Health Act. The Code provides the regulatory framework for the management of construction and built

[5] Williams (2013) *ibid*

developments. Its scope applies to the construction of new buildings and structures, alterations, renovations, remodeling, demolitions, removal, relocation, maintenance and occupancy of existing buildings.

The **Nevis Zoning Plan Ordinance** (1991) is peculiar to Nevis and is administered by the Department of Physical Planning, Natural Resources and Environment with the aim to provide for orderly physical development in context of land resources and **the Nevis Housing and Land Development Act** (1988), which is administered by the Nevis Housing and Land Development Corporation, regulates land development for Crown Lands. Under the **Nevis Physical Planning and Development Control Ordinance** (PPDCO) of 2005, the DPPNRE issues permits for new developments, construction or enterprises, anywhere on the island of Nevis, as well as permits for the construction or modification of any work causing the discharge of trade or sewage effluent into the environment. The DPPNRE monitors construction to ensure that their development restrictions and requirements are adhered to and deals with issues such as fencing and appropriate signage around the island.

- **Maritime Areas Act** (1984), which defines maritime areas of St. Kitts and Nevis. Echoing the provisions of UNCLOS, it sets out the various rights and responsibilities of the government with respect to these areas. The Act authorizes the Minister of Maritime Affairs to enact regulations for the protection and preservation of the marine environment of both the territorial sea and the EEZ, and for the exploration and exploitation of the EEZ for economic purposes.

- **Marine Pollution Management Act** (2002) seeks to (a) provide for the protection of ecologically sensitive marine resources; (b) enhance environmental quality of territorial waters and adjacent international waters; (c) give effect to certain international conventions relating to pollution of the sea; (d) implement port-state control to improve management of ship-generated wastes and prevent harm to safety, health and the marine environment from shipping activities; and, (e) encourages good environmental operating practices in commercial, cruise liner and leisure shipping and in ports, marinas and harbours. Thus, the Act provides for the monitoring and control of all marine pollution in waters of St. Kitts and Nevis and marine pollution caused by a vessel or marine structure of St. Kitts and Nevis outside of the territorial sea of St. Kitts and Nevis. The kinds of marine pollution to which particular attention is given in this Act are the dumping of hazardous waste in marine areas and marine pollution caused by vessels and land-based sources.

- **Fisheries Regulations** (1995) contain conservation measures for lobster, turtles, conch, coral, sponges, marine algae, sea stars, and aquarium fish. The regulations also affirm that in fishery waters, no person or company may introduce pollutants, poisons, or other harmful substances.

- **Solid Waste Management Corporation Act** (1996) provides for the management (storage, treatment and disposal) of solid waste in conformity with the best environmental practices. The Act also provides the legislative framework for the of solid waste, so as to avoid environmental degradation. Section 28 (1a) of the Act, requires that no individual shall deposit or knowingly cause to be deposited solid waste in or on land, beach, foreshore, marine waters or river banks. While the legislation is federal, its administration is shared by the St. Christopher Solid Waste Management Corporation and Nevis Solid Waste Management Authority.

- The **Public Health Act**, which is administered by the Department of Environmental Health in the Ministry of Health, established air, soil and water pollution control standards and provides for

them being monitored. Minister having responsibility for Health 5 is authorized to make regulations for the protection of water from contamination and pollution including the:

(i) inspection and approval of sources of supply, and the conditions, if any, on which such approval is granted;
(ii) testing and analysis of water;
(iii) construction, alteration, maintenance and purification of water supplies and water distribution systems;
(iv) supervision and control of any river, spring or part thereof contributing to a public water supply;
(v) regulation of persons bathing, washing clothes, cleaning vehicles, utensils or animals at or in any river, stream or spring or part thereof contributing to a public water supply; and
(vi) prescribing the limit or purpose for which water may be used and distributed.

Williams (2013) pointed out that there is a need to revise the Public Health Act and consolidate the environmental management provisions of other legislations toward establishing more appropriate institutional arrangements to support, co-ordinate and direct relevant environmental health activities.

Institutional Context

ST. KITTS

Key stakeholders on St Kitts are summaries in Table 2

The **Public Works Department** (PWD) is responsible for overseeing the design of new and maintenance of existing public infrastructure, including roads, drainage, bridges, culverts and ghaut stabilization. It is responsible also for overseeing the design, construction and repair of public buildings. As a member of the DCPB, the PWD provides technical support to the land development and building application review processes. The PWD is a member of the existing PSIP framework that is managed by the Ministry of Sustainable Development.

There are six key institutions with responsibility for land administration in St. Kitts: (a) Ministry of Sustainable Development (and the Development Control and Planning Board); (b) Frigate Bay Development Corporation; (c) Urban Development Corporation; (d) White Gate Development Corporation; (e) Ministry of Agriculture; and, (f) the National Housing Corporation. Other agencies with some role in land management either as a beneficiary or resource custodian, include the St. Christopher National Trust, the Nevis Historical and Conservation Society and the Ministry of Tourism. The Ministry of Finance has a significant role in land negotiations particularly with respect to major property developments.

The principal institution for the development and control of land is the **Development Control and Planning Board** (DCPB). Under the aegis of the Development Control and Planning Act (2000), the DCPB has the responsibility to prepare National Physical Development Plans (NPDP) for the island of St. Kitts and to grant permits for the development of land. The **Department of Lands and Surveys** (DLS) assists the land management process by ensuring the fair and equitable distribution of Crown Lands. The DLS is the first point of contact in the processing of all land issues. Also, the DCPB's permission does not extend to agricultural lands, which remain the clear mandate of the Ministry of Agriculture.

Table 2: Key stakeholders on St. Kitts (Source: Williams (2013))

STAKEHOLDER GROUP	CAPACITY
St. Kitts	
Department of Physical Planning and Environment (DPPE)	Technical inputs on land degradation and coastal zone management, protected areas, administration systems and awareness building.
Ministry of Health and Social Services	Technical inputs on appropriate sewage systems and potable and nearshore water quality, administration systems and awareness building.
Water Services Department	Management of freshwater resources and water conservation.
Public Works Department	Technical inputs on engineering works including ghaut stabilisation techniques and sewage design.
Ministry of Legal Affairs	Technical inputs on legal and regulatory reforms and recipient of awareness building
Ministry of Finance	Technical inputs on incentive measures and financial resource procurement (investment planning), and awareness building.
Department of Economic Affairs and Public Sector Investment Planning (PSIP)	Undertakes economic and social analysis, appraise, monitor and evaluate public sector investment, undertake donor and aid coordination and provide sound advice to public and private sectors
Ministry/Department of Marine Resources	Technical inputs on marine resources, fisheries, administration systems, planning, awareness building and integrating marine evaluation into ecosystem conservation processes.
Ministry of Social and Community Development, Culture and Gender Affairs	Foster Linkages With NGOs, CBOs; and Community Services.
St. Kitts Tourism Authority	Awareness building.
Chamber of Industry and Commerce	Recipient of awareness building.
St. Christopher National Trust	Recipient of awareness building.
St. Kitts and Nevis Hotel Association	Recipient awareness building.

The **Ministry of Agriculture** administers land leases and rentals of other state-owned lands on behalf of Government. This is a significant mandate, as the Government owns 82% of the land, which incorporates the most suitable agricultural lands.

Saint Kitts and Nevis does not possess a Forestry Department. The Forestry Ordinance was traditionally administered by the Department of Agriculture, but since the enactment of NCEPA in the late 1980s various responsibilities were assumed by the Department of the Environment, which was merged with the Physical Planning Department in 2005 to form the DPPE.

Management of the wider environment in St. Kitts has been the responsibility of several government ministries and departments. However, efforts have been made to streamline this responsibility through the formation of the **Department of Physical Planning and Environment** (DPPE) within the **Ministry of Sustainable Development**. The DPPE needs strengthening in its human, technical and

financial capacity to undertake its stated policy mandates[6]. The Forward Planning Section of the DPPE is responsible for the design and conduct of surveys, policy review, preparation of development and environmental project proposals, review of environmental impact assessments (EIAs) and review of development applications. This section prepared the new National Physical Development Plan (2006). Development control activities are managed by the Development Control Section. The Environmental Planning Section within the DPPE is responsible for the administration of the National Conservation and Environmental Protection Act (NCEPA) and for the preparation of national project documents including country position papers and national communications as required by multilateral environmental agreements.

Watershed management is shared between several agencies on St. Kitts and Nevis. These include the: (a) Water Services Department (WSD); (b) Department of Physical Planning and Environment; and, (c) the Department of Agriculture. The principal instruments are the **Watercourses and Waterworks Ordinance** (Cap 185 of 1956) and the **Watercourses and Waterworks Regulations**. This Ordinance establishes legislative and regulatory powers for the WSD on both islands to, among other things, regulate the supply of water to consumers, prevent waste, misuse and pollution of water and control sanitation of watersheds. Under this legislation it is an offence to put any rubbish or offensive solid or liquid matter into a watercourse, or to pollute water flowing into or out of a watercourse. Public health inspectors are responsible for maintaining drinking water quality. The Watercourses and Waterworks Ordinance (1956) makes provision for the declaration of watersheds to protect waterworks and water sources.

The **Water Services Department** (WSD) is responsible for the identification, upkeep and protection of water supply sources on St. Kitts. Watershed management is critical to maintaining both surface and groundwater sources, but the WSD does not consider itself a watershed management institution and would prefer to leave that function to a competent institution. Notwithstanding the WSD, working in close collaboration with the DPPE, has spearheaded the implementation of the first phase of the IWCAM project which sought to rehabilitate the lower coastal section of the Basseterre. Additionally, the WSD for many years has been playing a lead role in the management of the Wingfield Watershed.

Williams (2013) flagged a very strong and urgent need to establish mechanisms to facilitate greater collaboration and cooperation between all land and ocean management institutions in SKN. There is also a need to establish adequate institutional capacity, including planning mechanisms and procedures to adequately address watershed-based land degradation control and coastal zone management issues, so as to ensure the orderly development and proper management of land and sea resources now and into the future.

NEVIS

Key stakeholders on Nevis are summarized in Table 4.

The Nevis **Department of Physical Planning, Natural Resources and the Environment** (DPPNRE) is the coordinating and regulatory body for all physical planning and environmental matters. As part of its mandate, the DPPNRE has developed the NPDP, Sustainable Development Indicators and Land Use Zoning classification for Nevis. The DPPNRE has developed a 15-year **Nevis Physical Development Plan** that aims to ensure the sustainability of the island's resources through the regulation of land-use.

[6] Williams (2013) *ibid*

The plan includes policies and guidelines for sustainable development and seeks to guide the location of housing, industry, parks/conservation areas, hotel and tourism development with regards to land suitability and other physical and environmental attributes. The Nevis Physical Development Plan is still awaiting adoption by the NIA Cabinet. The project will support the up-dating of the Nevis Physical Development Plan and support its adoption by NIA Cabinet.

Table 4: Key stakeholders (Nevis)

STAKEHOLDER GROUP	CAPACITY
Nevis	
Department of Physical Planning, Natural Resources and Environment (DPPNRE)	Technical inputs on land degradation and coastal zone management, protected areas, administration systems and awareness building.
Nevis Housing and Land Development Corporation	Technical inputs and possibility of replication in future developments.
Ministry of Health	Technical inputs on appropriate sewage systems and potable and nearshore water quality, administration systems and awareness building.
Water Services Department	Management of freshwater resources and water conservation.
Public Works Department	Technical inputs on engineering works including ghaut stabilisation techniques and sewage design.
Legal Department	Technical inputs on legal and regulatory reforms and recipient of awareness building
Ministry of Finance/Economic Planning	Technical inputs on incentive measures and financial resource procurement (investment planning), and awareness building
Ministry/Department of Fisheries	Technical inputs on marine resources, fisheries, administration systems, planning, awareness building and integrating marine evaluation into ecosystem conservation processes

On Nevis land management roles are performed by counterpart agencies under the Nevis Island Administration (NIA). A **Development Advisory Committee** (DAC) approves or advises on development projects in consultation with other relevant organizations. As in St. Kitts, the DAC requests the preparation of EIA reports, when necessary. A multi-sectoral **Environmental Review Committee** (ERC) assists in the review of EIA documents.

The following is the list of NGO and CBO stakeholders and anticipated roles in the project.

Table 5. Roles of lead local non-governmental and community-based organizations in support of the project.

St Kitts & Nevis	
St. Christopher National Trust	• Promote general environmental advocacy in support of the project through awareness raising
St. Kitts and Nevis Hotel and Tourism Association	• Raise awareness on the implications of poor land use practices for the hospitality sector • Encourage hospitality sector stakeholders to provide strong support to the implementation of mutually beneficial areas under the project
St. Kitts Farmers Cooperative Society	• Undertake capacity building activities with local farmers in improved land use practices • Advocate and support improved management of the resources of the target areas
Nevis Fishermen Marketing and Supply Cooperative Society Limited	• Advocate and support improved management of the resources of the target areas
St Kitts quarry operators	• Support and buy-in to improved mining practices in the target areas under the project

Socioeconomic stakeholder overview

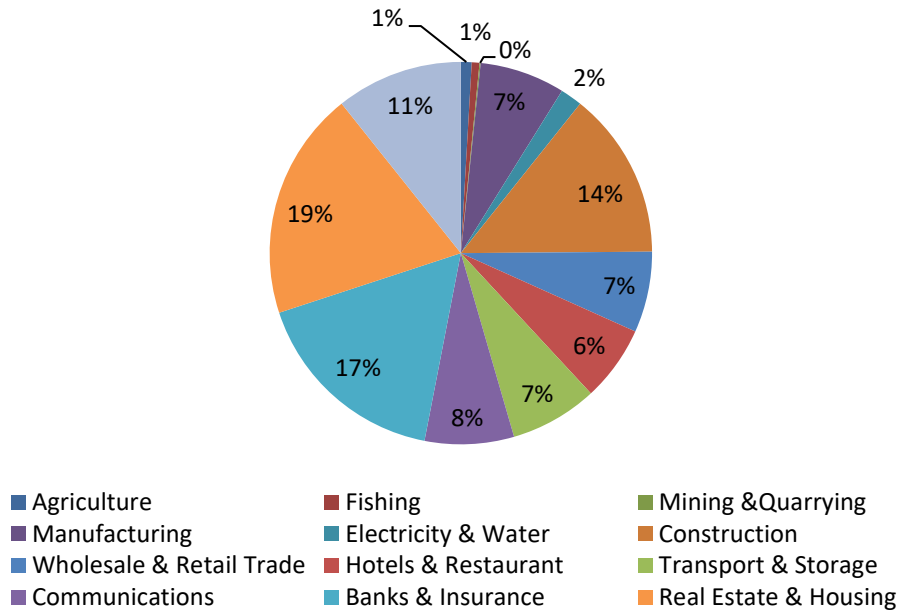
The Federation has a population of 46,398, with 34,983 (75.4%) of the population residing on St. Kitts and the remaining 11,415 (24.6%) on Nevis. Males make up 49.2% of the population, females 50.8%. The majority of the population resides in the main towns, Basseterre and Charlestown, respectively. There is a marked concentration of population in Basseterre city with 37% of the population. While St. Kitts' population has been shrinking, Nevis' population grew by 2.8% from 2001 to 2011. There is a trend for smaller but more numerous households on both islands, which is predicted to augment the demand for land and housing.

The Poverty Assessment Report (2001), cited by the UNCCD report[7], reported that 30.5% of the population in St. Kitts are poor (monthly expenditure is less than US$103.72 per and person). Eleven (11) percent were found to be extremely poor or indigent (US$65.90) per month. More than two-thirds of the poor (67.8%) are under 25 years of age; males made up 44% of the poor and women 56%. Twenty-nine percent of males were poor and 32% of women are poor. Similarly, in Nevis, 32% of the population are poor (monthly expenditure is less than US$121.63 per person). Twenty-six percent of males are poor and females account for 36 percent of the poor. Seventeen percent of all individual are extremely indigent (less than US$75.70). Fifty-eight percent of the poor are under the age of 25, with males making up 37% of the poor and females 63%. While Saint Kitts and Nevis has made considerable progress in human development, there is still a high incidence of poverty in both rural and urban areas, with the youth and women being disproportionally affected**.**

[7] Federation of St Kitts and Nevis (2007). National Action Programme for Combating Desertification and Land Degradation In the Context of the United Nations Convention To Combat Desertification. Department of Physical Planning and Environment. Basseterre, St. Kitts

Traditionally, the St. Kitts and Nevis' economy was dominated by sugar production, but has since diversified agricultural production, particularly fruit trees, and developed other economic sectors, such as tourism, financial services, construction and manufacturing (Figure 4). The Federation's tourism attractions are a mix of the typical sun-sea-sand vacation, diversified with nature hikes to the rainforests, shopping, deep-sea fishing, snorkeling and scuba around various dives sites at the dozens of unexplored wrecks around the islands.

Figure 4: GDP by Economic Activity at Basic Price
In Constant (2006) Prices (E.C. $ Million)



Effect of degraded habitats in St Kitts and Nevis on biodiversity of global significance

Mangroves are found principally on the margins of salt ponds in St. Kitts and Nevis. Typical species include black mangrove (*Avicennia germinans*), buttonwood (*Conocarpus erectus*), white mangrove (*Laguncularia racemosa*), and red mangrove (*Rhizophora mangle*). Mangroves protect and stabilize low-lying coastal lands and provide protection and food sources for coastal fishery food chains. Mangroves serve as feeding, breeding, and nursery grounds for a variety of fish, shellfish, birds, and other wildlife.

Nevis' coastal lagoons and ponds are of great importance to a number of waterbirds, seabird and shorebirds[8]. The leatherback turtle (*Dermochelys coriacea*), hawksbill turtle (*Eretmochelys imbricata*) - both CR - and the VU-rated green turtle (*Chelonia mydas*) (IUCN Red List 2004) all depend on relatively undisturbed sandy beaches for reproduction and are thus extremely threatened by sand mining on Nevis. The globally EN-rated Lesser Antillean green iguana (*Iguana delicatissima*), which depends on the same sandy beach habitats for nesting, is already regionally extirpated on St Kitts and Nevis, as a result of habitat destruction (IUCN Red List 2010).

Sand mining also has a ruinous effect on beach aesthetics, affecting one of the main tourism products of Nevis, and aggravates the above-mentioned sedimentation issues related to quarrying in marine ecosystems off Nevis. Sediments suspended in the water column turn the water turbid. This reduces the amount of sunlight entering the water, inhibiting plant growth, smoothing sensitive corals, and making it more difficult for predatory fish and birds to hunt. Suspended sediments in the water column also interfere with the uptake of oxygen by fish and invertebrates[9].

Though quarry operations are located on the east and south coast of the island, prevailing coastal currents take silt from the quarries around to marine ecosystems on the west coast. This has seriously affected the health of marine ecosystems, resulting in most of the reefs being dead and covered by silt and algal growth. Most of the surviving corals are boulder or encrusting corals (brain, mustard, star etc.). Most of the branching corals (elkhorn and staghorn etc.) are dead, mainly as a result of heavy silt loading5. In fact, the staghorn (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*) are both globally CR, with antropogenic habitat modifications and climate change being major contributing factors (IUCN Red List 2008). The VU-rated pillar coral (*Dendrogyra cylindrus*) is predominantly found on flat or gently sloping reefs, but this species, together with *A. palmata*, is resistant to heavy wave action (IUCN Red List 2008) and these globally threatened corals thus plays an important role in maintenance of healthy reefs that protect coastal zones against storm surges. They also provide habitat to a host of VU-, EN-, and CR-rated marine creatures whose range includes the waters around St Kitts and Nevis.

Effect of degraded habitats in St Kitts and Nevis on surface and groundwater resources,

St Kitts

The above-mentioned stressors - urbanization on St Kitts and quarrying and sand mining on Nevis - with the concomitant deforestation and forest degradation is leading to a reduction in of carbon stored in forest ecosystems, carbon sequestration and negatively impacts hydrological parameters. Surface water runoff following heavy rainfall has led to bank failure, progressive erosion and flooding. Solid waste within the ghaut results in blockages, contamination and water quality problems. Increased sediments in the nearshore waters affect the livelihoods of those who depend directly on these resources, especially people defined as poor. Thus, water quality: and quantity were identified as national priorities for land use planning and resource management by the preceding IWCAM project

Status of forest resources in St Kitts and Nevis – opportunities for restoration

[8] Collier, N. & Brown, A. (2009) St Kitts and Nevis. Pp 329 – 332 in C. Devenish, D. F. Díaz Fernández, R. P. Clay, I. Davidson & I. Yépez Zabala Eds. *Important Bird Areas Americas - Priority sites for biodiversity conservation.* Quito, Ecuador: BirdLife International (BirdLife Conservation Series No. 16).

[9] Williams (2013) *ibid*

Forests include lands with at least 25% tree or tree plus shrub cover. Compared with other Caribbean islands, Saint Kitts and Nevis have a relatively low forest cover, which, until recently, was largely restricted to the steep central mountains. Furthermore, primary forest no longer exists; secondary forests in the Federation are highly disturbed by human activity, particularly in lowland areas. Table 4 quantifies land cover and forest formations of St. Kitts and Nevis. Thanks to the Forest Ordinance of 1904, which provides protection for forests above 1000 feet, good secondary growth renders the Federation one of the few Caribbean countries with currently increasing forest cover, after centuries of agriculture-driven deforestation. Up to now, drier forest formations at low to mid altitudes (below 1000 feet) and mangroves are not nearly as well protected as evergreen formation at high altitudes and, given the fact that most development takes place at low altitudes too, were flagged as potential priority for good forest management practices, biodiversity conservation and enhanced institutional capacity[10].

Table 6 Land cover and forest formations (ha) for St. Kitts and Nevis (Source: Helmer et al. 2008)

Land-cover or forest formation (ha)	St. Kitts	Nevis
Urban or built-up land		
High-Medium Density Urban or Built-up Land	728	141
Low Density Built-up Land (Rural or Residential)	444	528
Herbaceous agriculture		
Sugar cane	4,548	0
Minor crops (including sugar cane in Grenada)	0	24
Mixed and Woody agriculture		
Nutmeg and Mixed Woody Agriculture	0	0
Coconut Palm and Mixed Woody Agriculture (incl. cacao, banana, etc.)	0	0
Coconut Palm-Pasture	9.3	14
Pasture and rangeland		
Pasture, Hay or Inactive Agriculture (e.g. abandoned sugar cane)	0	0
Pasture, Hay or other Grassy Areas	2,634	2,724
Golf course	56	49
Drought Deciduous Woodland	644	981
Lower Montane, Non-Forest Vegetation (e.g. *Miconia* thicket)	103	12
Steep Non-Forest Vegetation	77	2.8
Drought Deciduous and Semi-Deciduous Forest, Lowland or Submontane		
Deciduous, Evergreen Coastal and Mixed Forest or Shrubland, with or without Succulents, on Limestone or other substrates1	753	210
Drought Deciduous Forest/Shrub	72	325
Semi-Deciduous and Drought Deciduous Forest on Limestone (includes Semi-Evergreen Forest)	0	0
Semi-Deciduous Forest (includes Semi-Evergreen Forest)	1,155	1,935
Seasonal Evergreen and Evergreen Forest, Lowland or Submontane		
Evergreen Forest with Coconut Palm	24	158
Seasonal Evergreen Forest	1,453	1,031
Evergreen Forest (includes some Sierra Palm forest)	2,726	755
Evergreen Forest, Submontane or Lower Montane		
Sierra Palm, Transitional and Tall Cloud Forest	575	110
Elfin and Sierra Palm Cloud Forest	194	45

[10] Helmer, E. H., T. A. Kennaway, D. H. Pedreros, M. L. Clark, H. Marcano-Vega, L. L. Tieszen, T. R. Ruzycki, S. Schill, and C. M. S. Carrington. 2008. Land cover and forest formation distributions for St. Kitts, Nevis, St. Eustatius, Grenada and Barbados from decision tree classification of cloud-cleared satellite imagery. *Caribbean Journal of Science* 44(2):175-198

Land-cover or forest formation (ha)	St. Kitts	Nevis
Wetlands		
Mangrove	13	0.8
Seasonally Flooded Savannahs and Woodland	0	5.4
Emergent Wetland	1.2	0.8
No vegetation		
Quarries	15	13
Coastal Sand, Rock and Bare Soil	107	104
Bare Soil (including bulldozed land)	104	134
Water - Permanent	260	7.0
Cloud-covered areas in final map	0	0
Total	**16,695**	**9,311**

From 1945 to 2000 cumulative forest types increased by 50% on St Kitts and by 134% on Nevis. However, bare lands have also increased (both at the expense of cultivated lands) and the proportional increases in drier forest formations (drought deciduous, mixed and semi-deciduous forests or shrublands) at lower elevations were larger than those in evergreen formations10. Of 15 vegetation types that are regarded rare or uncommon, three are endangered and represent conservation priorities[11]:

- *Acrostichium aureum* (golden leather fern) seasonally flooded tropical or subtropical grassland is associated with estuarine mangrove systems with little to no shrub or tree cover. It becomes flooded during rainy season or after heavy downpours. This vegetation association is limited to the west coast of Nevis, north of Charlestown, and is not found on St Kitts.
- *Coccoloba uvifera-Thevetia peruviana* Association and
- *Hippomane mancinella-Cordia obliqua* Association. Both of these associations are windswept and exposed to constant salt spray from the Atlantic Ocean in lowland tropical or sub-tropical broad-leaved evergreen sclerophyllous forest. They are threatened by coastal development and on both islands.

St Kitts and Nevis' terrestrial flora and fauna includes numerous Lesser Antillean endemics, but no confirmed national endemic or EN- or CR- listed species, except those that are regarded extirpated from St Kitts and Nevis. The geckos *Sphaerodactylus sabanus* and *S. sputator*, as well as two subspecies of the anole (*Anolis bimaculatus bimaculatus* and *A. wattsi schwartzi*) are endemic to St. Kitts-Nevis, and the Dutch northern neighbour, St. Eustatius. Two native forest trees worth mentioning are:

- Spanish cedar (*Cedrela odorata*). Although widespread throughout the Americas, Large individuals have become scarce and the species is rated VU (IUCN, 1998). One of the world's most important timber species, it occurs in humid or dry lowland forest, preferring well-drained soils.
- Small-leaved Mahogany (*Swietenia mahagoni*) is a highly appreciated but overexploited timber tree (VU). The species is also listed on CITES Appendix II of CITES for saw-logs, sawn wood and veneer sheets. Both these timber species have potential for reforestation.

It is also worth mentioning that the landscape of St. Kitts is characterized by a range of fruit trees found in the foothills of mountains, along ghauts and the sides of mountain paths. Traditionally St. Kitts is not a commercial fruit-tree producing country and locally fruits have been consumed seasonally.

[11] Horwith, D. and Lindsay, K (1999). A Biodiversity Profile of St Kitts and Nevis. Island Resource Foundation, Eastern Caribbean Biodiversity Programme.

Recently, there is an increasing and more continuous demand for fresh tropical fruit for the hospitality sector and also from more health-conscious residents. This may represent an opportunity for agroforestry or tree crop production as a revenue-generating activity that counteract land degradation. For example, a 13 hectare orchard in Wingfield Mountain is the main production site for mango, citrus and avocados[12]. Wingfield is also the primary catchment system that serves the capital, Basseterre.

Water resources management in St Kitts and Nevis

On St. Kitts there are seven main watersheds. The two most significant ones are the Wingfield and the Basseterre watersheds. The Wingfield watershed has historically been the main source or surface water for the island and the capital Basseterre in particular. This watershed is also widely used for eco-tourism and agriculture (both tree-crop and animals). The catchment is in a semi-developed national park, and the potential for pollution is very high due to the lack of control of visitors[12,16].

The Basseterre Valley lies adjacent to the capital city of Saint Kitts, Basseterre. The underground aquifer lies immediately below this valley and is a major source of potable ground water to the city. The Basseterre Watershed has two main drainage channels, both of which provide potable water (College Street Ghaut and Westbourne Ghaut). This watershed however, is most significant for the underlying aquifer, which is estimated to have a safe-yield of 2.5 million gallons per day (mgd), and currently provides approximately 2 mgd[13]. Potential threats to this water source include use of pesticides and fertilizers for agricultural practices in the Valley; onsite wastewater disposal associated with commercial, industrial and housing programmes; storm water runoff along major roads traversing the aquifer with the potential for increased loadings of nitrates and phosphates; and possible over-extraction from this water source due to increased demands for potable water in the surrounding areas[14].

The supply and distribution of potable water is the responsibility of the GOSKN through its *Water Services Department* (WSD). Until 1970, most of the water needs were met by surface water from spring water. As the population grew, ground water became the primary source of water supply. The principal ingredient into the water distribution system in St. Kitts is rainfall, which is either impounded in reservoirs directly through surface catchments or is extracted from the ground water reserve through drilling. It is estimated that about 20% of the rainfall becomes ground water flow or a ground water recharge, accounting for approximately 6 million gallons per day. Average annual yields for surface water are 3.6 million m^3 and 20 million m^3 for ground water. Over 90% of the population in St. Kitts is served through house connections while the remaining 10% is located within acceptable distances from stand-pipes (400 m) [12, 15.]

[12] Federation of St Kitts and Nevis (2007). National Action Programme for Combating Desertification and Land Degradation In the Context of the United Nations Convention To Combat Desertification. Department of Physical Planning and Environment. Basseterre, St. Kitts

[13] Williams, C. (2010?) State of water resources of St Kitts and Nevis [source? confirm year? &&]

[14] Clauzel, S. (2007) Rehabilitation and Management of the Basseterre Valley as a Protection Measure for the Underlying Aquifer. Capture and demonstration of good practice and lessons learned from the case study of the GEF-IWCAM Saint Kitts & Nevis demonstration project. Integrating Watershed and Coastal Areas Management (GEF-IWCAM) Project.

[15] Williams (2013) *ibid*

Water distribution infrastructure in both St. Kitts and Nevis is excellent with both islands having 100% coverage of the population13. Water availability on St Kitts and Nevis is seasonal. On St. Kitts there are some 22 water storage tanks, totaling about 7 million gallons[13]. Surface water supplies are variable and insufficient to meet the water supply demands. Neither St. Kitts nor Nevis have any natural reservoirs; desalination plants are used only to irrigate golf courses12. As a result of groundwater becoming increasingly important, sewerage treatment is growing in relevance too.

Sewage disposal is the responsibility of the Public Health Department. Presently, sewage from private households is disposed either via septic tanks and soak-aways, by the vast majority of domestic and other premises (55.8%) or pit latrines, used by 39.0% of private households. Grey waters tend to be left untreated. In fact, the NAP for the UNCCD[12] states that all urban areas on the island of St. Kitts lack adequate treatment facilities for domestic sewage and waste water and that the oceans are receiving effluents from a variety of land based sources of pollution, delivered to the coastal waters via streams and underground seepage. The report explicitly points out that these problems have potentially injurious environmental implications both for the public health and the natural environment.

Extreme rainfall associated with hurricanes and violent thunderstorms is the main cause of flooding in St. Kitts and Nevis. Four main properties of the islands that increase flooding are the following[16]:

- Soils are highly erodible. The soil is washed away by runoff and deposited in the ghauts/ghuts. Road crossings at bridges and culverts often become blocked, which increases flooding.
- The watersheds are very steep which cause rapid flow of water.
- The foothills (especially in St. Kitts) are being urbanized.
- Livestock grazing on Nevis compacts soils and reduces infiltration rates.

Several areas near Basseterre have the highest potential for flooding due to continues severe deforestation in that area. The flood-prone area comprises the major commercial center and College Street Ghaut. On Nevis, the Newcastle Airport is located within a high flood hazard zone (Figure 5).

[16] US Army Corps Engineers (2004) Water Resources Assessment of Dominica, Antigua, Barbuda, St. Kitts And Nevis. Mobile District & Topographic Engineering Center

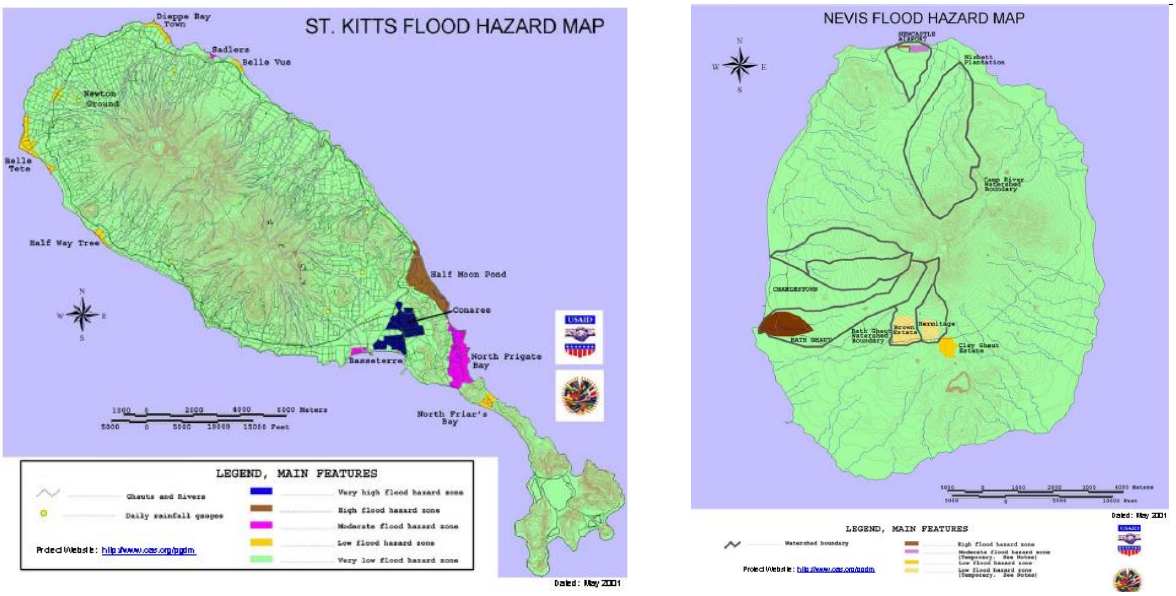


Figure 5: Flood hazard map for St Kitts (left) and Nevis (right).
Source: US Army Corps Engineers (2004).

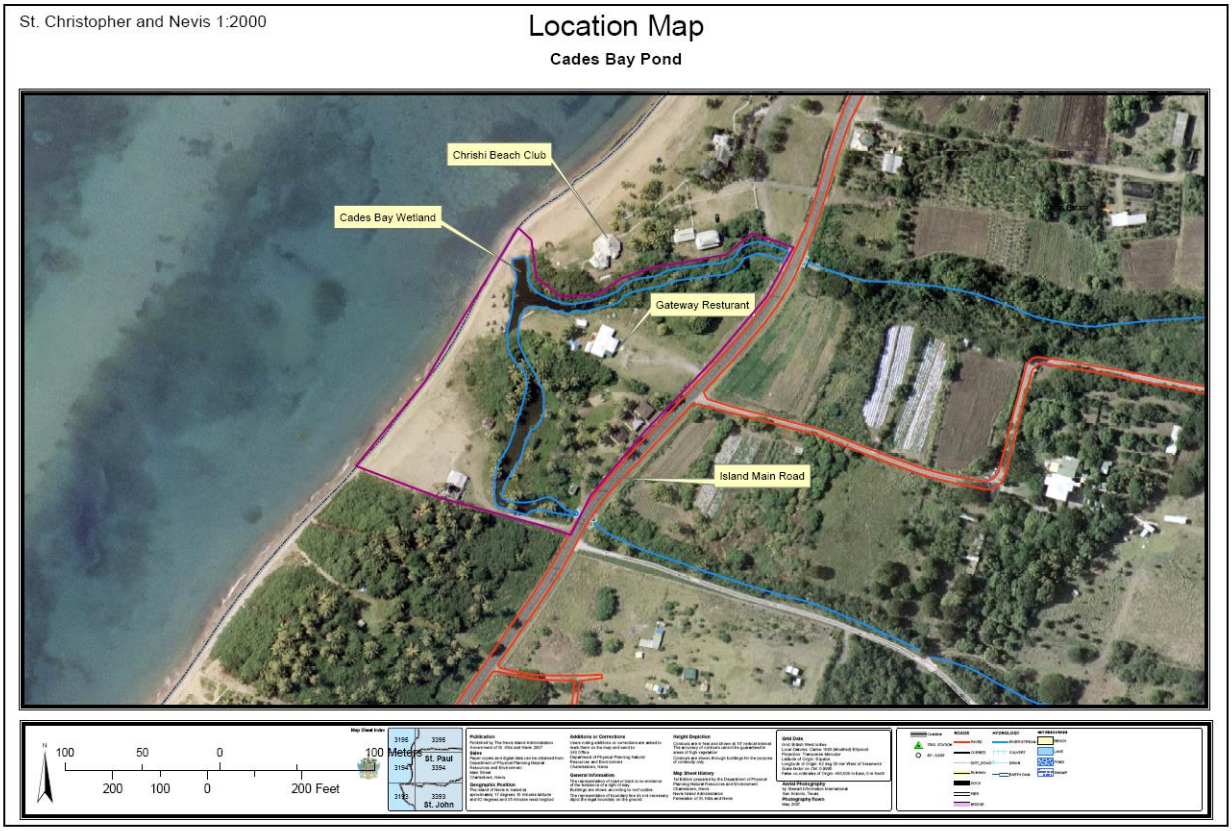


Figure 6. Cades Bay Showing the Mangrove system

2.2 Overall Objective and Outcomes

2.2.1 Objective: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites and sand-mined beaches on Nevis, by an integrated water, land and ecosystems management approach.

2.2.2. The expected outcomes are:

National component C1.1 Outcome Measurable stress reduction achieved in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.

National component C1.2 Outcome Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning

National Component C2.1 Outcome: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.

National Component C3.1 Outcome: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.

National Component C3.2 Outcome: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.

National Component 4.1 Outcome: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks

2.3 Consistency with National and International Efforts

As outlined in the main project document, the GEF strategies for LD, BD and IW are consistent with the Federation's efforts as signatory of relevant multilateral environmental agreements (MEAs). The indicators selector to assess progress of IWECO project interventions also aim to support Saint Kitts and Nevis in their monitoring and evaluation of progress and reporting to these conventions.

Project interventions are consistent with the GEF-5 **Sustainable Forest management/REDD-Plus Strategy** with a view to multiple environmental benefits, such as conservation, sustainable management of forests and enhancement of forest carbon stocks, as well as strengthening the national spatial planning framework under Components 1 & 3. The project will support the sustainable land management interventions articulated under the **UN Convention to Combat Desertification and Land Degradation (UNCCD)** National Plan of Action (NAP), which Saint Kitts and Nevis completed in 2007. Top priorities of the NAP are a reduction in current and potential land degradation as well as protection and conservation of threatened biodiversity resources.

The NBSAP's expressed vision is improved efficiencies and effectiveness of land use planning on St. Kitts and Nevis with people-led development planning strategies and actions that take watershed and coastal protection into consideration. The NBSAP seeks to harmoniously link economic development goals and strategies with those of environmental protection and conservation, and hazard mitigation in order to ensure that utilization of natural resources and the environment today does not damage prospects for their use by the present and future generations. Among the first priorities to be

addressed is land degradation, which is to be halted and reversed by awareness-raising and local capacity-building in addition to interventions on the ground. Pivotal for success is the integrative approach proposed in this project, as stated in the NAP[17] "*SLM in St. Kitts and Nevis can best be achieved through business, civil society and Government working together in partnerships to address and identify common aims. Whilst there is a recognition that Government will lead in SLM it has neither the assets nor attributes to deliver on its own. Future SLM activities in St. Kitts and Nevis requires strong and effective links and cooperation between Government, the private sector and civil society*."

St. Kitts and Nevis are members of the **Caribbean Disaster Emergency Response Agency (CDERA).** CDERA was established in September 1991 by the Agreement of the Conference of Heads of Government of the Caribbean Community (CARICOM) to be responsible for disaster management. Each member is required to maintain a National Disaster Organization or a national relief organization capable of assisting other members in case of a hurricane, flood, landslide, earthquake, volcano, tsunami, technological and man-made disasters. This role is fulfilled by the National Emergency Management Agency (NEMA), based in Basseterre, St Kitts, and the Nevis Disaster Management Department in Long Point, Nevis.

Saint Kitts and Nevis has developed its **National Biodiversity Strategies and Action Plans (NBSAP)** in 2004, which is now pending revision, but has not submitted any National Report to the **UN Convention on Biological Diversity (CBD).** Key areas highlighted in the NBSAP as needing attention to create the foundation for NBSAP implementation are:

- Effective legal instruments and their enforcement
- Financing
- Regional and international cooperation
- Organizational development and capacity-building
- Public awareness

The **Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (Cartagena Convention)** is a comprehensive umbrella agreement for the protection and development of the marine environment in the WCR and provides the legal framework for cooperative regional and national actions. It entered into force in 1986 and provides the basis for the legal implementation of the **Action Plan for the Caribbean Environment Programme.** St Kitts and Nevis is a signatory to the Cartagena Convention and both relevant protocols, the **Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (SPAW Protocol)** and the **Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol)**. The objective of the SPAW Protocol is to protect rare and fragile ecosystems and habitats, thereby protecting the endangered and threatened species residing therein. The LBS Protocol of 2010 is a regional mechanism assisting the United Nations member states in the Wider Caribbean Region to meet the goals and obligations of two international agreements: The **United Nations Convention on the Law of the Sea (UNCLOS)** and the **Global Plan of Action for the Protection of the Marine Environment from Land-Based Activities (GPA)**. UNCLOS calls upon States to adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources. The GPA highlights the need for action to reduce the pollutant load to the seas from land-based sources and activities. Both of these instruments emphasize the need to act at the regional level to address this problem.

[17] Federation of St Kitts and Nevis (2007). *ibid*

The **Reducing Risks to Human and Natural Assets Resulting from Climate Change** (RRACC) project is funded by the United States Agency for International Development (USAID) with a total budget of US$2.5 million. Under the RRACC, St. Kitts has proposed a water audit and conservation project. The main objectives of the project are: (1) capacity building and training of a cadre of persons in water auditing including implementation of water conservation practices; (2) pilot water audit projects targeting the tourism and agricultural sectors; and, (3) demonstration of water conservation technologies such as rainwater harvesting for irrigation of schoolyard and backyard gardens and installation of water saving devices in hotels. The water audit is estimated to cost US$110,000.00. Under the RRACC, Nevis has proposed a drainage system demonstration project. The project has the following objectives: (a) to develop a drainage master plan; and, (b) to develop and implement a hydrological data collection and monitoring system for the Charlestown area. Thus, the RRACC will contribute to the reduction of sediments to the marine environment and, by extension, assist in the protection of nearshore reef and seagrass bed ecosystems[18]1.

The **Global Climate Change Alliance** (GCCA) is an initiative of the European Union (EU) to strengthen dialogue and cooperation on climate change with developing countries most vulnerable to climate change. The overall objective is to support sustainable development in the Caribbean region and preserve the progress of the countries towards achieving the Millennium Development Goals (MDGs). The support to the GCCA Project is being implemented by the Caribbean Community Climate Change Centre (CCCCC) over a period of 42 months in 16 Caribbean Forum (CARIFORUM) countries. This initiative has a total budget of €8 million Euros (roughly US$10 million or EC$27million). The Support to the GCCA Project has been endorsed by the MoSD and the letter has been sent to GCCA for further action. The Senior Environmental Officer/Climate Change Focal Point will be following up on this project1.

The **Caribbean Large Marine Environment** (CLME) Project assists participating countries from the wider Caribbean Region to improve the management of their shared Living Marine Resources – most of which are considered to be fully or overexploited—through an Ecosystem-Based Management (EBM) approach. A preliminary Transboundary Diagnostic Analysis (TDA) identified three priority transboundary problems that affect the Caribbean Large Marine Ecosystem (CLME) and Adjacent Regions: (1) Unsustainable exploitation of fish and other living marine resources, (2) Habitat degradation and community modification and (3) Pollution. The Global Environment Facility (GEF) provides the funding for the CLME project along with co-financing from countries and other international partners with a total budget of US$7.01 million[18]1.

The five components of the **Adaptation Activities to Increase Resilience and Reduce Vulnerability to Climate Change Impacts in the Eastern Caribbean Fisheries Sector** (ARCCIF) project respond to the expressed needs of the countries targeted namely: Trinidad and Tobago, Barbados, Grenada, St Vincent and the Grenadines, St Lucia, Dominica, Antigua and Barbuda and St. Kitts and Nevis. The project involves a number of win-win adaptation strategies that include; (1) the development and introduction of practical adaptive fisheries management tools, (2) strengthening the capacity of fisherfolk organizations and their access to critical safety equipment such as VHF and GPS, (3) the development of innovative information communication technologies (ICTs) for information sharing between fishers, scientists and policy-makers, (4) pilot and demonstrations activities, (5) knowledge networks and (6) policy adjustments[18]1.

[18] William (2013) *ibid*

In Nevis, the Department of Physical Planning, in collaboration with the Nevis Disaster Management Department and HOPE Nevis Inc., was successful in securing a US$50,000.00 OAS funded project entitled, "Building Resilience to Natural Hazards one Community at a time". The goals of the project are to enhance disaster risk management in communities on Nevis and to improve the communication strategy in community disaster risk management. The project aims to equip local persons with the knowledge and technical skills to prepare, respond to and minimize the fallouts from natural and human induced hazards by dissemination of multi-media material to aid awareness of the danger posed to the environment, biodiversity and livelihoods as a result of illegal dumping of refuse and sand mining[19.]

The St. George's Declaration of Principles for Environmental Sustainability in the OECS of 2006 aims to foster equitable and sustainable improvement in the quality of life in the OECS region. In order to work towards this agrees communal goal, each member state agreed to work individually and jointly to:

- build the capacity of Member States and regional institutions to guide and support processes of sustainable development;
- incorporate the objectives, perspectives, resources, knowledge and talents of all of society in environmental management;
- achieve the long-term protection and sustained productivity of the region's natural resource base and of the ecosystem services it provides;
- ensure that natural resources contribute optimally and equitably to economic, social and cultural development.

The **Barbados Programme of Action (BPOA) on the Sustainable Development of SIDS** of 1994 recognizes that land and ecosystem degradation and the loss of critical goods and services such as biodiversity habitats and watersheds, are among the major long-term management issues in these countries due to a combination of factors including deforestation, urbanization, unsuitable farming practices and inappropriate land use policies[20]

Saint Kitts and Nevis is participating in a number of complementary regional and global projects, which have committed co-finance towards the IWECO FSP:

- **Enhancing the adaptive capacity of rural economies and natural resources to climate change in selected Caribbean small island and low lying coastal developing states:** This GIZ-funded and CARICOM/CEHI-led project on the management and protection of land based natural resources and agricultural production systems addresses some of the main threats and challenges posed by climate change to the marine and coastal resources through capacity-building that will be coordinated to complement the IWECO objective. This four-year project started in mid 2013.
- The **Critical Ecosystem Partnership Fund (CEPF) in the Caribbean Islands Biodiversity Hotspots** is a US$6.9 million grant, managed by the Caribbean Natural Resources Institute (CANARI), to support civil society in developing and implementing conservation strategies and raising public awareness on the implications of loss of biodiversity. Given the implementation period of 2010 to 1015, the IWECO proposal was coordinated with CANARI for optimal complementarity.

[19] William (2013) *ibid*
[20] Federation of St Kitts and Nevis (2007). *ibid*

- The **Caribbean Challenge**, launched in 208 and led by the Nature Conservancy (TNC), aims to protect the health of Caribbean lands and waters and pilots a model of sustainable, multi-country funding that could help solve the problem of unfunded, ineffective national parks in the Caribbean.

2.4 Activities, Outputs

The **overall goal** of the sub-project in Saint Kitts and Nevis is to reduce and revert land degradation within the College Street Ghaut watershed (Saint Kitts), and quarry sites and sand-mining-hotspots (Nevis), by an integrated water, land and ecosystems management approach. This will be achieved by an integrated approach with four synergistic components that include (1) investment in innovative on-the-ground solutions, (2) strengthened monitoring and indicators frameworks, (3) strengthened policy, legislative and institutional capacity, and (4) knowledge management at local, national, regional and global level, as further outlined below. Please see annex 3.2 for the complete sub-project logframe; a brief summary is given below.

Component 1: Develop and foster the implementation of targeted innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the College Street Ghaut watershed and quarry sites on Nevis.

Activities

- Conduct (rapid) water and land-related diagnostic analysis for the College Street Ghaut watershed, Saint Kitts, as well as quarry sites and sand-mined beaches on Nevis, as well as a community needs assessment (with gender audits) on both islands and feed information and management needs into development of national watershed management plan.
- Stabilization of College Street Ghaut by planting contour hedges (vetiver) along upper bank; maintaining existing retaining walls and bridges; clearing culverts, drains, outfalls and roads of debris and sediment, and install new and maintain existing gabion baskets along College Street Ghaut
- Conduct geotechnical survey to determine stability and sustainability/thresholds of operations
- Construct retention pond at Shadwell Estate and establish on-site treatment of grey water on private and commercial properties in GBA
- Stabilize ghauts and water harvesting systems to reduce quarry run-off into ocean on Nevis
- Develop and implement restoration and reforestation plan for abandoned areas within operational quarries
- Replant mangroves and other coastal plant species and restore coastal wetlands on Nevis based on a preceding survey of state of mangroves and coastal wetlands
- Restore beach at Indian Castle and deploy artificial reefs at New River, Indian Castle, Dogwood and Long Haul, Nevis, based on a preceding coral reefs survey
- Conduct feasibility study for sand extraction in Nevis and cost-benefit and feasibility study for sustainable sand extraction for St Kitts and raise public awareness on the effect on sand mining on beaches as well as on alternative construction materials.

- Raise public awareness on the effect of littering and illegal disposal of waste in ghauts and nearby water bodies.

The GEF Small Grants Programme (GEF-SGP) will support the development and implementation of smaller-scale investments associated with the main project to enhance economic livelihood opportunities. These will be defined during project inception and negotiated over the early stages of project implementation.

Outputs

- Banks of College Street Ghaut stabilized
- On-site treatment of grey water on private and commercial properties in greater Basseterre area
- Retention pond constructed at Bayfords Estate
- Restoration and reforestation plan for abandoned quarry at Hick Estate developed and implemented and economic analysis and management plans for wetlands at Cades Bay and Bath Bog
- Beach restored at Indian Castle and artificial reefs deployed at New River, Indian Castle, Dogwood and Long Haul.
- Feasibility of sand mining in Nevis and Cost-benefit and for sustainable sand extraction for St Kitts
- Plumbers/building contractors, septic service providers, home-owners and business people on St Kitts aware of importance of grey water treatment
- Access to safe drinking and ambient water for women and men as well as disadvantaged groups, such as the poor in settlements with substandard hygienic infrastructure
- Public aware of activities contributing to littering and measures to reduce unsightly garbage dumps and waste in the marine environment.

PROPOSED CHANGE

	Activity	Proposed Change
1	Conduct (rapid) water and land-related diagnostic analysis for the College Street Ghaut watershed, Saint Kitts, as well as quarry sites and sand-mined beaches on Nevis, as well as a community needs assessment (with gender audits) on both islands and feed information and management needs into development of national watershed management plan.	No changes proposed. However, given the fact that a Watershed Catchment study is being proposed under the CDB financed Investment Plan for Climate Resilient Water Supply Services it may be in the interest of both projects to explore opportunities for combining resources and making a submission to the GCF. In cooperation with Ministry of SD prepare a preliminary application utilising the GCF Project Preparation Facility (PPF) to undertake a water catchment study as detailed in the Investment Plan. Consistent with Priority areas for adaptation – 6; and Activity 3 of Cross-cutting issues.
2	Stabilization of College Street Ghaut by planting contour hedges (vetiver) along upper bank; maintaining existing retaining walls and bridges; clearing culverts, drains, outfalls and roads of debris and sediment, and install new and maintain existing gabion baskets along College Street Ghaut	No significant changes proposed other than to arrange for a cleaning out of the Ghaut, including the existing check-damn(s).

	Activity	Proposed Change	
3	Conduct geotechnical survey to determine stability and sustainability/thresholds of operations	An alternative site at Bayford's Estate (west of Ogee's village) has been identified for the Retention Pond. That site will require detailed geotechnical studies, leaving little, if any funds for construction. However, given the proposed site is higher up the College St. Ghaut, there is a strong possibility that the water retained could be channeled (piped) to the Basseterre to artificially recharge the aquifer or used for agricultural purposes.	Use currently allocated funds to undertake the geotechnical studies and prepare proposal, utilising the GCF Project Preparation Facility (PPF). Specifically, one may consider Investment Package #3 "Climate Resilient Water Supply" and specifically CRW3 – Feasibility and development of alternative water sources for agricultural use of the Investment Plan for Climate Resilient Water Supply Services
4	Construct retention pond at Shadwell Estate and establish on-site treatment of grey water on private and commercial properties in GBA		
5	Develop and implement restoration and reforestation plan for abandoned areas within operational quarries	Only one (Hick Estate) of the 7 quarries is available for rehabilitation. Regarding this quarry, 4 Acres is in government of (Nevis Housing and Land Development Corporation) ownership and 8 in private ownership. Also, much of the land has been sold for housing development. Physical Plan has no intention of renewing the lease on the quarry, making it available for the intended project purposes.	Awaiting correspondence confirming that the lease will not be renewed.
6	Replant mangroves and other coastal plant species and restore coastal wetlands on Nevis based on a preceding survey of state of mangroves and coastal wetlands	Feasibility studies are proposed for wetlands at Cades Bay and Bath Bog in the absence of available quarry lands for rehabilitation as noted above.	The management plan will include a cost-benefit analysis detailing the economic benefits of wetland system to the Nevis economy following which replanting will be undertaken as determined from the studies.
7	Restore beach at Indian Castle and deploy artificial reefs at New River, Indian Castle, Dogwood and Long Haul, Nevis, based on a preceding coral reefs survey	No changes proposed	Will be done in conjunction with the SGP. The SGP National Coordinator has commenced discussions with Fishermen in the area to assist with the implementation of some of these activities.
8	Conduct cost-benefit and feasibility study for sustainable sand extraction for St Kitts and Nevis and raise public awareness on the effect on sand mining on beaches as well as on alternative construction materials.	The Government of Nevis has made it clear in legal document that sand mining is illegal. In future, any individual wishing to engage in such activity must seek permission from the Minister responsible to obtain such material.	It proposed instead that a proper management plan for mining will be sufficient.
9	Raise public awareness on the effect of littering and illegal disposal of waste in ghauts and nearby water bodies.	No change	Undertaken in cooperation with PCI Media and in SKN work closely with Solid Waste Management Authority and Sanitation Department in crafting an awareness programme, strategy and action plan.
10	Conduct a feasibility study of a municipal waste water treatment system for the St. Peter's area.	Not initially part of the project but given the growing concern WRT the urban growth in the St. Peters area and the absence of a centralised waste water treatment system, there is growing concern that given the nature of the soil, it is only a matter of time before evidence of pollution of the Basseterre aquifer is revealed.	Will explore with SD the possibility of obtaining PPF for this initiative. If part of the intention is to protect and preserve the integrity of the water supply (Basseterre aquifer) there is reason to believe that it can be of interest to the GCF. Consistent with Priority areas for adaptation – 6; and Activity 3 of Cross-cutting issues.

Outcomes

- ***Measurable stress reduction achieved in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.***
- ***Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning***

Component 2: Strengthen Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystems Monitoring and Indicators frameworks in Saint Kitts and Nevis

Activities

- Identify and monitor suite of GEF LD, IW, SFM and BD tracking tool indicators, including carbon accounting, to assist objective assessment of impacts at the College Street Ghaut and quarry sites on Nevis and
- Develop monitoring protocol for periodic assessment of environmental indicators (ground and surface water quality in particular) at College Street Ghaut and quarry sites on Nevis intervention sites with participatory engagement of stakeholders
- Develop and implement beach analyses and regular monitoring (profiles, water quality, sediment analysis)
- Strengthening and mainstreaming of indicators in national accounts
- Development of and/or strengthening of existing decision-making tools

Outputs

- Adoption into national accounts of IW and LD, and BD-related indicators of process, stress reduction, and environmental and socioeconomic status to monitor improvements in the management of land and water resources and wastewater
- A monitoring protocol for periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders

PROPOSED CHANGE

	Activity	Proposed Change	Status/Recommendation
1	Identify and monitor suite of GEF LD, IW, SFM and BD tracking tool indicators, including carbon accounting, to assist objective assessment of impacts at the College Street Ghaut and quarry sites on Nevis	Expanded to include testing of pollutants/ contaminants that are not currently being undertaken.	Existing water and soil quality testing parameters should be expanded to include testing of pollutants/contaminants that are not currently being checked.
2	Develop monitoring protocol for periodic assessment of environmental indicators (ground and surface water quality in particular) at College Street Ghaut and quarry sites on Nevis intervention sites with participatory engagement of stakeholders	No changes proposed. Sanitation	
3	Develop and implement beach analyses and regular monitoring (profiles, water quality, sediment analysis)	No changes proposed. Sanitation Department has commenced monitoring of water quality in popular bathing areas.	

		However, limited testing facilities severely delays the acquisition of results.	Regional component could explore further assistance with monitoring programme
4	Strengthening and mainstreaming of indicators in national accounts	No changes proposed	
5	Development of and/or strengthening of existing decision-making tools	No changes proposed	

Outcome

- ***Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.***

Component 3: Strengthen policy, legislative and institutional reforms and capacity building to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystem services management taking into consideration climate change resilience building in Saint Kitts and Nevis.

Activities

- Review of national water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation
- Draft new and/or revise existing legislations, policies and regulations on water supply and sanitation based on the IWRM Roadmaps (and IWRM/WUE strategies where they may exist), National Plans of Action for SLM and ecosystem conservation in St Kitts and Nevis. Support revision of water/wastewater and land use management policy, legislation and institutional arrangements in Saint Kitts and Nevis
- Develop Sand-mining and quarrying Ordinances
- Strengthen licensing system for quarry operators to be conditional on training, certification and compliance with rules
- Regularize leases for quarries on public lands
- Support legislative drafting of NCEMA (federal legislation) to ensure quarrying and sand mining are adequately covered and update the Zoning Plan and Map for Nevis and support the adoption of the Zoning Plan by NIA.
- Support to strengthening national Integrated land and water resource management strategies/plans
- Develop watershed basin master planning framework
- Prepare Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.

Outputs

- National reviews of water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation

- New and/or revised legislations, policies and regulations on water supply and sanitation based on the IWRM Roadmaps (and IWRM/WUE strategies where they may exist), National Plans of Action for SLM and ecosystem conservation
- Support to legislative drafting of NCEMA (federal legislation) to ensure quarrying and sand mining are adequately covered
- National Integrated Water Resource Management/ Water Use Efficiency strategies/plans integrates ICZM and BD conservation issues
- Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.
- National Environmental Committee/Commission
- Programmes for cross-sectoral sensitization and awareness-raising for all relevant stakeholders on LD and watershed management, integrating SLM & ecosystem management, IWRM/WUE and ICZM management issues to support mainstreaming and implementation
- Programmes for training and capacity building to support the implementation on LD and watershed management, integrating SLM & ecosystem management, IWRM/WUE and ICZM management issues to support mainstreaming and implementation throughout the relevant government, private sector agencies and civil society organizations
- Training manual of best quarry layout and extraction practices
- Quarry operators are informed about and aware of site layout and extraction practices in order to facilitate subsequent restoration/reforestation
- Increased public awareness on alternative construction materials and the effect on sand mining on beaches of St Kitts and Nevis

PROPOSED CHANGE

	Activity	Proposed Change	Status/Recommendation
1	Review of national water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation	No changes proposed. However, this activity coincides with Investment Package #1 "Policy, Legislation and Capacity Development" of the Investment Plan for Climate Resilient Water Supply Services	Liaise with SD to explore the possibility of combining resources to undertake a detailed financing package utilising the GCF Project Preparation Facility (PPF) or other appropriate funding agency (CDB, GEF). Contribution from the GEF-IWEco Regional Component could also be considered.
2	Draft new and/or revise existing legislations, policies and regulations on water supply and sanitation based on the IWRM Roadmaps (and IWRM/WUE strategies where they may exist), National Plans of Action for SLM and ecosystem conservation in St Kitts and Nevis. Support revision of water/wastewater and land use management policy, legislation and institutional arrangements in Saint Kitts and Nevis		
3	Develop Sand-mining and quarrying Ordinances	A management plan for quarrying and mining will be sufficient. The Nevis Administration has made it clear in legal document that sand mining is illegal, and permission must be obtained from the Minister.	Confirmation is needed on the status of sand mining on Nevis.
4	Strengthen licensing system for quarry operators to be conditional on training, certification and compliance with rules	No Changes proposed	

	Activity	Proposed Change	Status/Recommendation
5	Regularize leases for quarries on public lands	No Changes proposed	
6	Support legislative drafting of NCEMA (federal legislation) to ensure quarrying and sand mining are adequately covered	Update the Nevis Physical Development Plan Update the Nevis Zoning Plan Ordinance (1991) and the Nevis Zoning Plan map and link or bring in-line with the Zoning Plan and support its adoption by Cabinet.	
7	Support to strengthening national Integrated land and water resource management strategies/plans	This activity coincides with Investment Package #3 "Climate resilient water supply" of the Investment Plan for Climate Resilient Water Supply Services	Liaise with SD to explore the possibility of combining resources to undertake the preparation of a preliminary application utilising the GCF Project Preparation Facility (PPF). Consistent with Priority areas for adaptation – 6; and Activity 3 of Cross-cutting issues.
8	Develop watershed basin master planning framework		
9	Prepare Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.		

Outcomes

- ***Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change***
- ***Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account***

Component 4: Enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Kitts and Nevis

Activities

- Capacity building for targeted stakeholders in College Street Ghaut watershed and for quarry sites on Nevis
- Preparation of summary 'state of environment' reports (result of project interventions in St Kitts and Nevis) and contribute project outputs to the global knowledge network (e.g. existing or new project website), as well as to a Community of Practice (COP) for the Caribbean region for vertical as well as horizontal (multi-sectoral) information exchanges with local stakeholders, as well as debates on the needs and aspirations of people, project deliverables and environmental realities
- Saint Kitts and Nevis actively engaging in Inter-regional SLM and IWRM/BD dialogue process of local stakeholders with the Alliance of Small Island States (AOSIS).
- Develop and apply community participatory media/outreach tools

Outputs

- Saint Kitts and Nevis contribute to suite of best practices and lessons, in common pool of knowledge, that are exchanged with other SIDS in SLM/ecosystems management and related projects
- Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project

- At least 2 major technical conferences and symposia convened to showcase the innovative solutions
- Research articles, books, other awareness materials through various media

PROPOSED CHANGE

	Activity	Proposed Change	Status/Recommendation
1	Capacity building for targeted stakeholders in College Street Ghaut watershed and for quarry sites on Nevis	No changes proposed	Link to 1 and 2 in Component 3.
2	Preparation of summary 'state of environment' reports (result of project interventions in St Kitts and Nevis) and contribute project outputs to the global knowledge network (e.g. existing or new project website), as well as to a Community of Practice (COP) for the Caribbean region for vertical as well as horizontal (multi-sectoral) information exchanges with local stakeholders, as well as debates on the needs and aspirations of people, project deliverables and environmental realities	No changes proposed	
3	Saint Kitts and Nevis actively engaging in Inter-regional SLM and IWRM/BD dialogue process of local stakeholders with the Alliance of Small Island States (AOSIS).	No changes proposed	
4	Develop and apply community participatory media/outreach tools	A public education program is required to educate residents on the need to maintain the local watercourses free of debris, and the risks of constructing or filling in the flood plains A public education program is required in respect of maintenance of quarries and limiting runoff into the marine environment Public education programme to address solid waste management as part of the education awareness programme planned	Collaborate with the Solid Waste Management Authority to develop a media campaign to address indiscriminate and illegal disposal of waste as well as other practices to encourage proper storage and final disposal of household waste Regional component – Information Awareness led by PCI Media

Outcome

- ***Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks***

2.5 Incremental Reasoning

2.5.1 Baseline:

The preceding GEF-IWCAM project initiated a process of capacity building in the management of watersheds and coastal areas through activities to plan and manage aquatic resources and ecosystems on a sustainable basis at the regional level. The project developed toolkits to support IWCAM reforms in policy, legislation and institutional arrangements, but also implemented pilot demonstration interventions aimed at improving the quality of fresh and coastal water resource for up-scaling and

replication. For example, the Basseterre Valley Aquifer (BVA) was mapped using Multi-Electrode Electricity Resistivity (MER). This novel technology provided a wealth of new information about the BVA, such as a delineating, depth and variations between fresh and salt water, information about the salt and fresh water interface and the implications for long-term pumping or water extraction. MER methodology can also be employed to delineate zones of contamination.

The IWCAM project revealed the following areas of priority concern for the long-term management of the Basseterre Valley and aquifer[21]:

[1] The industrial developments to the north and northwest of the well-field posed a serious threat of contamination by petroleum products.
[2] Domestic waste is generally disposed of through septic tank and soak-away pits that can potentially recharge the aquifer with partially treated or untreated sewerage. The existing well-field is currently operating at capacity to meet existing demands, and salt water underlies the entire well-field area. This is resulting in the long-term mining of the groundwater from the Basseterre Valley Aquifer, which is causing intrusion of saline waters into the aquifer from three different directions.
[3] The existing distribution of wells is oriented west to east, which is acceptable, but not ideal according to the ground water modeling scenarios. Declines of water levels as little as 0.5 meters will result in seawater entering most of the wells. Water levels in the well-field have already declined approximately 0.6 to 1 meter over the past 30 years, even with above average rainfall for the past 10 years of record.
[4] Global warming is projected to increase the rate of sea level rise. The projected rise could result in saltwater intrusion within 20 years according to some predictions about the rate of glacial collapse and associated sea level rise.

The IWCAM project addressed two pollution sources related to the first threat. It collaborated with the St. Kitts Electricity Department to install an oil / water separator at the Needsmust Power Plant. In addition, since one of the identified threats to the BVA is pollution from the inappropriate disposal of domestic wastewater, a five-day training workshop in best practices related to the design, construction, inspection, operations and maintenance of septic tanks and other onsite wastewater treatment technologies was conducted in February 2011. Over 30 persons participated including environmental health officers, building inspectors, architects, engineers, plumbers and contractors from both St. Kitts and Nevis[21]. However, up-take remained low after project end. The co-management of water resources by “more than six separate agencies” was identified as an obstacle to integrated master planning for the water resources of Saint Kitts and a National Water Resources Master Plan was drafted in an attempt to bring structure and clearly defined roles and responsibilities to water research management.

At present quarry licenses are given upon application without any conditions. Sites that are no longer productive, are left barren, exposed to the elements. No restoration and reforestation plan for abandoned areas within operational quarries exists, nor are manuals or guidelines accessible to quarry operators. While international technical solution may be accessible to planners, these are not typically integrated in mainstream national development planning.

Sand mining is illegal but common on Nevis. Sand is widely regarded as a renewable resource; awareness of alternative building materials is low. Legislation is in the process of being up-dated: the

[21] Clauzel (2007*) ibid*

National Conservation and Environment Protection Act (NCEPA) is to be replaced by National Conservation and Environmental Management Act (NCEMA). Regulation will also be required. A feasibility study for sustainable sand extraction for St Kitts and Nevis was conducted by Gillian Cambers, University of Puerto Rico, but needs up-dating.

Agricultural production within the College Street Ghaut watershed is dominated by crop cultivation and cattle raising. Overgrazing by cattle and vegetation clearing for cropping releases a significant amount of sediments to the ghaut channel which eventually reaches the nearshore marine environment with adverse impacts. A number of tour operators use the College Street Ghaut for scenic hiking tours and its continued degradation is undesirable. Threats to livelihoods, particularly the viability of the fishing sector and of tourism-based natural attractions, on account of land and ecosystems degradation are not widely appreciated. Furthermore, linkages between water, land and ecosystem degradation and socio-economic impacts to the tourism sector is not well documented or publicized, which is partly due to a scarcity of data to make linkages and a lack of mainstreamed assessment protocols.

2.5.2 Business as usual scenario:

Under the current scenario, flooding and contamination of aquifers as well as coastal waters in the Basseterre Valley, most notably the College Street Ghaut, would continue and grow in severity, particularly in the face of climate change, with the inevitable impact on ecosystem services and associated livelihoods. Similarly, land degradation, sand dune and beach destruction, deforestation and decline of mangrove and wetlands on Nevis would accelerate and render the islands even more vulnerable to severe weather events. This land degradation, in turn, would undermine the natural beauty, including reef health, which is still a key asset for the tourism sector. Rare and threatened marine life attracts recreational divers, while bird-watching brings in foreign revenue linked to terrestrial ecosystems.

Without intervention, out-dated legislation would provide an inadequate framework for the management of modern public health and environmental issues. Responsibility for land administration and environmental health activities in the Federation would continue to be fragmented across a multitude of agencies. Current legislation and institutional arrangements are not doing adequate justice to the causal relationship between watershed management and water quality. Without intervention, the disconnect between environmental and public health would continue, with the inevitable adverse effects on livelihoods dependent on natural resources and on quality of lives, particularly of the poor.

2.5.3 Incremental reasoning:

Project interventions in Saint Kitts and Nevis will mostly focus on the GEF Land Degradation (LD) strategy by addressing impacts of acute land degradation in the College Street Ghaut in St Kitts and quarries and sand mining hotspots on Nevis. Specifically, the project will target Strategic Objective 3 "*to reduce pressures on natural resources from competing land uses in the wider landscape*" with co-benefits from both the Biodiversity Strategy and International Waters, respectively, as follows: BD Strategic Objective 2 *"to mainstream biodiversity conservation and sustainable use into production landscapes, seascapes and sectors"* will be pursued with the long-term goal of positive impacts on rare and threatened species in terrestrial and marine ecosystems. Under the GEF IW Strategy Strategic Objective 1, "*to catalyse multi-state cooperation to balance conflicting water uses in trans-boundary*

surface and groundwater basins while considering climatic variability and change" and Strategic Objective 2, "*to catalyse multi-state cooperation to rebuild marine fisheries and reduce pollution of coasts and Large Marine Ecosystems (LMEs) while considering climatic variability and change*" will be addressed. In St Kitts and Nevis, the project seeks to enhance the management of watershed areas, groundwater aquifers, and coastal and marine ecosystems as part of the wider Caribbean Sea basin and will thereby contribute towards implementation of the Cartagena Convention.

Following a consultative needs assessment in the Colleage Street Ghaut, St Kitts, as well as quarry sites and sand-mining hotspots on Nevis, inclusive of a knowledge, awareness, practices & behaviour (KAPB) survey and gender audit, innovative solutions will be adapted for the participatory development of a watershed master planning framework for the Colleage Street Ghaut, St Kitts, and land managment plans on Nevis, with investments in replication of proven technical appropriateness of waste water solutions. The sub-project in St Kitts and Nevis aims to increase adoption and mainstreaming by increased enhancing institutional capacity and an enabling environment, as well as strengthened engagement of the private sector. Private sector engagement was deemed challenging and left room for improvement in the IWCAM project evaluation. However, process lessons learnt will be combined with modern social marketing approaches to add maximum value to IWCAM outcomes. Moreover, IWEco will target those priority threats that could not yet be addressed under IWEco, such as grey water management and improved flood water retention, bringing development benefits particularly to people defines as poor. Country-level interventions will also seek to address emerging priorities, such as soil conservation and erosion control, which were not priorities under the GEF-IWCAM project. In this context, the present project will invest in a range of proven interventions, such as:

- measures that stabilize river banks, ghauts, culverts, drains, and bridges (contour strips, reinforced infrastructure,
- grey water treatment systems
- a flood water retention pond at Shadwell Estate
- reforestation and restoration of affected sites on St Kitts (College Street Ghaut) and Nevis (quarries and sand-mining hotspots)
- restoration of affected downstream habitats, such as mangroves, wetlands, beaches and coral reefs, using a landscape approaches for terrestrial and marine ecosystems within the “ridge to reef” framework.

Intervention sites will be used for demonstration and training in an integral capacity-building and awareness raising programme. This integrated programming is likely to trigger structural transformations in the agroforestry/forest, quarrying, construction and tourism sectors. Linkages throughout the region and beyond will allow for cross-fertilization and exchange of experiences, specifically by:

- Development of community codes of practices and best practice guidelines for regional/global (SIDs) audiences
- Training of trainers in workshops and cross-sectoral sensitization and awareness-raising
- Identification and strengthening of a suite of IW, LD and BD-related indicators of process, stress reduction, and environmental and socioeconomic status to assist objective assessment and monitoring of impacts of the Georgetown watershed project. Mainstreaming of indicators in national accounts and global reporting.

- Participatory development of a monitoring protocol for periodic assessment of environmental indicators (ground and surface water quality in particular) at intervention sites on both islands.
- Development of and/or strengthening of existing decision-making tools, particularly in water resource management, also with a view to integrating ICZM and BD conservation issues in National Integrated Water Resource Management/ Water Use Efficiency strategies/plans
- Participation in technical exchanges between countries and relevant conferences to promote technologies and replication opportunities, and publish research articles, books, other awareness materials through various media and events (social marketing)
- Review of national land and water resources management legislation and institutional arrangements in Saint Kitts and Nevis
- Training and capacity building to support the integrated implementation on LD and watershed management throughout the relevant government, private sector agencies and civil society organizations
- Contribution to suite of best practices and lessons that are exchanged with other SIDS in SLM/ecosystems management and related projects, to a Community of Practice (COP) for the Caribbean region and a common pool of knowledge employing innovative on-line ICT applications
- Engagement of Saint Kitts and Nevis in inter-regional SLM and IWRM/BD dialogue process of local stakeholders with the Alliance of Small Island States (AOSIS).
- Participation in IW Learn activities, such as biennial conferences, experience notes and website compatible with IW:LEARN Standards, and SIDS learning exchange at regional and global; meetings (Global Oceans Forum, GPA, CWWA, CEF etc).

The approximate annual costs for investments on both islands are US$175,000, an amount complemented by externally and internally financed programmes and activities. This figure compares favourably with estimated damages of US$120,000 in College Street Ghaut during summer 2013 flood alone.

2.5.4 Expected benefits:

The project will achieve an improvement of the social and economic welfare Basseterre residents and communities near quarries and sand-mined beaches on Nevis, through improved water and wastewater management and improved ecosystem services functioning, equitable for gender and disadvantaged groups, specifically:

- Reduction in risk posed by land degradation in (i) the College Street Ghaut, Basseterre, St Kitts (floods, risk to life and property), farmlands and forests in upper watershed (soil loss and pollution) and waters (solid and liquid waste; sediment load in rivers and near coastal marine habitats) and (ii) near quarry sites and sand-mined beaches in Nevis (denuded soils, siltation, imbalances in sand budgets);
- Strengthened legal and institutional framework of quarry sites and better governance/enforcement of sand-mining regulations on Nevis beaches and the livelihoods associated with these economic activities and the construction sector; and
- Enhanced cross-sectoral enabling environment for integrated landscape management by empowered communities in College Street Ghaut, Basseterre, St Kitts and near quarry sites and sand-mined beaches in Nevis.

Integrative benefits through the GEF multi-focal area management approach - Sustainable Forest Management, Land Degradation and International Waters: Investments in sustainable land forest management will focus primarily on erosion control as the primary objective on both islands. In St Kitts the investments will concentrate on stabilization within unstable actively degrading areas within the College Ghaut watershed. Hotspots within the watershed are along the riparian corridors of the main watercourse which over the years have become degraded due to unsustainable land practices which have accelerated erosion and result in excessive sedimentation into the channel that exacerbates flood risk to the country's capital city. The surrounding areas are under a mixed land use that includes dry woodland forest and abandoned sugar cultivations. Interspersed amongst these areas are commercial (including mining), housing developments and small holder agriculture that typically lack land conservation measures predisposing the predominantly sandy loam and loamy sand soils to erosion. Land degradation will be controlled over the watershed through investments in forestry and agroforestry systems particularly over the elevated areas to the north.

In Nevis the strategy will focus on the rehabilitation of quarry areas where surface erosion control measures will be installed. These will include grass contour barriers, drainage to control runoff to prevent sedimentation into the adjacent marine environment. Mangrove rehabilitation in adjacent coastal areas will seek to restore ecological functioning and serve as a control for sediment immobilization, reduce overland runoff and serve as defense against coastal erosion. Through on-site land and forest cover investments within 135 hectares over the target watershed areas on both islands, it is expected that an estimated 13,169.5 equivalent tonnes of CO_2 over the life of the project, or an average of 2,633.9 tCO_2eqv/year will be sequestered (see Annex 3.4).

The actions under the project will be supported by improvement in the policies that mainstream sustainable land and forest management within the wider national development frameworks so as to reduce the extent of land degradation in the country. The key outcome from investments supported by the GEF SFM contributions are in the promotion of good management practices in existing forests that are effected through enhancement of the enabling environment and uptake and up-scaling of lessons learnt in the management of land and forest resources.

2.5.5 Gender dimensions

The project will seek to carefully consider gender mainstreaming in the development and implementation of SLM/ecosystems management, ensuring equitable access to and management of safe and adequate water, for domestic supply, sanitation, food security and environmental sustainability by women and men, as well as vulnerable and marginalized groups in the College Street Ghaut watershed, Saint Kitts, as well as quarry sites and sand-mined beaches on Nevis.

Land degradation caused by land use changes, poor land use practices, along with poor and/or indiscriminate waste discharges influences the mid to long-range sustainable access to resources for agriculture and fisheries development, and development and sustainability of productive sectors such as tourism. These influences have very direct economic value-chain impacts where the flow of benefits are compromised which in turn affects household income security, maintenance of health and stability in the home and the community at large.

The gender roles in counterbalancing these impacts will need to be evaluated so as to determine relative influence and how the project can support an improvement in the social and economic welfare of stakeholders in a manner that is equitable for gender and disadvantaged groups.

2.6 Budget

The total cost of the St Kitts and Nevis sub-project is **4,273,460** USD. The GEF Grant is **999,685** USD. The co-financing is **3,273,775** USD, provided through the Government of St Kitts and Nevis; external partners are UNEP Car/RCU, UNDP, CARPHA, OECS and UWI.

Table 7: Sub-project 1.1 – Entire budget at activity level

National Sub-project 1.5: St Kitts & Nevis	GEF Funding	Co-Financing	Total component Cost
COMPONENT 1.1: Measurable stress reduction achieved in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.	**515,800**	**1,305,925**	**1,821,725**
Sub-component 1.1.1: Land degradation control measures along the banks of the College Street Ghaut	211,800	194,137	405,937
Activity 1.1.1.1 - Conduct (rapid) water and land-related diagnostic analysis for the College Street Ghaut watershed, Saint Kitts, as well as quarry sites and sand-mined beaches on Nevis, as required to support project interventions	4,600	139,037	143,637
Activity 1.1.1.2 - Feed College Street Ghaut watershed information and management needs into development of national watershed management plan.	4,600	2,900	7,500
Activity 1.1.1.3 - Establish contour hedges (vetiver) planted along upper bank of College Street Ghaut	50,600	17,400	68,000
Activity 1.1.1.4: Stabilize and regularly maintain existing retaining walls and bridges along College Street Ghaut	50,400	11,600	62,000
Activity 1.1.1.5 - Clear culverts, drains, outfalls and roads of debris and sediment at College Street Ghaut	10,000	5,800	15,800
Activity 1.1.1.6 - Stabilize ghauts and water harvesting systems to reduce quarry run-off into ocean on Nevis	50,800	8,700	59,500
Activity 1.1.1.7 - Install new and maintain existing gabion baskets at College Street Ghaut	40,800	8,700	49,500
Sub-component 1.1.2: On-site grey water treatment investment to treat effluent from private and commercial properties in greater Basseterre area	-	400,000	400,000
Activity 1.1.2.1 - Establish on-site treatment of grey water on private and commercial properties in GBA	-	400,000	400,000
Sub-component 1.1.3: Retention pond at Bayford's Estate	82,000	300,000	382,000
Activity 1.1.3.1 – Undertake feasibility study of locating a Retention Pond at Bayford's Estate	82,000	300,000	382,000
Sub-component 1.1.4: Restoration and reforestation plan for abandoned areas within operational quarries	-	173,638	173,638
Activity 1.1.4.1 - Develop restoration and reforestation plan for abandoned quarry at Hicks Estate (Nevis)	-	173,638	173,638
Sub-component 1.1.5: Restoration and reforestation investments within non-productive quarry areas (guided by criteria outline in the restoration plan); undertake economic analysis of Mangroves/Wetlands and prepare management plans.	204,000	108,150	312,150
Activity 1.1.5.1 - Restore and reforest non-productive quarry at Hicks Estate identified using the criteria in the above plan.	150,000	90,000	240,000
Activity 1.1.5.2 – Undertake economic analysis of wetlands at Cades Bay and Bath Bogs; survey state of mangroves and coastal wetlands and prepare management plans	4,000	6,050	10,050
Activity 1.1.5.3 - Replant mangroves and other coastal plant species; restoration of coastal wetlands on Nevis	50,000	12,100	62,100

National Sub-project 1.5: St Kitts & Nevis	GEF Funding	Co-Financing	Total component Cost
Sub-component 1.1.6: Artificial reefs deployed at New River, Indian Castle, Dogwood and Long Haul.	8,000	70,000	78,000
Activity 1.1.6.1: Coral reefs survey at New River, Indian Castle, Dogwood and Long Haul.	1,600	5,000	6,600
Activity 1.1.6.2 - Deployment of artificial reefs at New River, Indian Castle, Dogwood and Long Haul, Nevis	6,400	5,000	11,400
Sub-component 1.1.7: Beach restoration investment at Indian Castle	10,000	60,000	70,000
Activity 1.1.7.1 - Beach restoration at Indian Castle on Nevis	10,000	60,000	70,000
COMPONENT 1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning	**55,800**	**681,741**	**737,541**
Sub-component 1.2.1: Cost-benefit and feasibility study for sustainable sand extraction for St Kitts and Nevis	30,000	173,638	203,638
Activity 1.2.1.1 – Determine the feasibility of sand mining in Nevis and conduct cost-benefit and feasibility study for sustainable sand extraction for St Kitts	30,000	173,638	203,638
Sub-component 1.2.2: Information resources for plumbers/building contractors, septic service providers, home-owners and business people on St Kitts aware of importance of grey water treatment	10,000	5,000	15,000
Activity 1.2.2.1 – Conduct seminars and awareness raising activities for plumbers/building contractors, septic service providers, home-owners and business people on treatment of and use/recycling of greywater	10,000	5,000	15,000
Sub-component 1.2.3: Investment in community-based water supply and sanitation for disadvantaged communities (priority on those with substandard hygienic infrastructure) to be supported by the GEF-SGP	15,800	503,104	518,904
Activity 1.2.3.1 - Conduct a gender-sensitive community needs assessment to assess water availability and sanitation issues within target communities within the College Street Ghaut watershed and quarry sites on Nevis	3,000	166,076	169,076
Activity 1.2.3.2 - Develop standards and protocol for water quality data collection and determination of linkages to human health	8,000	166,076	174,076
Activity 1.2.3.3 - Design a small-scale communal intervention to enhance water security and sanitation for disadvantaged communities within the project areas for support under the GEF-SGP	4,800	170,953	175,753
COMPONENT 2: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.	**180,000**	**1,024,276**	**1,204,276**
Sub-component 2.1.1: Suite of IW and LD, and BD-related indicators of process, stress reduction, & environmental and socioeconomic status mainstreamed into national accounts	108,000	708,413	816,413
Activity 2.1.1.1 - Identify suite of IW, LD and BD-related indicators of process, stress reduction, and environmental and socioeconomic status to assist objective assessment and monitoring of impacts at the College Street Ghaut and quarry sites on Nevis	10,800	185,388	196,188
Activity 2.1.1.2 - Monitor the implementation of national projects using GEF LD, IW and SFM tracking tools as part of annual project implementation review process as well as at inception, midterm and terminal stage	32,400	228,888	261,288
Activity 2.1.1.3 – Promote and strengthen mainstreaming of indicators in national accounts	21,600	207,138	228,738
Activity 2.1.1.4 - Conduct carbon benefit accounting of project activities	-	-	0
Activity 2.1.1.5: Conduct beach analyses and regular monitoring (profiles, water quality, sediment analysis) in place	27,000	54,375	81,375
Activity 2.1.1.6 - Conduct geotechnical survey to inform/guide sustainable aggregate extraction rates	16,200	32,625	48,825
Sub-component 2.1.2: A monitoring protocol for periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders	72,000	315,864	387,864

National Sub-project 1.5: St Kitts & Nevis	GEF Funding	Co-Financing	Total component Cost
Activity 2.2.1.1 - Develop monitoring protocol for periodic assessment of environmental indicators (ground and surface water quality in particular) at College Street Ghaut and quarry sites on Nevis intervention sites with participatory engagement of stakeholders	43,200	254,990	298,190
Activity 2.2.1.2 - Development of and/or strengthening of existing decision-making tools	28,800	60,874	89,674
COMPONENT 3.1: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.	**62,085**	**74,000**	**136,085**
Sub-component 3.1.1: National reviews of water and wastewater legislation and institutional arrangements (and recommendations of necessary reforms)	9,600	10,000	19,600
Activity 3.1.1.1 -Review of national water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation	9,600	10,000	19,600
Sub-component 3.1.2: New and/or revised legislations, policies and regulations on water supply and sanitation, land degradation control (related to unsustainable mining).	29,985	27,000	56,985
Activity 3.1.2.1 - Draft new and/or revise existing legislations, policies and regulations on water supply and sanitation based on the IWRM Roadmaps (and IWRM/WUE strategies where they may exist), National Plans of Action for SLM and ecosystem conservation in St Kitts and Nevis	7,985	7,000	14,985
Activity 3.1.2.2 -Support revision of water/wastewater and land use management policy, legislation and institutional arrangements in Saint Kitts and Nevis	6,000	5,000	11,000
Activity 3.1.2.3 - Develop Sand-mining and quarrying ordinances	6,000	5,000	11,000
Activity 3.1.2.4 - Strengthen licensing system for quarry operators to be conditional on training, certification and compliance with rules	5,000	5,000	10,000
Activity 3.1.2.5 - Regularize leases for quarries on public lands	5,000	5,000	10,000
Sub-component 3.1.3: Revised NCEMA (federal legislation) with provisions for quarrying and sand mining	10,000	10,000	20,000
Activity 3.1.3.1 - Support legislative drafting of NCEMA (federal legislation) to ensure quarrying and sand mining are adequately covered and update the Nevis Zoning Plan & Map and support its adoption by Parliament	4,000	5,000	9,000
Activity 3.1.3.2 - Support to strengthening national Integrated land and water resource management strategies/plans	6,000	5,000	11,000
Sub-component 3.1.4: Watershed basin master planning framework to guide investment planning processes	5,000	15,000	20,000
Activity 3.1.4.1. - Develop watershed basin master planning framework	5,000	15,000	20,000
Sub-component 3.1.5: Watershed Management Plan for College Street Ghaut (as a sub-component of overall National Water Resources Management Plan)	7,500	12,000	19,500
Activity 3.1.5**.1**: Prepare Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.	7,500	12,000	19,500
COMPONENT 3.2: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.	**90,000**	**65,133**	**155,133**
Sub-component 3.2.1: Functioning National Environmental Committee/Commission	45,000	31,800	76,800
Activity 3.2.1.1 - Establish a National Environmental Committee/Commission and support regular meetings during project implementation	45,000	31,800	76,800
Sub-component 3.2.2: Programme for cross-sectoral sensitization and awareness-raising for all relevant stakeholders (water, sustainable land and ecosystem management)	15,000	13,333	28,333
Activity 3.2.2.1 – Promote cross-sectoral sensitization and awareness-raising on LD and watershed management	5,000	5,000	10,000
Activity 3.2.2.2 - Convene national training - governmental and non-governmental target groups	5,000	5,000	10,000
Activity 3.2.2.3 - Develop and implement collaborative public relations and awareness strategy within and across sectors (e.g. solid waste, physical planning, agriculture, public health, water department) in St Kitts and Nevis	5,000	3,333	8,333

National Sub-project 1.5: St Kitts & Nevis	GEF Funding	Co-Financing	Total component Cost
Sub-component 3.2.3: Programme for training and built capacity to support watershed management, SLM & ecosystems management for relevant government, private sector agencies and civil society organizations	10,000	10,000	20,000
Activity 3.2.3.1: Training of trainers for staff of Physical Planning; Housing, Fisheries, Agriculture, Public Works, Public Health and related technical practitioners (geotechnical, beach monitoring, biodiversity in mangroves and wetlands, reefs)	5,000	5,000	10,000
Activity 3.2.3.2 - Conduct training of trainers workshops	5,000	5,000	10,000
Sub-component 3.2.4 Training manual for best quarry layout and extraction practices	10,000	5,000	15,000
Activity 3.2.4.1 - Capture of best practices for quarry layout and extraction	5,000	2,500	7,500
Activity 3.2.4.2 - Develop training manual of best quarry layout and extraction practices	5,000	2,500	7,500
Sub-component 3.2.5: Training programme for quarry operators (on site layout, extraction practices and restoration/reforestation)	5,000	-	5,000
Activity 3.2.5.1 - Training of quarry operators on site layout and extraction practices to facilitate subsequent restoration/reforestation	5,000	-	5,000
Sub-component 3.2.6: Training programme on sand/aggregate substitution	5,000	5,000	10,000
Activity 3.2.6.1 - Broad training and capacity building activities at the national level on beach sand mining and use of alternative construction materials	5,000	5,000	10,000
COMPONENT 4: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks	**96,000**	**122,700**	**218,700**
Sub-component 4.1.1: Contributions to suite of best practices and lessons in improved quarry management and land restoration	24,000	33,000	57,000
Activity 4.1.1.1 - Capacity building for targeted stakeholders in College Street Ghaut watershed and for quarry sites on Nevis	2,000	6,000	8,000
Activity 4.1.1.2 - Preparation of summary 'state of environment' reports (result of project interventions)	2,000	6,000	8,000
Activity 4.1.1.3: Compile contributions to a Community of Practice (COP) for the Caribbean region on improved quarry management/aggregate extractive processes	4,000	6,000	10,000
Activity 4.1.1.4 - Contribute project outputs to the global knowledge network	3,000	1,500	4,500
Activity 4.1.1.5 - Contribute content to existing websites and or/develop project website	3,000	1,500	4,500
Activity 4.1.1.6: Participation by stakeholders at inter-regional SLM & IWRM/BD dialogues	5,000	6,000	11,000
Activity 4.1.1.7 - Develop and apply community participatory media/outreach tools	5,000	6,000	11,000
Sub-component 4.1.2: Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project	40,000	29,700	69,700
Activity 4.1.2.1 - Support technical exchanges, internships between participating countries and other SIDS regions (linked to Component 1, but global scope)	8,000	6,000	14,000
Activity 4.1.2.2 - Participate in SIDS learning exchanges at regional and global; meetings (Global Oceans Forum, GPA, CWWA, CEF etc).	7,000	6,000	13,000
Activity 4.1.2.3 - Strengthen community-based local-area natural resource assessments	7,000	6,000	13,000
Activity 4.1.2.4 - Development of best practice guidelines	10,000	6,000	16,000
Activity 4.1.2.5 - Participate in technical exchanges between countries	8,000	5,700	13,700
Sub-component 4.1.3: At least 2 major technical conferences and symposia to showcase the innovative solutions	27,000	50,000	77,000
Activity 4.1.3.1: Saint Kitts and Nevis participates in IW Learn activities, such as Biennial conferences, preparation of at least 2 experience notes and a website compatible with IW:LEARN Standards	15,000	25,000	40,000
Activity 4.1.3.2 - Participate in major conferences to promote technologies and replication opportunities	12,000	25,000	37,000
Sub-component 4.1.4: Research articles, books, other awareness materials through various media	5,000	10,000	15,000
Activity 4.1.3.1 - Awareness raising on alternative construction materials	5,000	10,000	15,000

National Sub-project 1.5: St Kitts & Nevis	GEF Funding	Co-Financing	Total component Cost
TOTAL	**999,685**	**3,273,775**	**4,273,460**

Co-financing

Table 8. Co-finance

Name of Co-financier	Sources of Co-financing	Type of Co-financing	*Amount(US$)*
Department of Physical Planning and Environment (St Kitts)	Government	In Kind	$86,500
Basseterre Drainage Improvement Study ($3million) and Improve Water Supply and Expand Storage Capacity ($600K) - CDB - estimated at approx 50%	Government	In Kind	$1,500,000
Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment in the Nevis Island Administration (NIA)	Government	In Kind	$78,400
UNEP Car/RCU	GEF Agency	In Kind	$210,000
UNDP	GEF Agency	In Kind	$35,000
CARPHA	Other Multilateral Agency (ies)	In Kind	$448,875
OECS	Other Multilateral Agency (ies)	In Kind	$840,000
UWI	Other - University	In Kind	$75,000
	Total co-financing		**$3,273,775**

Consultants working for technical assistance in the subproject description:

Table 9. Consultants working for technical assistance in the subproject description:

Sub-project 1.5 St Kitts & Nevis	GEF($)	Co-financing (US$)	Project total (US$)
International consultants	0	0	0
Local consultants	333,985	0	333,985
Total	**333,985**	**0**	**333,985**

2.7 Project Timeline

Table 10: Workplan and Timeline

M = Meeting, **R**= Report (includes other publications), **W** = Workshop, **S** = Communication Strategy, **MR** = Mid-term Report, **TR** = Terminal Report, **I** = Project website. (NOTE: the timing of the outputs are indicative; these will be finalized on project inception and subject to review during project implementation).

National Sub-project 1.5: St Kitts & Nevis	**Year 1**				**Year 2**				**Year 3**				**Year 4**			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Component 1: To develop and foster the implementation of targeted Innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the College Street Ghaut watershed and quarry sites and sand-mining hotspots on Nevis.																
COMPONENT 1.1: Measurable stress reduction achieved in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.																
Sub-component 1.1.1: Land degradation control measures along the banks of the College Street Ghaut																
Activity 1.1.1.1 - Conduct (rapid) water and land-related diagnostic analysis for the College Street Ghaut watershed, Saint Kitts, as well as quarry sites and sand-mined beaches on Nevis, as required to support project interventions		R														
Activity 1.1.1.2 - Feed College Street Ghaut watershed information and management needs into development of national watershed management plan.		R														
Activity 1.1.1.3 - Establish contour hedges (vetiver) planted along upper bank of College Street Ghaut					W		R									
Activity 1.1.1.4: Stabilize and regularly maintain existing retaining walls and bridges along College Street Ghaut	W			R												
Activity 1.1.1.5 - Clear culverts, drains, outfalls and roads of debris and sediment at College Street Ghaut		W			R											
Activity 1.1.1.6 - Stabilize ghauts and water harvesting systems to reduce quarry run-off into ocean on Nevis				R		R		R		R		R		R		R
Activity 1.1.1.7 - Install new and maintain existing gabion baskets at College Street Ghaut						R				R						
Sub-component 1.1.2: On-site grey water treatment investment to treat effluent from private and commercial properties in greater Basseterre area																

National Sub-project 1.5: St Kitts & Nevis	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 1.1.2.1 - Establish on-site treatment of grey water on private and commercial properties in GBA				M					R							
Sub-component 1.1.3: Retention pond at Bayford's Estate																
Activity 1.1.3.1 – Undertake feasibility study for the location and construction of a retention pond at Bayford's Estate									R							
Sub-component 1.1.4: Restoration and reforestation plan for abandoned quarry at Hick Estate																
Activity 1.1.4.1 - Develop restoration and reforestation plan for abandoned quarry at Hick Estate			W/ M		R											
Sub-component 1.1.5: Restoration and reforestation investments within non-productive quarry areas (guided by criteria outline in the restoration plan) and Mangroves at Cades Bay and Bath Bog																
Activity 1.1.5.1 - Restore and reforest non-productive quarry areas identified using the criteria in the above plan.								R		R		R		R		R
Activity 1.1.5.2 – Undertake economic analysis of wetlands at Cades Bay and Bath Bog, carry out a survey of the state of mangroves and prepare management plan for coastal wetlands	W	R														
Activity 1.1.5.3 - Replant mangroves and other coastal plant species; restoration of coastal wetlands on Nevis								W		R						
Sub-component 1.1.6: Artificial reefs deployed at New River, Indian Castle, Dogwood and Long Haul.																
Activity 1.1.6.1: Coral reefs survey at New River, Indian Castle, Dogwood and Long Haul.			W	R												
Activity 1.1.6.2 - Deployment of artificial reefs at New River, Indian Castle, Dogwood and Long Haul, Nevis					W		R									
Sub-component 1.1.7: Beach restoration investment at Indian Castle																
Activity 1.1.7.1 - Beach restoration at Indian Castle on Nevis								R								
COMPONENT 1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning																
Sub-component 1.2.1: Feasibility of sand mining in Nevis and undertake a cost-benefit and feasibility study for sustainable sand extraction in St Kitts																
Activity 1.2.1.1 - Conduct a feasibility study of sand mining in Nevis and a cost-benefit and feasibility study for sustainable sand extraction for St Kitts			M	R												

National Sub-project 1.5: St Kitts & Nevis	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sub-component 1.2.2: Information resources for plumbers/building contractors, septic service providers, home-owners and business people on St Kitts aware of importance of grey water treatment																
Activity 1.2.2.1 – Conduct seminars and awareness raising activities for plumbers/building contractors, septic service providers, home-owners and business people on treatment of and use/recycling of greywater		W		W/ R		R		W/ R		R		W/ R		R		W/ R
Sub-component 1.2.3: Investment in community-based water supply and sanitation for disadvantaged communities (priority on those with substandard hygienic infrastructure) to be supported by the GEF-SGP																
Activity 1.2.3.1 - Conduct a gender-sensitive community needs assessment to assess water availability and sanitation issues within target communities within the College Street Ghaut watershed and quarry sites on Nevis			R													
Activity 1.2.3.2 - Develop standards and protocol for water quality data collection and determination of linkages to human health		M			R											
Activity 1.2.3.3 - Design a small-scale communal intervention to enhance water security and sanitation for disadvantaged communities within the project areas for support under the GEF-SGP				R		R		R		R		R		R		
COMPONENT 2: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.																
Sub-component 2.1.1: Suite of IW and LD, and BD-related indicators of process, stress reduction, and environmental and socioeconomic status mainstreamed into national accounts																
Activity 2.1.1.1 - Identify suite of IW, LD and BD-related indicators of process, stress reduction, and environmental and socioeconomic status to assist objective assessment and monitoring of impacts at the College Street Ghaut and quarry sites on Nevis			W/ M		R											
Activity 2.1.1.2 - Monitor the implementation of national projects using GEF LD, IW and SFM tracking tools as part of annual project implementation review process as well as at inception, midterm and terminal stage				W		R		R		R		R		R		R
Activity 2.1.1.3 – Promote and strengthen mainstreaming of indicators in national accounts			W/ M	R		R		R	W							
Activity 2.1.1.4 - Conduct carbon benefit accounting of project activities												R				
Activity 2.1.1.5: Conduct beach analyses and regular monitoring (profiles, water quality, sediment analysis) in place						R		R								
Activity 2.1.1.6 - Conduct geotechnical survey to inform/guide sustainable aggregate extraction rates				R												

National Sub-project 1.5: St Kitts & Nevis	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sub-component 2.1.2: A monitoring protocol for periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders																
Activity 2.2.1.1 - Develop monitoring protocol for periodic assessment of environmental indicators (ground and surface water quality in particular) at College Street Ghaut and quarry sites on Nevis intervention sites with participatory engagement of stakeholders				R		R		R		R		R		R		R
Activity 2.2.1.2 - Development of and/or strengthening of existing decision-making tools							R									
National Component 3 Objective: To strengthen policy, legislative and institutional reforms and capacity building to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystem services management taking into consideration climate change resilience building in Saint Kitts and Nevis.																
COMPONENT 3.1: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.																
Sub-component 3.1.1: National reviews of water and wastewater legislation and institutional arrangements (and recommendations of necessary reforms)																
Activity 3.1.1.1 -Review of national water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation																
Sub-component 3.1.2: New and/or revised legislations, policies and regulations on water supply and sanitation, land degradation control (related to unsustainable mining).																
Activity 3.1.2.1 - Draft new and/or revise existing legislations, policies and regulations on water supply and sanitation based on the IWRM Roadmaps (and IWRM/WUE strategies where they may exist), National Plans of Action for SLM and ecosystem conservation in St Kitts and Nevis		W/ M		R		R		R	W	R		R		R		R
Activity 3.1.2.2 -Support revision of water/wastewater and land use management policy, legislation and institutional arrangements in Saint Kitts and Nevis		W/ M		R					W/ R							
Activity 3.1.2.3 - Develop Sand-mining and quarrying ordinances		W/ M		R				W/ R								
Activity 3.1.2.4 - Strengthen licensing system for quarry operators to be conditional on training, certification and compliance with rules									W			R				
Activity 3.1.2.5 - Regularize leases for quarries on public lands												R			W/ R	

National Sub-project 1.5: St Kitts & Nevis	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sub-component 3.1.3: Revised NCEMA (federal legislation) with provisions for quarrying and sand mining																
Activity 3.1.3.1 Support legislative drafting of NCEMA (federal legislation) to ensure quarrying & sand mining are adequately covered. Update the Nevis Zoning Plan & Map											W	R		R		R
Activity 3.1.3.2 - Support to strengthening national Integrated land and water resource management strategies/plans					W	R		R		R		R		R		R
Sub-component 3.1.4: Watershed basin master planning framework to guide investment planning processes																
Activity 3.1.4.1. - Develop watershed basin master planning framework	W		R													
Sub-component 3.1.5: Watershed Management Plan for College Street Ghaut (as a sub-component of overall National Water Resources Management Plan)																
Activity 3.1.5.**1**: Prepare Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.	W		R													
COMPONENT 3.2: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.																
Sub-component 3.2.1: Functioning National Environmental Committee/Commission																
Activity 3.2.1.1 - Establish a National Environmental Committee/Commission and support regular meetings during project implementation		W	R													
Sub-component 3.2.2: Programme for cross-sectoral sensitization and awareness-raising for all relevant stakeholders (water, sustainable land and ecosystem management)																
Activity 3.2.2.1 – Promote cross-sectoral sensitization and awareness-raising on LD and watershed management		W		R	W			R	W			R	W			R
Activity 3.2.2.2 - Convene national training - governmental and non-governmental target groups		W		R	W			R	W			R	W			R
Activity 3.2.2.3 - Develop and implement collaborative public relations and awareness strategy within and across sectors (e.g. solid waste, physical planning, agriculture, public health, water department) in St Kitts and Nevis		S		R		R		R		R		R		R		R
Sub-component 3.2.3: Programme for training and built capacity to support watershed management, SLM & ecosystems management for relevant government, private sector agencies and civil society organizations																
Activity 3.2.3.1: Training of trainers for staff of Physical Planning; Housing, Fisheries, Agriculture, Public Works and related technical practitioners (geotechnical, beach monitoring, biodiversity in mangroves and wetlands, reefs)				W	R							W	R			

National Sub-project 1.5: St Kitts & Nevis	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 3.2.3.2 - Conduct training of trainers workshops				W				W				W	R			
Sub-component 3.2.4 Training manual for best quarry layout and extraction practices																
Activity 3.2.4.1 - Capture of best practices for quarry layout and extraction				R	R	R	R	R	R	R	R	R	R	R	R	R
Activity 3.2.4.2 - Develop training manual of best quarry layout and extraction practices													R			
Sub-component 3.2.5: Training programme for quarry operators (on site layout, extraction practices and restoration/reforestation)																
Activity 3.2.5.1 - Training of quarry operators on site layout and extraction practices to facilitate subsequent restoration/reforestation														R		
Sub-component 3.2.6: Training programme on sand/aggregate substitution																
Activity 3.2.6.1 - Broad training and capacity building activities at the national level on beach sand mining and use of alternative construction materials						R		R		R		R		R		R
National Component 4 Objective: To enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Kitts and Nevis																
COMPONENT 4: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks																
Sub-component 4.1.1: Contributions to suite of best practices and lessons in improved quarry management and land restoration																
Activity 4.1.1.1 - Capacity building for targeted stakeholders in College Street Ghaut watershed and for quarry sites on Nevis					W		R						W		R	
Activity 4.1.1.2 - Preparation of summary 'state of environment' reports (result of project interventions)									M	R						
Activity 4.1.1.3: Compile contributions to a Community of Practice (COP) for the Caribbean region on improved quarry management/aggregate extractive processes														R		
Activity 4.1.1.4 - Contribute project outputs to the global knowledge network						R		R		R		R		R		R
Activity 4.1.1.5 - Contribute content to existing websites and or/develop project website			I			R		R		R		R		R		R
Activity 4.1.1.6: Participation by stakeholders at inter-regional SLM and IWRM/BD dialogues			W			R		R	W	R		R	W	R		R
Activity 4.1.1.7 - Develop and apply community participatory media/outreach tools						R		R		R		R		R		R
Sub-component 4.1.2: Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project																
Activity 4.1.2.1 - Support technical exchanges, internships between participating countries and other SIDS regions (linked to Component 1, but global scope)						R		R		R		R		R		R

National Sub-project 1.5: St Kitts & Nevis	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 4.1.2.2 - Participate in SIDS learning exchanges at regional and global; meetings (Global Oceans Forum, GPA, CWWA, CEF etc).																
Activity 4.1.2.3 - Strengthen community-based local-area natural resource assessments			**W**		**W**			**W**		**W/ R**						
Activity 4.1.2.4 - Development of best practice guidelines					**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**
Activity 4.1.2.5 - Participate in technical exchanges between countries						**R**		**R**		**R**		**R**		**R**		**R**
Sub-component 4.1.3: At least 2 major technical conferences and symposia to showcase the innovative solutions																
Activity 4.1.3.1: Saint Kitts and Nevis participates in IW Learn activities, such as Biennial conferences, preparation of at least 2 experience notes and a website compatible with IW:LEARN Standards																
Activity 4.1.3.2 - Participate in major conferences to promote technologies and replication opportunities																
Sub-component 4.1.4: Research articles, books, other awareness materials through various media																
Activity 4.1.3.1 - Awareness raising on alternative construction materials				**R**		**R**		**R**		**R**		**R**		**R**		**R**
				R		**R**		**R**		**R**		**R**		**R**		**R**

2.8 Risk Analysis

Risk	Rating	Risk management strategy
Limited private sector buy-in	high	Engange private sector from inception; indentify trendsetters and cultivate relationship with them. Encourage several community-based small and micro enterprises to diversify risk.
Cost-effectiveness of novel INRM may no be apparent during first years of implementation and thus deters efforts of continuation and sustainability	medium	Broad stakeholder involvement to achieve rapid and wide-spread recognition of benefits; Social marketing approaches.
Climate change variability: major natural disaster (such as hurricane, earthquake) strikes the Saint Kitts and Nevis	medium	Risk cannot be prevented, but is diversified across several interventions
Changes in implementation arrangements at national level such as capacity constraints, over-subscribed staff and high staff turnover in agencies. Limited policy level buy-in during challenging fiscal times shifts priorities away from sustainable resource management and diminishes national investment post-project.	medium	Broad stakeholder involvement to render benefit independent of party politics; Social marketing approaches. Consultative and iterative development of frameworks and plans. Analyses and fine tuning of interventions aims for financial self-sustainability by project end.
Occurrence of major socio-economic challenges as a result of natural or other causes that may compromise overall implementation, for exmple floods could further erodes river bank and before seedlings can root properly	medium	The five year project foresees four years for on-the-ground interventions, leaving a 20% time buffer in case of set backs.
Enforcement and sustainable sources of financing decline post project	low	Broad regional partner engagement from project inception. Regular PSC Skype conferences and annual regional meetings will include key partners to maintaing and open line of communicationa and feedback mechanisms
Political elections result in reversal of agreed plans and policies	low	Consultative and iterative development of frameworks and plans. Analyses and fine tuning of interventions aims for documented financial self-sustainability by project end.

2.09 Sustainability

Sustainability assessment is the identification and analysis of degree of presence or absence of the factors that are likely to impact, either positively or negatively on the prospects of sustained delivery of project outcomes

and benefits. Economic, financial analysis and social analysis are important and should be undertaken to ensure incorporation of sustainability enhancement inputs during the preparation and the design stage of a project.

The plan for sustainability for this subproject will be relevant, participatory, acceptable and viable. Consideration will be given previous adverse impact experiences to ensure that they are effectively mitigated. The implementation, monitoring and post project evaluation strategies employed by the Ministry of Sustainable Development and other key stakeholders/partners will form the core process for analyzing project sustainability.

2.10 Replicability

The interventions proposed here represent a first step of sustainable replication and adaptation of lessons learnt during the predecessor GEF-IWCAM Project. As detailed in section 2.5.1., IWCAM piloted reversal of land degradation, water security, and pollutions control projects in several Caribbean SIDs. Lessons learnt from this project are now proposed for replication in and adaptation to the conditions of the College Street Ghaut, St Kitts, as well as selected quarries and sand-mined beaches on Nevis. Quarries and beaches that cannot be covered under the proposed project are prime candidates for future replication.

It is expected that further lessons on adaptation requirements for the transfer of IWCAM innovative solutions across Caribbean SIDs will be learnt during IWECO. This, in turn, will allow a more systematic replication of solutions in IWRM, SLM, BD and SFM across the Caribbean region.

The suite of IW, LD and BD-related indicators of process, stress reduction, and environmental and socioeconomic status that will be identifies and strengthened under the current project phase in St Kitts and Nevis, as well as the protocol to monitoring them, can be extended to the national level for the management of land/ecosystems, water resources and wastewater.

Participation in major relevant conferences will facilitate the promotion and enhance replication opportunities of tested technologies and adaptation protocols.

2.11 Execution Arrangements

The project will be implemented over a period of four years. The IWEco project will be managed using standard UNEP/GEF modality. The National Executing Agency (NEA) for the project will be the Ministry of Sustainable Development. A dedicated Project Management Unit (PMU) will be established within the Department of Physical Planning and Environment (DPPE). The DPPE will be directly responsible for the timely delivery of inputs and outputs and for coordination with all other relevant agencies through the PMU.

The NEA will execute its functions under the guidance of the GEF Implementing Agency (UNEP) with technical back-stopping from UNEP Car/RCU, supported by CARPHA's Environmental Health & Sustainable Development Department. The Project Management Unit (PMU) will coordinate project execution and it will be headed by a Project Manager (PM). He/she will be a national professional recruited for the four-year duration of the project and will be directly responsible for the project execution including day to day operations guided by approved work plans. The PM will work under the direction of the Permanent Secretary of the Ministry of Sustainable Development.

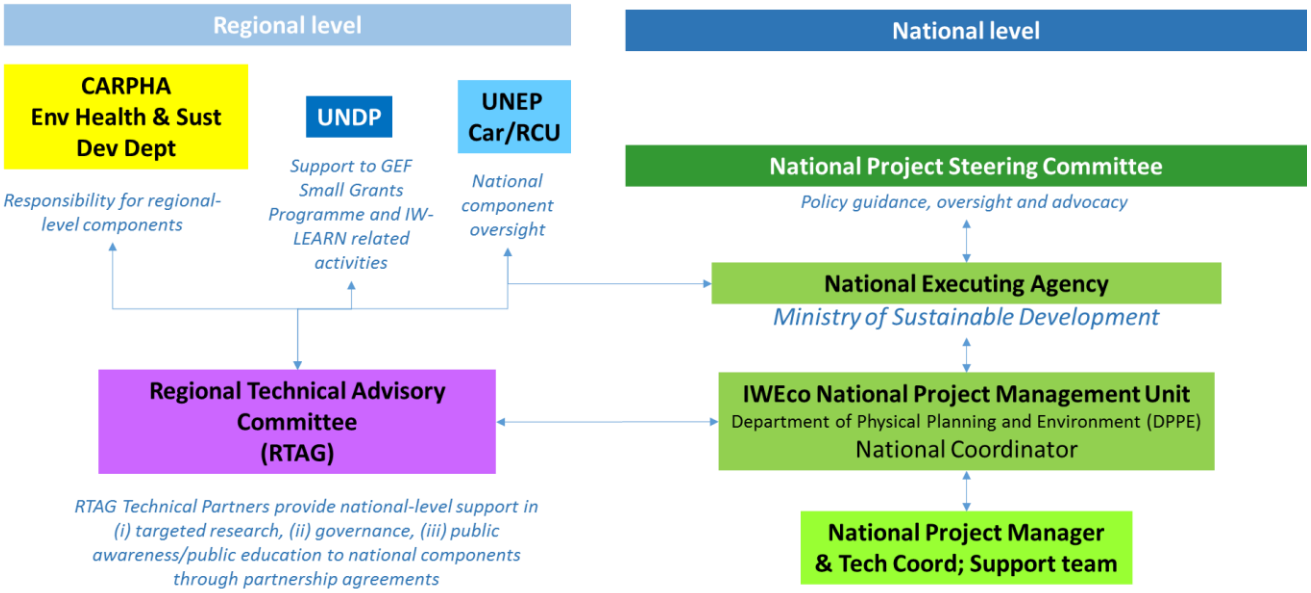
The PMU will have overall responsibility for project management, administrative, technical and financial reporting in collaboration with the GEF-Implementing Agency (UNEP) and will be responsible for achievement of the objectives and outputs of the project. The PMU will manage the selection process for all local contracts and recruitment of local consultants. This will include preparation of TOR, call for bids and organization of the selection process. This will all be done in close coordination with GEF-Implementing Agency (UNEP) but the contracts will be awarded by the PMU.

The project will receive high-level policy support and technical guidance from the Ministry of Sustainable Development. The Project Steering Committee (PSC) will be responsible for policy input, functional guidance, and overall coordination of the project and will meet every three months or as often as is necessary. The Project Manager shall be the Secretary of the Committee, which will be chaired by the Senior Environmental Officer in the DPPE.

The PSC will be composed of the representatives from the following agencies.

- Department of Physical Planning & Environment (UNCCD Focal Point) (MSD)
- Department of Lands & Survey, Ministry of Sustainable Development
- Department of Agriculture
- Ministry of Legal Affairs
- Department of Economic Affairs and Public Sector Investment Planning, Ministry of Sustainable Development)
- Water Services Department
- Public Works Department
- Sanitation Division (Public Health)
- Ministry of Social Development and Community Affairs
- St. Kitts Tourism Authority
- Department of Fisheries
- Chamber of Industry and Commerce
- Nevis Historical and Conservation
- Community-based Organization representative (to be determined)
- Farmers representative (to be determined)

Mechanisms will be developed to ensure that the project receives the maximum level of recognition, commitment, support and involvement at the highest level of Government. Agreements will be made between co-financing and partner institutions to ensure full commitment and assure that the objectives of the project are met. The national executing arrangements are illustrated in the graphic below.



Project Steering Committee
Hosted by Ministry of Sustainable Development
Chair: Senior Environmental Officer in (DPPE)
Secretary: Project Manager

Members:
Department of Physical Planning & Environment (UNCCD Focal Point) (MSD)
Department of Lands & Survey, Ministry of Sustainable Development
Department of Agriculture
Ministry of Legal Affairs
Department of Economic Affairs and Public Sector Investment Planning, Ministry of Sustainable Development)
Water Services Department
Public Works Department
Ministry of Social Development and Community Affairs
St. Kitts Tourism Authority
Department of Fisheries
Chamber of Industry and Commerce
Nevis Historical and Conservation
Community-based Organization representative (to be determined)
Farmers representative (to be determined)

2.12 Communications and Dissemination Mechanisms

A detailed schedule of project review meetings will be developed by the DPPE in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. This schedule will include (i) tentative time frames for Tripartite Reviews, Project Coordination Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.

The day to day monitoring will be the responsibility of the PMU, operating out of the DPPE and based on the project's Annual Work Plan and its indicators. The DPPE will inform the GEF-Implementing Agency (UNEP) of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted timely.

Periodic Monitoring of Implementation Process will be undertaken by the GEF-Implementing Agency (UNEP) through quarterly meetings with the project proponent, or more frequently as deemed necessary. This should allow parties to take stock and troubleshoot any problems pertaining to the project aptly to ensure smooth implementation of project activities. The Project Coordinator in conjunction with the UNEP-GEF extended team will be responsible for the preparation and submission of the following reports that form part of the monitoring process.

An Inception Report (IR) will be prepared immediately following the Inception Workshop and submitted within 3 months from the start of project implementation. It will include a detailed First Year/Annual Work Plan divided in quarterly time frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan would include the dates of specific field visits, support missions from the GEF-Implementing Agency (UNEP) Office, or the Project Coordinating Unit (RCU) or Consultants, as well as time frames for meetings of the PSC. The report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12-month time frame.

The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions, and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. Once finalized, the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond to comments or queries.

Quarterly Operational Reports: Short reports outlining main updates in the project progress will be provided quarterly to the Regional Project Coordinating Unit by the project team.

Technical Reports will be scheduled as part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the project, and tentative due dates. Where necessary/applicable, this Reports List will be revised and updated, and included in subsequent Annual Progress Reports (APRs). Where necessary, Technical Reports will be prepared by external consultants and will be comprehensive with specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

2.13 Monitoring and Evaluation (M&E)

The sub-project will be monitored through the following M&E activities:

Sub-project start-up: An Inception Workshop will be held within the first 3 months of the establishment of the National Project Management/Coordinating Unit involving those with assigned roles in the overall project organization structure, UNEP, CARPHA and where appropriate/feasible regional partners, national advisors as well as other national and local stakeholders. The Inception Workshop is crucial to building ownership for the project and commitment to achieving project results and to plan the first year annual work plan.

The following are the key areas to be addressed in the Inception Workshop:

- Provide clear understanding amongst all partners of the project and create ownership of the sub-project.
- Detail the roles, support services and complementary responsibilities of UNEP Car/RCU and CARPHA vis à vis the project team.
- Provide guidance on the roles, functions, and responsibilities within the sub-project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.
- Review the sub-project staff Terms of Reference as appropriate.
- Finalize the first annual work plan based on the project results framework and the relevant GEF Tracking Tool. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed upon.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule National Project Steering Committee meetings.

The first National Project Steering Committee meeting should be held within the first 6 months following the Sub-Project Inception Workshop. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Sub-project monitoring of implementation progress will be undertaken by the National Project Implementation Unit (NPIU) through the provision of quarterly reports. The reports are the responsibility of the National Project Coordinator, and will be developed with the close support of the PCU and RPC. Progress reports will be submitted to the PCU for onward submission to the PSC for review and reflection on challenges and opportunities. These reports will be the principle tools of regular project monitoring, form the basis for adaptive management. Each report will minimally contain:

- An account of implementation activities undertaken during the reporting period, and an update and assessment of progress against the implementation plan;
- Identification of (known and/or new) barriers to project implementation and corresponding recommendations for corrective actions during the following period (including revisions to the implementation plan, as necessary);
- A detailed and costed work plan for the subsequent reporting period, including status of funds held locally and, when necessary, a request for further cash transfers to the sub-project;
- An updated inventory of non-expendable equipment and items procured for the project; and
- Copies of project meeting reports or minutes and participant lists, as well as other technical outputs submitted to the project PCU.

The monitoring information will then be compiled and submitted as part of the reporting for the project, and integrated in the periodic reporting by the executing agencies to the PCU. The collection of information at the national and regional levels will be part of the project's knowledge management efforts.

Periodic Monitoring through site visits: UNEP/DEPI Task Manager and the UNEP Car/RCU will conduct visits to sub-project sites based on the agreed schedule in the sub-project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the NPSC may also join these visits. A Field Visit

Report will be prepared by the Task Manager and UNEP Car/RCU and will be circulated no less than one month after the visit to the sub-project team and NPSC members.

Mid-term Evaluation of sub-project cycle: The sub-project will undergo an independent Mid-Term Evaluation at the mid-point of sub-project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the sub-project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the sub-project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNEP based on guidance from the Regional Coordinating Unit. The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Sub-Project: An independent Final Evaluation will take place prior to the final NPSC meeting and will be undertaken in accordance with UNEP and GEF guidance. The final evaluation will focus on the delivery of the sub-project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNEP with the support of the Regional Coordinating Unit and the GEF.

During the last three months, the sub-project team will prepare the Sub-Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the sub-project's results.

Learning and knowledge sharing: Results from the sub-project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The sub-project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this sub-project and other projects of a similar focus.

Table 11: Monitoring and Evaluation Matrix for Sub-project 1.5

Sub-Project 1.5: ***Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis***				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
Component 1: Develop and foster the implementation of targeted innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the College Street Ghaut watershed and quarry sites on Nevis.				
Sub-component 1.1.1: Land degradation control measures along the banks of the College Street Ghaut	• Areal extent of riparian erosion control contour barriers and other solutions (ha)	• limited land degradation controls in target areas • disruptive localized and seasonal floodings especially along the	• At least 2 km (linear) or 2 ha infrastructural works installation within the ghaut riparian zone	• infrastructural works installation over at least 5 linear km (5 ha) within riparian zone

Sub-Project 1.5: *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis*				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
	• Estimated soil loss (t/ha/yr) • Volume of sand extractions (tonnes)	lower sections of the watershed.	• Reduction in sediment loading from ghaut by at least 10% • Reduction in sand mining from the College Street Ghaut by at least 20% over baseline	• Reduction in sediment loading from ghaut by at least 30% • Reduced by at least 50% volume of sand/aggregate from College Street Ghaut and Basseterre beach
Sub-component 1.1.2: On-site grey water treatment investment to treat effluent from private and commercial properties in greater Basseterre area	• Percentage of households and commercial properties with on-site treatment; water quality (coliform count) of outfall of College Street Ghaut	• Less than 10% of households and commercial properties treat grey waters	• Feasibility assessment for appropriate on-site wastewater treatment. Commencement of initial installation works	• At least 20% of households and commercial properties treat grey waters on-site
Sub-component 1.1.3: Retention pond at Bayford's Estate	• retention pond constructed	• No retention pond	• Feasibility assessment and commencement of initial work	• One retention pond installed
Sub-component 1.1.4: Restoration and reforestation plan for abandoned quarry at Hick Estate	• Published restoration and reforestation plan	• No plan	• Restoration plan agreed and published	• Plan actively used to guide investments over project duration
Sub-component 1.1.5: Restoration and reforestation investments of non-productive quarry at Hick Estate (guided by criteria outline in the restoration plan)	• Area of reforestation and restoration (hectares)	• Barren rock and soil is exposed	• 50% of identified areas restored/reforested – approx. 70 ha	• 100% of identified areas restored/reforested – total of 135 hectares
Sub-component 1.1.6: Artificial reefs deployed at New River, Indian Castle, Dogwood and Long Haul.	• Aerial extent of artificial reef installation (hectares)	• No artificial reefs; natural coral stressed or dead	• Feasibility (reef survey) assessment for artificial reefs (e.g. made of old car tyres) deployment at prioritized sites	• Artificial reefs deployed at prioritized sites over at least 2 hectares
Sub-component 1.1.7: Beach restoration investment at Indian Castle	• Volume of sand extracted (tonnes/yr) • Soil loss (t/ha/yr)	• Heavy erosion headland and shoreline; beach denuded; regular sand mining activities	• Reduction in volume extractions by at least 20% over baseline • Reduction in estimated associated soil loss by at least 10% over baseline	• Halt headland erosion; stabilized shoreline; reduced sand mining by 50% • Reduction in soil loss by at least 20%
Sub-component 1.2.1: Cost:benefit and feasibility study for sustainable sand extraction for St Kitts and Nevis	• Recommendations for sustainable aggregate extraction adopted	• Baseline study by Gillian Cambers, University of Puerto Rico	• Cost-benefit analyses for 5 different extraction scenarios on each island •	• Study used as basis for design of policy
Sub-component 1.2.2: Information resources for plumbers/building contractors, septic service providers, home-owners and business people on St Kitts aware of importance of grey water treatment	• Number of consultations and community meeting • Number of attendees at consultations • KAPB (knowledge, attitudes, practice, behavior) study findings on awareness	• Limited awareness and concomitant short-sighted investment/action	• At least 50% of targeted stakeholders engaged in consultations (community, plumbers/building contractors, septic service providers, business owners)	• 80% of target stakeholders attended sector-specific awareness-raising consultations/events • Final KAPB indicate increased awareness by

Sub-Project 1.5: *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis*				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
			• Initial KAPB study completed and findings used in project implementation	at least 50% among stakeholders
Sub-component 1.2.3: Investment in community-based water supply and sanitation for disadvantaged communities (priority on those with substandard hygienic infrastructure) to be supported by the GEF-SGP	• Potable and ambient water quality standards • Number of water borne illness reports within target community • Number of households in target community with improved water and sanitation access	• PAHO & WHO standards used; weak linkages between land degradation, environmental quality to human health; sparse documentation and availability of data that makes connections; data capture mechanisms are not appropriately linked and need strengthening.	• Development of standard and protocol for water quality data collection and linkages to human health • Gender audit related to access to safe water and challenges – inform small-scale intervention • Initiation of at least 1 small-scale communal intervention under GEF-SGP on enhancing water security and sanitation	• National water quality standard (and data collection protocol) formally adopted • Small-scale water and sanitation intervention completed • 60% improvement of water quality samples meeting accepted quality standards • Increase by at least 40% in number of households with improved access to water and sanitation in target community • Reduction by at least 30% in reports in water-borne illness within target community
Component 2: Strengthen Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystems Monitoring and Indicators frameworks in Saint Kitts and Nevis				
Sub-component 2.1.1: Suite of IW and LD, and BD-related indicators of process, stress reduction, and environmental and socioeconomic status mainstreamed into national accounts	• National register/compendium of agreed indicators at national level • complement of trained professionals in application of indicators	• Legislative framework for EIA's exist; but no regulatory framework for application of environmental indicators • limited integration of environmental indicators into national reporting • limited use of environmental indicators in socio-economic development and assessment of impacts of environmental degradation on productive sector outputs • capacity to mainstream these indicators is generally low given knowledge and human resource deficits • movement toward sustainable development approaches is gaining momentum.	• Assessment report on national progress towards indicators integration with recommendations for enhancement (based on IWCAM work) • National indicators register approved by Ministry of Sustainable Development • Initiation of national reporting alignment process with environmental indicators • At least two (2) awareness-raising/training events targeting policy and technical personnel	• National reporting frameworks aligned to include environmental indicators • Total of at least four (4) awareness-raising/training events targeting policy and technical personnel
Sub-component 2.1.2: A monitoring protocol for	• Monitoring protocol & instrumentation installed	• Monitoring protocols are generally weak or non-	• Project monitoring framework	• monitoring framework adequately informed

Sub-Project 1.5: *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis*				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders	at target intervention sites	existent; difficult to make periodic baseline assessments; lack or poor level of knowledge to support decision-making	• Field instrumentation/monitoring installed and generating data • Project personnel trained in operation of instrumentation and interpretation of data • Data sets generated on land degradation (surface erosion, beach profiles)	project progress assessment • Data sets generated
Component 3: Strengthen policy, legislative and institutional reforms and capacity building to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystem services management taking into consideration climate change resilience building in Saint Kitts and Nevis.				
Sub-component 3.1.1: National reviews of water and wastewater legislation and institutional arrangements (and recommendations of necessary reforms)	• Published policy/legal review - update of current situation	• Some level of policy and legislative review has been undertaken with recommendations - the rate of adoption and implementation is hampered by capacity of relevant agencies to drive process (especially case for attorney general chambers which are often overwhelmed) • regional-level frameworks exist that can be translated to local jurisdictions;	• Completed review process and draft institutional arrangements proposed •	• Legislative and policy review completed (based on contributions from OECS policy development and IWCAM Project)
Sub-component 3.1.2: New and/or revised legislations, policies and regulations on water supply and sanitation, land degradation control (related to unsustainable mining).	• Ratified policies • bills passed into law • new regulations	• Investments in legislative reform as a result of review processes take a long time to go through parliamentary processes • low level of priority assigned hampers rate of progress • national action plans and other frameworks emanating from regional and international treaties exist but not adequately mainstreamed through laws and regulations • buy-in at the highest political level, the private sector and civil society is not yet at desired levels	• Initiation/continuation of work on water and land use policy • Draft legislation and regulations formulated • Draft sand-mining and quarrying ordinances developed • Framework for licensing system for quarry operators • At least 2 public and a high-level policy maker awareness seminars/workshops convened	• National water and land use policy ratified by government • Support legislation and regulations adopted • Sand-mining and quarrying ordinances adopted • Licensing system for quarry operators completed • Total of at least 2 public and a high-level policy maker awareness seminars/workshops convened
Sub-component 3.1.3: Revised NCEMA (federal legislation) with provisions	• Enactment of NCEMA	• Bill in draft	• Final review process completed (ensure	• National Conservation and Environmental

Sub-Project 1.5: *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis*				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
for quarrying and sand mining and updating the Nevis Zoning Plan and Map			coverage of quarrying and sand mining)	Management Bill is enacted •
Sub-component 3.1.4: Watershed basin master planning framework to guide investment planning processes	• Adoption of watershed planning framework •	• priority ascribed is relatively low and thus presents challenges in advancing the process • level of awareness amongst stakeholders is relatively low	• Watershed management planning framework adopted	• Watershed planning framework supports guides planning and implementation
Sub-component 3.1.5: Watershed Management Plan for College Street Ghaut (as a sub-component of overall National Water Resources Management Plan)	• Published watershed management plan	• No plan exists	• College Street Watershed Management Plan prepared and ratified.	• College Street Watershed Management Plan used as basis to guide project investments
Sub-component 3.2.1: Functioning National Environmental Committee/Commission	• Terms of Reference for Committee • Number of meetings of the NEC	• No National intersectoral committee exist. National inter-sectoral coordinating mechanism needs strengthening and not mainstreamed in national-level planning; existence of multiple such committees typically 'project-driven' • typically composition of same agencies across most such committees • the project steering committee established under IWCAM has not functioned in the context of promotion and replication of the national demonstration project • some level of stakeholder fatigue and capacity limitations in making meaningful contributions	• Rules of Procedure for NEC developed • NEC formally constituted • At least 2 meetings of the NEC – engaged in national project implementation guidance	• At least 6 NEC meetings during project implementation
Sub-component 3.2.2: Programme for cross-sectoral sensitization and awareness-raising for all relevant stakeholders (water, sustainable land and ecosystem management)	• National PA/PE programmes • Number of private sector and community representatives engaged • number and diversity of media products generated	• Public awareness and public education programmes are ongoing but tends to be ad-hoc and/or sporadic in roll-out and typically project-driven • such programmes tend not to be sufficiently mainstreamed as part of routine outreach	• Comprehensive national PA/PE programme in support of the project • range of printed and electronic media products • at least 4 special seminars held	• Range of printed and electronic media products • At least 10 seminars held

Sub-Project 1.5: *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis*				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
		activities of responsible agencies often the result of capacity constraints, either human and/or financial • recognition that engagement of schools in such programmes must be expanded but most countries have not been able to mainstream within school curricula • Linkages between mainstream media and relevant agencies to facilitate outreach are weak - mainstream media usually ascribe low priority/attention to matters related to the environment; (v) private sector not targeted sufficiently to trigger their empowerment and acceptance of their contributory roles		
Sub-component 3.2.3: Programme for training and built capacity to support watershed management, SLM & ecosystems management for relevant government, private sector agencies and civil society organizations	• Number of training activities • number and diversity of stakeholders that participated • resource materials	• Country have implemented capacity building programmes mainly associated with projects where resources are available • routine training and capacity building is somewhat limited on account of resource constraints	• Needs assessment based on existing and planned initiatives completed • Harmonized capacity building programme designed and under implementation • At least 4 training activities	• At least 10 training activities
Sub-component 3.2.4 Training manual for best quarry layout and extraction practices	• Manual produced to international standards and available for training	• There is no manual available to quarry operators on Nevis	• Quarry management manual produced to international standards	• manual used to support project implementation
Sub-component 3.2.5: Training programme for quarry operators (on site layout, extraction practices and restoration/reforestation)	• Number of training events held • Number of participants	• No training given; no guidelines for good practices available	• At least 60% of target quarry operators trained	• 100% of all operators trained
Sub-component 3.2.6: Training programme on sand/aggregate substitution	• KAPB study findings (assess issues associated with poor mining practices)	• Low awareness of alternative building materials; sand regarded a renewable resource	• KAPB survey at start of project implementation • At least 25% increase in awareness level on St Kitts and Nevis	• KAPB survey at end of project implementation • 50% increase in awareness on St Kitts and Nevis

Sub-Project 1.5: *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis*				
Project Outputs	**Description of indicator**	**Baseline level**	**Mid-term targets**	**End-of-project targets**
Component 4: Enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Kitts and Nevis				
Sub-component 4.1.1: Contributions to suite of best practices and lessons in improved quarry management and land restoration	• best practices readily available as reference in a compendium	• documentation of best practices and application in the utilization of natural resources for commercial and industrial purposes remains weak • the extent of information capture and dissemination/promotion/publicity is not as extensive/elaborate as it needs to be to encourage uptake • capacity limitations exists in capturing and sharing knowledge • there has been best practices harvested from many projects but does not receive the level of visibility given priority accorded in mainstream media	• documentation of best practices	• National compendium of best practices compiled and disseminated
Sub-component 4.1.2: Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project	• Number of country visits • Number of professionals/stakeholders participating in exchanges	• Routine technical exchanges amongst practitioners tends to be limited due to financing constraints	• At least 1 technical exchange by at least 6 local professionals in another the Caribbean country	• At least 2 technical exchanges between professionals across SIDS regions to share experiences and develop/validate tools target a maximum of 5 persons to participate in each
Sub-component 4.1.3: At least 2 major technical conferences and symposia to showcase the innovative solutions	• Number of professionals/stakeholders participating major conference events	• Opportunities for showcasing tools and techniques exist through conferences and meetings including UNEP's IGM, the OECS TAC, the CWWA and the CARICOM COTED	• Core stakeholders participate in at least 1 major event to present findings from national project (at least 5 persons to participate)	• Core stakeholders participate in at least 2 major events to present findings from national project (target max of 5 persons to attend such events)
Sub-component 4.1.4: Research articles, books, other awareness materials through various media	• Publications and media products widely disseminated	• Research articles and published outputs tend to be limited in circulation to target stakeholders and may not be in most appropriate format to be considered relevant	• At least 1 significant research article (peer reviewed and/or non-peer reviewed) from the national project	• At least 3 significant research articles (peer reviewed and/or non-peer reviewed)

3 PROJECT ANNEXES

Annex 3.1 Logical Framework and Objectively Verifiable Impact Indicators

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
Component 1 Objective: To develop and foster the implementation of targeted innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the College Street Ghaut watershed and quarry sites on Nevis.					
National component C1.1 Outcome Measurable stress reduction at Measurable stress reduction achieved in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.	• Investments successfully demonstrate stress reduction and replication is taking place based on lessons learnt • Movement toward a favourable change in status in the condition of the resource base in the College Street Ghaut watershed [and downstream of quarry sites in Nevis], as evidenced by scientific observation and tracking he relevant indicators • Replication and up-scaling of methods and approaches is initiated in other parts of the country and across other SIDS	• Limited use of targeted interventions to prove measurable benefits • critical areas where land and water and/or biodiversity degradation is occurring are not being addressed • assessments are very sporadic - cannot assess change over time • information tends not to be analyzed • reports generated are not shared - info lost • limited capacity to utilize information - data is sometimes not used to make decisions - data is not available so hampers use in decision-making	• Establish of baselines as applicable • Investments informed by best practices in quarry/aggregate mining and abstraction management and rehabilitation of at least 135 hectares	• National reporting to conventions and other international and regional frameworks • Project progress reports • Collaborating agency progress reports • Media reports • Scientific reports (monitor impacts of investments) on biodiversity status • Reports of replication and up-scaling to other sites in the country and translation to other Caribbean countries and at the global level	**Risks:** (i) frameworks for monitoring are established that exceed national level capabilities for long-term support; (ii) established systems are not maintained as a result of resource commitment; (iii) **Assumptions:** governments and patterns will continue commitment and investments in monitoring systems; (ii) stakeholders will recognize and value benefits of monitoring systems and will contribute towards maintenance of such systems; (iii) results/information from monitoring systems will be effectively communicated toward effecting meaningful change in practice; (iv) design of systems will be sensitive to capacities of stakeholder agencies to mainstream systems; (v)
Sub-component 1.1.1: Land degradation control measures along the banks of the College Street Ghaut	• Areal extent of riparian erosion control contour barriers and other solutions (ha) • Estimated soil loss (t/ha/yr) • Volume of sand extractions (tonnes)	• limited land degradation controls in target areas • disruptive localized and seasonal floodings especially along the lower sections of the watershed.	**Mid-term** • At least 2 km (linear) or 2 ha infrastructural works installation within the ghaut riparian zone • Reduction in sediment loading from ghaut by at least 10%	• Aerial photos • Technical reports/publications • Monitoring and scientific reports • Media reports	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
			• Reduction in sand mining from the College Street Ghaut by at least 20% over baseline **End of project** • infrastructural works installation over at least 5 linear km (5 ha) within riparian zone • Reduction in sediment loading from ghaut by at least 30% • Reduced by at least 50% volume of sand/aggregate from College Street Ghaut and Basseterre beach		
Sub-component 1.1.2: On-site grey water treatment investment to treat effluent from private and commercial properties in greater Basseterre area	Percentage of households and commercial properties with on-site treatment	Less than 10% of households and commercial properties treat grey waters	**Mid-term** • Feasibility assessment for appropriate on-site wastewater treatment. • Commencement of initial installation works **End of project** • At least 20% of households and commercial properties treat grey waters on-site	• Completed installations • Project technical reports	
Sub-component 1.1.3: Retention pond at Bayford's Estate	retention pond constructed	No retention pond	**Mid-term** • Feasibility assessment and commencement of initial work **End of project** • One retention pond installed	• Project technical report • Ministry reports • Project reports	
Sub-component 1.1.4: Restoration and reforestation plan for abandoned areas within operational quarries	Published restoration and reforestation plan	No plan	**Mid-term** • Plan agreed and published **End of project** • Plan used to guide investments over project duration	• Restoration plan • Ministry reports • Project reports	
Sub-component 1.1.5: Restoration and reforestation investments within non-productive	Area of reforestation and restoration (hectares)	Barren rock and soil is exposed	**Mid-term** • 50% of identified areas restored/reforested – approx. 70 ha	• Physical inspection • Ministry reports • Project reports	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
quarry at Hick Estate (guided by criteria outline in the restoration plan)			**End of project** • 100% of identified areas restored/reforested – total of 135 hectares		
Sub-component 1.1.6: Artificial reefs deployed at New River, Indian Castle, Dogwood and Long Haul.	Aerial extent of artificial reef installation (hectares)	No artificial reefs; natural coral stressed or dead	**Mid-term** • Feasibility assessment for artificial reefs (e.g. made of old car tyres) deployment at prioritized sites **End of project** • Artificial reefs deployed at prioritized sites over at least 2 hectares	• Installation report • Physical inspection reports • Project reports	
Sub-component 1.1.7: Beach restoration investment at Indian Castle	• Volume of sand extracted (tonnes/yr) • Soil loss (t/ha/yr)	Heavy erosion headland and shoreline; beach denuded; regular sand mining activities	**Mid-term** • Institute control measures to reduce sand mining; reduction by at least 20% over baseline **End of project** • Halt headland erosion; stabilized shoreline; reduced sand mining by 50%	• Ministry reports • Monitoring reports • Project reports • Media reports	
National component C1.2 Outcome Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning	• Potential for sustainable livelihood improved through creation of spin-off economic benefits • Communities are engaged in elements of project implementation at the local community level • Clear evidence of gender-equity in access to benefits	• limited understanding of resource use/extraction rates/ use characterization - by community, government, private sector • studies exist re the marine valuation of ecosystems services - need to look at the terrestrial resources in same context • limited understanding amongst stakeholders of consequences of actions on their own livelihoods - e.g. degradation of riparian zones • Relatively low engagement of community groups and CSOs in active natural resources management	• good knowledge of economic dimension of resource use - valuation of ecosystem services • positive growth of economic status of targeted stakeholders • programme supports community groups, e.g. Mothers' Union, church groups, etc. May need to implement rules for urban spaces regarding wastewater, rain water and water recycling/reuse	• national planning and development reporting • national reporting to conventions and other international and regional frameworks • SGP implementation reviews • national grantee reporting	**Risks:** (i) senior policy makers and other stakeholders do not regard investments in improved environmental management within national development priorities; (ii) private sector are not sufficiently integrated, perceive limited gains and adopt a 'business-as-usual' approach; (iii) challenges related to capacity limitations within targeted communities; (ii) low level

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
Sub-component 1.2.1: Cost:benefit and feasibility study for sustainable sand extraction for St Kitts and Nevis	Recommendations for sustainable aggregate extraction adopted	Baseline study by Gillian Cambers, University of Puerto Rico	**Mid-term** • Cost-benefit analyses for 5 different extraction scenarios on each island by end of year 2 **End of project** • Study used as basis for design of policy	Consultancy report	of buy-in amongst targeted interest groups within communities; (iii) lack of support by local counterpart state agencies **Assumptions:** (i) governments integrate environmental considerations within mainstream planning in respect to contributions to improved health and livelihood attainment; (ii) the benefits of investments in environment is adequately reflected in national accounts and standard development indices; (iii) development partners continue to support investments in improved environmental management towards improved community welfare and economic livelihoods; (iv) communities are motivated and perceive livelihood and other benefits; (v) continued support by local agencies post-project; (vi) lessons learnt and positive experiences are built on for replication.
Sub-component 1.2.2: Information resources for plumbers/building contractors, septic service providers, home-owners and business people on St Kitts aware of importance of grey water treatment	• Number of consultations and community meeting • Number of attendees at consultations KAPB (knowledge, attitudes, practice, behavior) study findings on awareness	Limited awareness and concomitant short-sighted investment/action	**Mid-term** • At least 50% of targeted stakeholders engaged in consultations (community, plumbers/building contractors, septic service providers, business owners) • Initial KAPB study completed and findings used in project implementation **End of project** • 80% of target stakeholders attended sector-specific awareness-raising consultations/events • Final KAPB indicate increased awareness by at least 50% among stakeholders	• KAPB study findings • Consultation proceedings • Project reports • Ministry reports	
Sub-component 1.2.3: Investment in community-based water supply and sanitation for disadvantaged communities (priority on those with substandard hygienic infrastructure) to be supported by the GEF-SGP	• Potable and ambient water quality standards • Number of water borne illness reports within target community • Number of households in target community with improved water and sanitation access	PAHO & WHO standards used; weak linkages between land degradation, environmental quality to human health; sparse documentation and availability of data that makes connections; data capture mechanisms are not appropriately linked and need strengthening.	**Mid-term** • Development of standard and protocol for water quality data collection and linkages to human health • Gender audit related to access to safe water and challenges – inform small-scale intervention • Initiation of at least 1 small-scale communal intervention under	• Data (epidemiological), Multipurpose Lab, health clinics and other heath providers; • health care worker testimonials • Project reports	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
			GEF-SGP on enhancing water security and sanitation **End of project** • National water quality standard (and data collection protocol) formally adopted • Small-scale water and sanitation intervention completed • 60% improvement of water quality samples meeting accepted quality standards • Increase by at least 40% in number of households with improved access to water and sanitation in target community • Reduction by at least 30% in reports in water-borne illness within target community	• media releases	
Component 2 Objective: To strengthen Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystems Monitoring and Indicators frameworks in Saint Kitts and Nevis					
National Component C2.1 Outcome: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.	• Heightened awareness amongst policy makers and national stakeholders of the value of monitoring systems for informed decision making • Improved understanding of the impacts of project investments on change of environmental status through monitoring and tracking the relevant indicators • Decision makers and technical personnel are using the data and information generated to	Indicators are not applied in decision making	• Applicable baselines established • Technical analyses from effective monitoring systems to inform effectiveness of project investments • Agreement on indicators for assessing progress in the implementation land degradation control measures • Built capacity to undertake reliable monitoring	• relevant state of environment reports at national and regional levels • UN convention and other international and regional reporting outputs • regional-level harmonized monitoring plan • scientific research publications • strengthened observation platforms • national databases	**Risks:** (i) indicators frameworks promoted by the GEF and donor community are difficult to align within national accounts due to capacity human resource and financial limitations; (ii) continued challenges in regional and international support agency coordination in harmonizing indicator reporting frameworks; (iii) capacity constraints in maintaining observation

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
	strengthen the evidence base and apply it in future decision making				platforms and decision support platforms
Sub-component 2.1.1: Suite of IW and LD, and BD-related indicators of process, stress reduction, and environmental and socioeconomic status mainstreamed into national accounts	• National register/compendium of agreed indicators at national level • complement of trained professionals in application of indicators	• Legislative framework for EIA's exist; but no regulatory framework for application of environmental indicators • limited integration of environmental indicators into national reporting • limited use of environmental indicators in socio-economic development and assessment of impacts of environmental degradation on productive sector outputs • capacity to mainstream these indicators is generally low given knowledge and human resource deficits • movement toward sustainable development approaches is gaining momentum.	**Mid-term** • Assessment report on national progress towards indicators integration with recommendations for enhancement (based on IWCAM work) • National indicators register approved by Ministry of Sustainable Development • Initiation of national reporting alignment process with environmental indicators • At least two (2) awareness-raising/training events targeting policy and technical personnel **End of project** • National reporting frameworks aligned to include environmental indicators • Total of at least four (4) awareness-raising/training events targeting policy and technical personnel	• Status/assessment reports • published register/compendium of indicators in national accounts • convention reporting instruments • project progress reports • training reports	**Assumptions:** (i) strong state support for establishing and mainstreaming monitoring and reporting frameworks on the basis of recognized benefits; (ii) continued support by regional and international support partners
Sub-component 2.1.2: A monitoring protocol for periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders	Monitoring protocol & instrumentation installed at target intervention sites	Monitoring protocols are generally weak or non-existent; difficult to make periodic baseline assessments; lack or poor level of knowledge to support decision-making	**Mid-term** • Project monitoring framework • Field instrumentation/monitoring installed and generating data • Project personnel trained in operation of instrumentation and interpretation of data • Data sets generated on land degradation (surface erosion, beach profiles) **End of project**	• Project Monitoring Framework • Functioning instrumentation • training needs assessments • training course resources • training reports	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
			• monitoring framework adequately informed project progress assessment • Data sets generated	• project progress reports • media releases	
Component 3 Objective: To strengthen policy, legislative and institutional reforms and capacity building to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystem services management taking into consideration climate change resilience building in Saint Kitts and Nevis.					
National Component C3.1 Outcome: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.	• Improved resource management based on strengthened and mainstreamed legal and regulatory instruments that enables improved enforcement and compliance	• Some national legislation lacking supporting regulations therefore they are unable to adequately address negative environmental outcomes • International and regional treaties ratified but not integrated into national law • challenges in gaining buy-in from stakeholders • incentive measures to accompany legislative provisions are typically weak • instruments dominated by command and control rather than participatory approaches	• critical priority legislative provisions related to IWRM, LD, BD and SFM in Saint Kitts and Nevis are upgraded • publication and dissemination on new policy positions	• gazetted legislative amendments • new policy statements • reporting to UN conventions and other regional and international frameworks • project reports • media releases	**Risks:** (i) Potential lack of willingness at political level where proposals may be regarded as either controversial or costly to implement; (ii) lack of broad-based stakeholder support **Assumptions:** (i) There is willingness to collaborate with lead national agencies ; (ii) The project public awareness programme should provide the needed information to increase buy-in to policy and legal reforms
Sub-component 3.1.1: National reviews of water and wastewater legislation and institutional arrangements (and recommendations of necessary reforms)	Published policy/legal review - update of current situation	• Some level of policy and legislative review has been undertaken with recommendations - the rate of adoption and implementation is hampered by capacity of relevant agencies to drive process (especially case for attorney general chambers which are often overwhelmed) • regional-level frameworks exist that can be translated to local jurisdictions;	**Mid-term** • Review process commenced **End of project** • Legislative and policy review completed (contributions from OECS policy development and IWCAM Project)	• Status Review and recommendations report	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
Sub-component 3.1.2: New and/or revised legislation, policies and regulations on water supply and sanitation, land degradation control (related to unsustainable mining).	• Ratified policies • bills passed into law • new regulations	• Investments in legislative reform as a result of review processes take a long time to go through parliamentary processes • low level of priority assigned hampers rate of progress • national action plans and other frameworks emanating from regional and international treaties exist but not adequately mainstreamed through laws and regulations • buy-in at the highest political level, the private sector and civil society is not yet at desired levels	**Mid-term** • Initiation/continuation of work on water and land use policy • Draft legislation and regulations formulated • Draft sand-mining and quarrying ordinances developed • Framework for licensing system for quarry operators • At least 2 public and a high-level policy maker awareness seminars/workshops convened **End of project** • National water and land use policy ratified by government • Support legislation and regulations adopted • Sand-mining and quarrying ordinances adopted • Licensing system for quarry operators completed • Total of at least 2 public and a high-level policy maker awareness seminars/workshops	• Adopted new legislative drafts and regulations • Gazetted publication • Stakeholder feedback • Project reports • Media releases	
Sub-component 3.1.3: Revised NCEMA (federal legislation) with provisions for quarrying and sand mining	Enactment of NCEMA	Bill in draft	**Mid-term** • Final review process completed (ensure coverage of quarrying and sand mining) **End of project** • National Conservation and Environmental Management Bill is enacted	• Federal gazette notification • Project reports • Stakeholder feedback • Media releases	
Sub-component 3.1.4: Watershed basin master planning framework to	• Adoption of watershed planning framework	• priority ascribed is relatively low and thus presents challenges in advancing the process	**Mid-term** • Watershed management planning framework adopted **End of project**	• Watershed planning framework • media releases	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
guide investment planning processes		• level of awareness amongst stakeholders is relatively low	• Watershed planning framework supports guides planning and implementation		
Sub-component 3.1.5: Watershed Management Plan for College Street Ghaut (as a sub-component of overall National Water Resources Management Plan)	Published watershed management plan	No plan exists	**Mid-term** • College Street Watershed Management Plan prepared and ratified. **End of project** • College Street Watershed Management Plan used as basis to guide project investments	• Published plan • Project reports • Media reports • Consultative dialogue proceedings	
National Component C3.2 Outcome: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.	Institutional response from both state and non-state agencies are effective in addressing implementation	• many institutions lack requisite capacity due to human resources and financial constraints to effectively implement statutory obligations for IWRM, SLM, BD, SFM • non-state agencies and community organization lack capacity to facilitate stakeholder engagement; • low awareness at policy making level to gain support for investment in institutional strengthening • public awareness programmes tend to be sporadic hampering investment in capacity building • poor coordination amongst regional agencies in harmonizing approaches and advisory support to countries	• policy changes that mainstreams implementation into practice • improved level of support from national agencies to stakeholder interests in natural resources management through roll-out of targeted programmes • cooperation agreements between regional support organizations and improved planning and coordination • increased flow of information and knowledge products from lead agencies to stakeholders	• published policy statements • publication and dissemination and access to information • regional cooperation frameworks in effect • project reports • media releases	**Risks:** (i) Potential lack of willingness at political level **Assumptions:** (i) There is continued political support for ecosystem protection initiatives.
Sub-component 3.2.1: Functioning National Environmental Committee/Commission	• Terms of Reference for Committee • Number of meetings of the NEC	• No National intersectoral committee exist. National inter-sectoral coordinating mechanism needs strengthening and not mainstreamed in national-level	**Mid-term** • Rules of Procedure for NEC developed • NEC formally constituted	• Proceedings of NEC meetings • media releases	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
		planning; existence of multiple such committees typically 'project-driven' • typically composition of same agencies across most such committees • the project steering committee established under IWCAM has not functioned in the context of promotion and replication of the national demonstration project • some level of stakeholder fatigue and capacity limitations in making meaningful contributions	• At least 2 meetings of the NEC – engaged in national project implementation guidance **End of project** • At least 6 NEC meetings during project implementation	• project progress reports	
Sub-component 3.2.2: Programme for cross-sectoral sensitization and awareness-raising for all relevant stakeholders (water, sustainable land and ecosystem management)	• National PA/PE programmes • Number of private sector and community representatives engaged • number and diversity of media products generated	• Public awareness and public education programmes are ongoing but tends to be ad-hoc and/or sporadic in roll-out and typically project-driven • such programmes tend not to be sufficiently mainstreamed as part of routine outreach activities of responsible agencies often the result of capacity constraints, either human and/or financial • recognition that engagement of schools in such programmes must be expanded but most countries have not been able to mainstream within school curricula • Linkages between mainstream media and relevant agencies to facilitate outreach are weak - mainstream media usually ascribe low priority/attention to matters related to the environment; (v) private sector not targeted	**Mid-term** • Comprehensive national PA/PE programme in support of the project • range of printed and electronic media products • at least 4 special seminars held **End of project** • Range of printed and electronic media products • At least 10 seminars held	• Needs assessment report • PA/PE programme for project featuring national proposals • media and web-based products/content • public events	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
		sufficiently to trigger their empowerment and acceptance of their contributory roles			
Sub-component 3.2.3: Programme for training and built capacity to support watershed management, SLM & ecosystems management for relevant government, private sector agencies and civil society organizations	• Number of training activities • number and diversity of stakeholders that participated • resource materials	• Country have implemented capacity building programmes mainly associated with projects where resources are available • routine training and capacity building is somewhat limited on account of resource constraints	**Mid-term** • Needs assessment based on existing and planned initiatives completed • Harmonized capacity building programme designed and under implementation • At least 4 training activities **End of project** • At least 10 training activities	• Needs assessment report • training modules	
Sub-component 3.2.4 Training manual for best quarry layout and extraction practices	Manual produced to international standards and available for training	There is no manual available to quarry operators on Nevis	**Mid-term** • Quarry management manual produced to international standards **End of project** • manual used to support project implementation	• Manual used in training	
Sub-component 3.2.5: Training programme for quarry operators (on site layout, extraction practices and restoration/reforestation)	• Number of training events held • Number of participants	No training given; no guidelines for good practices available	**Mid-term** • At least 60% of target quarry operators trained **End of project** • 100% of all operators trained	• Training reports • attendance lists	
Sub-component 3.2.6: Training programme on sand/aggregate substitution	KAPB study findings (assess issues associated with poor mining practices)	Low awareness of alternative building materials; sand regarded a renewable resource	**Mid-term** • KAPB survey at start of project implementation • At least 25% increase in awareness level on St Kitts and Nevis **End of project** • KAPB survey at end of project implementation • 50% increase in awareness on St Kitts and Nevis	• KAPB study findings	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
Component 4 Objective: To enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Kitts and Nevis					
National Component 4.1 Outcome: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks	• Enhanced stakeholder networking and knowledge sharing towards implementation of solutions across the Caribbean and other SIDS regions • Technologies and approaches are being adapted and replicated through effective knowledge management methods and tools	• limited exchange of experiences between St Kitts and Nevis and across other SIDS in innovative approaches for IWRM, SLM, BD and SFM • low level of dissemination and access to information by potential beneficiary stakeholders • investments made through project interactions at national and regional level that could be better informed by experiences exchanges to minimize recurrence of undesired outcomes	• practitioners accessing and applying published suite of replicable best practices disseminated globally through knowledge networks • increased knowledge and awareness of appropriate solutions from policy makers to communities, practitioners • enhanced learning opportunities through direct professional and practitioner exchanges between countries and SIDS regions	• awareness resources • reporting to UN conventions and other regional and international frameworks • compendiums and published best practices • meeting/conference proceedings • scientific reports • media releases	**Risks:** (i) Limited willingness to think and plan in cross-sectoral manner **Assumptions:** (i) Willingness to think and plan in cross-sectoral manner exists in key agencies; (ii) relevant conventions remain national priority
Sub-component 4.1.1: Contributions to suite of best practices and lessons in improved quarry management and land restoration	best practices readily available as reference in a compendium	• documentation of best practices and application in the utilization of natural resources for commercial and industrial purposes remains weak • the extent of information capture and dissemination/promotion/publicity is not as extensive/elaborate as it needs to be to encourage uptake • capacity limitations exists in capturing and sharing knowledge there has been best practices harvested from many projects but does not receive the level of visibility given priority accorded in mainstream media	**Mid-term** • documentation of best practices **End of project** • National compendium of best practices compiled and disseminated	• Published compendium of best practices • MOUs/cooperation frameworks between cooperation agencies	
Sub-component 4.1.2: Technical exchange visits between professionals, civil society organizations to share knowledge	• Number of country visits • Number of professionals/ stakeholders participating in exchanges	Routine technical exchanges amongst practitioners tends to be limited due to financing constraints	**Mid-term** • At least 1 technical exchange by at least 6 local professionals in another the Caribbean country **End of project**	• MOUs/cooperation agreements (with assigned scope of activities) between	

Goal: Reduce and revert land degradation within the College Street Ghaut watershed, Saint Kitts, and quarry sites on Nevis, by an integrated water, land and ecosystems management approach.					
Results Level	**Indicator**	**Baseline**	**Mid-term and Final Target (expected date)**	**Sources of verification**	**Risks and Assumptions**
directly over the duration of the project			• At least 2 technical exchanges between professionals across SIDS regions to share experiences and develop/validate tools target a maximum of 5 persons to participate in each	participating agencies • Debriefing reports (post exchange) including lessons learnt • technical reports	
Sub-component 4.1.3: At least 2 major technical conferences and symposia to showcase the innovative solutions	Number of professionals/stakeholders participating major conference events	Opportunities for showcasing tools and techniques exist through conferences and meetings including UNEP's IGM, the OECS TAC, the CWWA and the CARICOM COTED	**Mid-term** • Core stakeholders participate in at least 1 major event to present findings from national project (at least 5 persons to participate) **End of project** • Core stakeholders participate in at least 2 major events to present findings from national project (target max of 5 persons to attend such events)	• Conference proceedings • conference papers • media releases	
Sub-component 4.1.4: Research articles, books, other awareness materials through various media	Publications and media products widely disseminated	Research articles and published outputs tend to be limited in circulation to target stakeholders and may not be in most appropriate format to be considered relevant	**Mid-term** • At least 1 significant research article (peer reviewed and/or non-peer reviewed) from the national project **End of project** • At least 3 significant research articles (peer reviewed and/or non-peer reviewed)	• Scientific reports • other research articles • media releases (all kinds television, radio, internet) • Awareness publications;	

Annex 3.2: Letters of Co-financing

ST. CHRISTOPHER AND NEVIS

MINISTRY OF SUSTAINABLE DEVELOPMENT,
BLADEN'S COMMERCIAL DEVELOPMENT,
P. O. Box 186,
ST. KITTS W.I.

December 17, 2013

Dr. Maryam Naimir-Fuller
Director
Division of Global Environment Facility Coordination (DGEF)
United Nations Environment Programme
P.O. Box 30552, Nairobi,
Kenya

Dear Ms Naimir-Fuller,

Subject: Letter of Commitment for Partnership and Co-financing to the GEF-funded Full Size Project "Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco Project)"

The Government of St. Kitts and Nevis (GSKN) through the Ministry of Sustainable Development notes and commends the development of the GEF-funded Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco) Project. The Department of Physical Planning and Environment welcomes the opportunity to advance the mandate of the Ministry of Sustainable Development in the implementation of this project given its role as a constituent of the Ministry charged with the mission to provide a framework to support the implementation of policies, programmes and measures to control and regulate the development of land and buildings, as well as to prevent, mitigate and/or reverse environmental degradation through scientific and technological excellence, raising public awareness, standard setting, advocacy and resource mobilization, thereby contributing to poverty reduction.

We note that several of the IWEco Project outcomes and outputs are of direct relevance to the scope of work/activities that are carried out by the Ministry of Sustainable Development and we are in a position to lend support to this important regional initiative. This letter therefore serves to confirm the commitment of the Department of Physical Planning and Environment in contributing to the implementation of the GEF-IWEco Project particularly in the component areas in the project: Implementation of targeted Innovation, Climate Change Resilient Approaches; Strengthening of Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and Ecosystems Monitoring and Indicators Frameworks; Strengthening of Policy, Legislative and Institutional Frameworks and Enhanced Knowledge Management at the national level of the project.

The contribution of the Department of Physical Planning and Environment to the Implementation of targeted Innovation, Climate Change resilient Approaches; Strengthening of Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and Ecosystems Monitoring and Indicators Frameworks; Strengthening of Policy, Legislative and Institutional Frameworks and Enhanced Knowledge Management of the IWEco Project is estimated at US$86,500 (in-kind) over the duration of the project. This Initiative will also benefit from the planned investment by the GSKN in the Basseterre Drainage Improvement Study (US$600,000) and the Improve Water Supply and Expand Storage Capacity (US$3,000,000) Project at a cumulative amount of fifty percent (50%) with a value estimated at US$1,500,000 (in-cash).

Telephone (869) 465-2521 ★ Fax: (869) 466-7398

We are pleased to be engaged as a partner and look forward to our fruitful collaboration in the implementation of the Integrated Water, Land and Ecosystems Project.

Yours Sincerely,

Beverly Harris
Permanent Secretary (Ag.)

cc Nelson Andrade Colmenares
Coordinator, UNEP-CAR/RCU
Email: nac@cep.unep.org

Telephone (869) 465-2521 ★ Fax: (869) 466-7398

Nevis Island Administration
Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment

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December 17, 2013

Dr. Maryam Naimir-Fuller
Director
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P.O. Box 30552, Nairobi,
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The Government of St. Kitts and Nevis (GSKN) through the Ministry of Sustainable Development notes and commends the development of the GEF-funded Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco) Project. The Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment in the Nevis Island Administration (NIA) welcomes the opportunity to partner with the Ministry of Sustainable Development in the implementation of this project in the advancement of its mission to enhance the quality of life of all the people on Nevis in a sustainable and environmentally friendly manner over the long term.

We note that several of the IWEco Project outcomes and outputs are of direct relevance to the scope of work/activities that are carried out by the Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment therefore we are in a position to lend support to this important regional initiative. This letter therefore serves to confirm the commitment of the Department of Physical Planning, Natural Resources and Environment in contributing to the implementation of the GEF-IWEco Project particularly in the component areas in the project: Implementation of targeted Innovation, Climate Change Resilient Approaches; Strengthening of Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and Ecosystems Monitoring and Indicators Frameworks;

Strengthening of Policy, Legislative and Institutional Frameworks and Enhanced Knowledge Management at the national level of the project.

The contribution of the Department of Physical Planning, Natural Resources and Environment to the Implementation of targeted Innovation, Climate Change resilient Approaches; Strengthening of Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and Ecosystems Monitoring and Indicators Frameworks; Strengthening of Policy, Legislative and Institutional Frameworks and Enhanced Knowledge Management of the IWEco Project is estimated at US$78,400 (in-kind) over the duration of the project.

We are pleased to be engaged as a partner and look forward to our fruitful collaboration in the implementation of the Integrated Water, Land and Ecosystems Project.

Yours Sincerely,

Ernie Stapleton
Permanent Secretary

cc Nelson Andrade Colmenares
Coordinator, UNEP-CAR/RCU
Email: nac@cep.unep.org

Annex 3.3 Terms of Reference for Partners and Consultants

Terms of reference for local and international consultants will be drawn up during the inception phase of the project.

3.3.1 Partner/Consultant

3.3.1.1 Background (common to all partners' TORS)

3.3.1.2 Description of Work

3.3.1.3 Outputs

3.3.1.4 Timeline (indicative)

3.3.1.5 Provisional budget

GEF increment	Partner Co-financing

3.3.1.6 Contacts

Annex 3.4. Carbon accounting – St. Kitts & Nevis

Ouputs from FAO Ex-Ante Carbon-balance Tool (EX-ACT) tool

Project Name	*IWECO St. Kitts & Nevis*	
Continent	Central America	
Climate	Tropical	
Moisture regime	Moist	
Dominant Regional Soil Type	Volcanic Soils	
Duration of the Project (Years)	Implementation phase	4
	Capitalisation phase	1
	Duration of accounting	5

Total acreage of direct investment				135	Ha
2.2 Afforestation/reforestation conversion of "degraded areas" to "plantation zone 2"				**135**	**Ha**
2.3 Other land use changes conversion of "degraded areas" to "perennial tree crop"				**0**	**Ha**
	Gross fluxes tCO2eq (Positive = source / negative = sink)		**Results per year tCO2eq** (Positive = source / negative = sink)		
	Without project	**With project**	**Without project**	**With project**	**Balance**
Land Use Changes					
Deforestation	0.0	0.0	0.0	0.0	0
Afforestation	0.0	-13,169.5	0.0	-2,633.9	-2633.9
Other	0.0	0.0	0.0	0.0	0
Agriculture					
Annual	0.0	0.0	0.0	0.0	0
Perennial	0.0	0.0	0.0	0.0	0
Rice	0.0	0.0	0.0	0.0	0
Grassland & Livestocks					
Grassland	0.0	0.0	0.0	0.0	0
Livestock	0.0	0.0	0.0	0.0	0
Degradation	0.0	0.0	0.0	0.0	0
Inputs & Investments	0.0	0.0	0.0	0.0	0
Total	**0.0**	-13169.5	**0.0**	-2633.9	-2633.9
Per hectare	0.0	-97.5517			
Per hectare per year	**0.0**	-19.5103	**0**	-19.5103	-19.5103