The Global Environment Facility-funded Integrating Watershed and Coastal Areas Management (GEF-IWCAM) Project

Capture and Demonstration of Good Practice and Lessons Learned

Case Study of the GEF-IWCAM Saint Kitts & Nevis Demonstration Project:

“Rehabilitation and Management of the Basseterre Valley as a Protection Measure for the Underlying Aquifer”

FINAL

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**ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>CBO</td>
<td>Community Based Organisation</td>
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<tr>
<td>CEHI</td>
<td>Caribbean Environmental Health Institute</td>
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<td>DCPB</td>
<td>Development Control and Planning Board</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EHD</td>
<td>Environmental Health Department</td>
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<td>Food and Agriculture Organisation (UN)</td>
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<td>GEF</td>
<td>Global Environment Facility</td>
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<td>IWCAM</td>
<td>Integrated Watershed and Coastal Area Management</td>
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<td>NEMA</td>
<td>National Emergency Management Agency</td>
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<td>NCEPA</td>
<td>National Conservation and Environmental Protection Act</td>
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<td>NGO</td>
<td>Non Government Organisation</td>
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<td>OECS</td>
<td>Organisation of Easter Caribbean States</td>
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<td>OET</td>
<td>Ocean Earth Technologies</td>
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<td>PACT</td>
<td>Protected Areas Conservation Trust</td>
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<td>DPPE</td>
<td>Department of Physical Planning and Environment</td>
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<td>PWD</td>
<td>Public Works Department</td>
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<td>SIDS</td>
<td>Small Island Developing States</td>
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<td>SKN</td>
<td>Saint Kitts and Nevis</td>
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<td>TBL</td>
<td>Triple Bottom Line</td>
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<td>WRMP</td>
<td>Water Resources Management Plan</td>
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<td>WSD</td>
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**Introduction:**

The Global Environment Facility funded Integrated Watershed and Coastal Areas Management (IWCAM) demonstration project in the Basseterre Valley Watershed (BVW) aimed to demonstrate the proper management and protection of a critical aquifer and well-field through a parallel process of mitigating threats from contaminants; on-the-ground protection through specific management activities; and improved user-resource management through the establishment of a management regime in the form of a national park.

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 water to the city. There is need to address the growing threat of pollutants and contaminants to the aquifer (both actual and potential), as several factors have and continue to pose a major threat to the water quality. Potential threats 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. At the ground level, this demonstration project was intended to provide direct protection for the aquifer zone and its supportive ecosystems through the designation of the said area as a protected landscape in the form of a National Park; with a long-term plan to reintroduce native species of plants, to re-establish the natural ecosystem, and to exclude undesirable species such as goats and other types of livestock.

The GEF-IWCAM Demonstration Project attempted to pilot the proper management and protection of the aquifer and well-field. These initiatives include, but are not limited to, the following actions:

1. **Mitigation of threats from contaminants**
   - Addressing threats from agricultural pollution
   - Addressing threats from domestic (sewage and wastewater pollution)

2. **Protection of aquifer, well-field and supportive ecosystem**
   - Improving land usage and eradicating inappropriate development
   - Protecting the Valley area and its ecosystem functions

3. **Improvements to the user-resource management interface**
- Developing a water resource management plan
- Mitigating leakages and wastage

The approach adopted by the Project Management Unit (PMU), as a priority activity, was to contract a firm to conduct a hydro-geological study to identify the threats to the groundwater resource base. The analysis included:

- Review and evaluation of all existing hydrogeologic data
- Mapping of the aquifer using a novel geophysical technique
- Recording of water levels and video survey of existing wells
- Sampling of wells for various water quality parameters
- Construction of a computer simulation model.

This study revealed the following areas of priority concern for the long-term management of the aquifer:

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 project also attempted to identify those areas of excessive use, areas of wastage or inappropriate practices. The project introduced new strategies for improved water management practices such as the installation of automated storage tank level controls to minimize the overflowing of tanks and the installation of bulk water meters in strategic locations to be able to identify leaks more proactively.
Both the Water Resource Management Plan and National Park Management plan developed under this project for the Basseterre Valley and its commercial zone and hinterland envision the provision of active and passive green spaces including the establishment of a botanical garden; the establishment of a national park to demonstrate the protection of national heritage; and the development of alternative sustainable economic livelihoods through tourism initiatives associated with the gardens and national park.
**Background**

The Federation of Saint Kitts and Nevis is a twin island state with a population of approximately 52,402 (2010 estimates, World Bank, World Development Indicators). The economy has in the past been dependent on predominantly the sugar cane industry but with the closure of the industry in 2005, there has been a marked shift towards the development of other industries with tourism being the country’s main focus. Saint Kitts, which is the larger of the two islands, is the focus of this study. More specifically, the Basseterre valley, which is immediately adjacent to its capital, Basseterre, houses the aquifer which supplies 40% of the water supply to the country’s capital. This aquifer produces approximately 2.5 million gallons of the daily national water consumption of 5 million gallons per day (gpd). The watershed covers an area of 5,230 acres or 8.17 square miles. The eastern valley (sub basin A) occupies 3,010 acres and the western valley (sub basin B) occupies 2,220 acres. The former is drained by Ogees River in the northeast. The groundwater flows south and recharges the Basseterre well-field. The latter is drained by the South Olivees River as well as College Ghaut close to the eastern edge of Monkey Hill. Both systems drain through Basseterre into the bay.

The valley which has been reduced to a monoculture of sugar cane is also located close to the island’s main tourist area, Frigate Bay. The presence of this commercial area coupled with other human-induced impacts have the potential to negatively affect the water quality supplied by the aquifer. Impacts enumerated such as fertilizer application to the remaining sugar cane fields (although no chemicals have been applied to any of the sugar cane since 2005), sewage treatment and disposal and storm water runoff along major roads have the potential to increase nitrate and phosphate loadings to the aquifer.

Saint Kitts has engaged in development of specific sector economies, agriculture and tourism which have both been highly dependent on its extensive natural resource base. As such, the need for sustainable management of these resources has become even more pronounced. In its attempt to ensure the long term sustainability of its water resource, the government of Saint Kitts and Nevis has recognized its significance in meeting the water demands of Basseterre and the adjacent environment. However, there is need for an effective policy on water use efficiency and better management of water resources on the island. While the tourism industry has been flagged as the vehicle for growth on the island, its contribution to water exploitation creates a more urgent need to implement water resource management and develop sustainable water resource extraction policies while protecting the resource and reducing wastage and leakage.
With the municipal capacity for collection and sanitary landfill disposal of solid waste generated by the population centres at maximum capacity, there has been an increase in the practice of informal dumping on vacant lands and waterways. As a result, clogging of the waterways and potential for flooding have become major threats. Additionally, in many of the older communities of the BVW, there has been a proliferation of urban encroachments such as increased housing. In these communities, major roads and pavements and mixed commercial developments have broadened the extent of impermeable surfaces thus reducing the absorption and recharge of the aquifer, and augmenting the run-off.

The absence of a municipal sewage collection or treatment facility for the town of over five thousand (5000) residents further compounds the problem. Almost all the homes use septic tank and soak-away systems. While more than 50% of the population resides in the lower parts of the watershed, thus not posing a serious threat to groundwater quality, rural settlements along the main access roads in the river valleys can be direct contributors to bacterial loads in the aquifer.

Further to this, there are insufficient controls on the discharge of industrial and agro industrial effluents. This may be due to the absence of legislative provision for environmental audits; a monitoring agency to examine effluent disposal; and/or the absence of legislation enforcing the need for permits or licences for the disposal of wastewater from industrial or agricultural processing plants. Although there has been a decline in large scale plantation agriculture with the reduction of the sugar cane industry, nutrient loading may persist through small scale farming or from sewage leachates. According to modelling conducted by the demonstration project, the model farm funded by the Government of the Taiwan, located on the western side of the well-field, represents the most direct threat of nutrient loading.

As such, the principal concerns related to the Basseterre Valley Aquifer can be broadly categorised as threats from pollution; improper land usage and development thus threatening water integrity from the aquifer; inadequate overall protection of the Valley area inclusive of insufficient management and control of water extraction leading to leakage, wastage or inappropriate use of water resources.
Methodology:

Although this demonstration project was largely an environmental management initiative, there is widespread agreement by project implementation theorists that projects that attempt to resolve environmental issues cannot do this successfully by focusing exclusively on the environmental problem. Often there are social, or more specifically, livelihood or even national economic development considerations which impact the project and may determine success or failure.

The approach employed by this study was intended to capture best practices and lessons learned, by attempting to assess the social, economic and environmental opportunities for positive change which occurred in the watershed communities of Basseterre as a result of the project. The triple-bottom line (TBL) approach suggests that the bottom line of viability should not refer exclusively to financial feasibility or environmental sensitivity issues; but should give equal weighting to all critical dimensions of the assessment. It recommends giving equal weighting to socio-economic, environmental and financial considerations, which are all necessary for sustainability. To this end, project managers were required to extract information based on specific questions referring to the capacity of the project to contribute to social development, viable and sustainable economic development as well as an improved natural environment.

This information, captured in the section below entitled “Key Lessons Learned: Assessment of Success Factors”, was distilled to establish the interrelatedness of these variables and their collaborative contribution to best practices and replicable lessons. Further, the lessons learned were extracted from the TBL so as to determine the feasibility of the project to replicate lessons, and the demonstration value of the good practices (see section below entitle “Demonstrated Best Practices”). The criteria for identifying various components of good practice as well as criteria to aid in replication of lessons learned were developed by IWCAM project managers and associates. This is subdivided into feasibility and demonstration value. It was concluded that three broad criteria should be used to determine the feasibility of a project to provide lessons and good practice. These were identified as follows:

I. The enabling environment provided by supporting national policies and legislation.

II. The capacity of the local implementing agency and its supporting linkages.

III. The participation of the host community at all levels from planning to implementation.
Baseline Information on demonstration site:

Communities
A survey of 250 residents from the BVW was conducted to gauge their understanding of issues surrounding watershed conservation. Generally, as represented by 90% of the participants, there was a lack of awareness of the importance of the watershed and understanding of the importance of sustainable use of resources. This was further compounded by a misunderstanding of what natural resources represent. As such, a significant number of participants claimed that they did not use any type of natural resource.

Regarding access to water and consumption, the vast majority (95%) had access to the municipal water supply which was either piped to their homes (85%) or their yards. They however noted the significance of rainwater and saw it as more important than surface or groundwater. In fact, seventeen percent (17%) collected rainwater for mainly domestic house cleaning, watering of plants and kitchen gardens.

Resident engagement with the watershed varied among respondents to the survey. Twenty-nine percent (29%) of those who engaged with the watershed resources used them for farming. Almost 40% reported using ecological resources such as plants, wood/timber or birds/wildlife, while less than 25% reported use of the soil/lands. Soil erosion was not regarded as a threat to the watershed but grazing animals were seen as a greater contributor to pollution. Urban land usage was also recognised as a contributor to watershed deterioration. The correlation between watershed deterioration and natural disasters was not well recognised as 18% of all issues identified with the watershed were seen as not having any relation to natural hazards.

Residents of the area cited pollution as a significant contributor to environmental degradation and flooding. Their perceptions indicated that illegal dumping of solid waste in vacant lands, drains and ghauts was a major problem and directly contributed to flooding and poor sanitation leading to the spread of vermin and pests. While the community generally valued the physical environment, 13% felt that the environment was being destroyed because of indiscriminate dumping activities. Flooding was also seen as a result of dumping and directly contributed to the deterioration of the environment stemming from blocked drains and debris settling along roads and in yards, indicating the need for community clean ups and infrastructural improvements.
Institutional arrangements

The Water Services Department (WSD) is the primary body responsible for water distribution and supply in Saint Kitts. It is also the over-riding water resources planning and development agency for St. Kitts. It administers the work of the Water Board that was established under the Watercourses and Waterworks ordinance (WWO) and ensures that the supply of potable water is sustainably executed. In recent times, the WSD has worked to chlorinate the water supply from the BVA.

While the supply of potable water is the mandate of the WSD, the Department of Agriculture is responsible for the water resources used for irrigation. The WSD is also not responsible for the distribution and supply of water for private entities, such as hotels and industrial plants that use reverse osmosis plants. These are instead approved by the Development Control and Planning Board (DCPB) and monitored by the Chief Environmental Health Officer (CEHO).

The Department of Physical Planning and Environment (DPPE) is the governing body for monitoring the possible impacts that development proposals may have on the environment. It was established by the National Conservation and Environmental Protection Act (NCEPA) Amendment (No 12 of 1996) with the specific mandate of conservation and environment protection in Saint Kitts and Nevis and has the dual function of land use planning and permitting development proposals.

Under the NCEPA Section 34(1), the department of Agriculture, specifically the Chief Agricultural Officer, holds responsibility for watershed conservation. The department also engages in the administration of the Pesticide Control Act. Although, not explicitly stated in the law, the department also monitors fertiliser use and soil erosion prevention practices associated with farming practices.

Regarding the standards of water intended for human consumption, the Environmental Health Department (EHD) of the Ministry of Health and the CEHO ensure that the standards are in accordance with the 12 parameters recommended by the World Health Organisation. Additionally, the CEHO is responsible for enforcing environmental controls that are deemed critical for the control of wastewater and effluent discharges as mandatory conditions of approval for any proposed development.

The EHD also has responsibility for administering the provisions for water protection outlined in the Public Health Act. Its principal responsibility is to monitor the sanitary disposal of waste to ensure that it does not present a hazard to public health. Section 4 (1a) further gives the Minister power to inspect and examine any premises deemed necessary under the Act to
maintain health and enforce pollution and water control. Section 10 (8) speaks specifically to the Minister’s responsibility for the control of waste water disposal and effluents.

Water quality is also affected by flooding and storm water disposal. To this end, the Public Works Department (PWD) and the National Emergency Management Agency (NEMA) are responsible for the monitoring and management of flooding. The Development Control and Planning Act (DCPA) provides the main legislative control for storm water disposal while the PWD is authorised to prevent land degradation and erosion and to ensure that ghaunts are clear.

The Legislative and Policy framework
The legislation surrounding water resource management appears to be somewhat inadequate to deal with the issues of integrated water resources management. In the absence of a National Water Resources Master Plan, and because there are informal arrangements regarding quality standards and licensing, the monitoring and control management of challenges such as pollution and land use is arduous. Existing legislation does not specifically protect groundwater, recharge areas and well-head areas. Additionally, the Waterworks and Watercourses Ordinance is outdated. WSD’s primary function is water supply to domestic, commercial and industrial customers. Legislation regarding hydrological assessment and stream monitoring is absent. A somewhat disjointed approach to water resource management and a lack of legislation for trade or sewage discharge licences compounds the weak management of the resource.

The NCEPA No.5 of 1987 (Substituted by Act 21/2001) prohibits pollution of any part of the coastal area by depositing sewage, solid waste and garage oil among others. Pollution refers to any contamination or alteration of the physical, chemical or biological properties or anything that is likely to create a nuisance or render the area harmful or injurious to public health, safety or welfare. Further to this, the Litter (Abatement) Act No. 8 of 1989 provides for the abatement of nuisances caused by littering of public places and for associated matters. Section 8 of the Act requires that every proprietor or manager or any person in charge of a business shall make his own arrangements for litter disposal. The Public Health Act No. 22 of 1969 aims to consolidate and amend the law relating to Public Health in the state and surrounding matters. Section 10 allows the Minister to make necessary regulations related to water pollution and waste disposal.

With respect to land use, the Development Control and Land use Act No. 14 of 2000 provides for the orderly and progressive development of land in both urban and rural areas whilst effecting environmental protection and improvement of the amenities thereof. Section 26 relates to the conduct of environmental impact assessments (EIAs) for large development
projects as deemed necessary by the Board. The conduct of an EIA encompasses considerations such as the nature of the development; the geographical extent, scale and location; the expected changes to the environment; the extent of general knowledge about the proposed development and any other development plans for the area.

The Watercourses and Waterworks Ordinance Cap. 185 stipulates that the Water Board, under Section 10 (1) (i) may make regulations to deal with the sanitary control of the watersheds. Furthermore, under section 18, the Minister, by order, may declare a watershed from an area or any part of that area where the drainage of water from any area flows or is conveyed to a watercourse or water-works.

Regarding the conservation and protection of natural resources, the NCEPA No. 5 of 1987 provides for the better management of the natural and historical resources of Saint Kitts and Nevis where for the purposes of conservation, national parks, historic and archaeological sites and other protected areas can be established. Additionally, the DCPA Sections 12 and 54 make provision for the designation of ‘environmental protection areas’ in development plans. For the establishment of such an area, the Board and the Minister responsible shall consider the survey of the area, public comments on the plan and natural resources and hazards affecting the area.

While there are deficiencies in the existing legislative framework, there have been commendable efforts towards abating these issues. In an attempt to protect the aquifer, the designation of the well-field area as a protected area under the NCEPA (1987) became a significant item on the government’s agenda. This was approved in principle by Cabinet and by the time that this Demonstration Project was officially closed in June 2011, the sensitive well-field area had officially been designated as the St. Kitts National Capital Park under the NCEPA (1987). Additionally, a draft new Water Resources Act was commissioned by the project and is a first step towards more effective and current legislation to mainstream integrated water resources management in St. Kitts-Nevis.

### Activities undertaken by the Demonstration Project

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<th>Activities actually undertaken</th>
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<td><strong>Stress Reduction</strong></td>
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<td>Procurement and installation of water efficiency equipment including bulk water meters and automated tank level controls</td>
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<tr>
<td>Reduction of inappropriate disposal of oily water at the Needsmust Power Plant via the construction of an oil/water separator and area for storage of waste oil drum</td>
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<td>Official designation of National Park</td>
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**Capacity Building and Institutional Strengthening**

- Project management unit established
- 5-day workshop on best practices related to design, construction, inspection and maintenance of onsite wastewater treatment technologies for 32 participants including staff from Environmental Health Dept., DCPB, Building inspectors, local architects and engineers
- Drafting of new water resources act

**Water Resources Management Plan including:**

- Hydrogeological survey
- Geophysical mapping
- Water quality monitoring
- Water level monitoring
- Computer modelling
- Land use survey
- Natural resources survey
- Review of legislative and policy framework for water

**National Park Management Plan including:**

- Review of protected areas management
- Financial strategy
- Management policy and structure
- Implementation plan
- Stakeholder consultations and interviews
- Preliminary plans for park

**Public Education and Outreach**

- Designation of Park and closing ceremony
- Week of activities for World Water Day 2011 including:
- Promote water conservation
- Promote project outcomes
- Promote National Park
- Live TV Panel Discussion
- Visits to primary and secondary schools
- Exhibition at Independence Square
- "WaterCade" – one day motorcade around the island to engage with community members

**Sensitization of government departments of issues related to the Basseterre Valley Aquifer via 4 half day seminars**

**Sightseeing with “Splishy-Splashy” – a nature Walk at windmill located in the BVA and at well locations including information talks by WSD staff and special workbook geared for children**

**Newspaper articles, radio jingle, brochures, banners, community meetings etc.**

**Sharing of lessons learned at various conferences:**

- CWWA 2009, St. Thomas
- CEF-5 2010, Jamaica
- World Water Week 2010, Sweden
- 1st UNESCO IHP GRAPHIC Seminar for Latin America and the Caribbean (LAC) in Juan Dolio, Dominican Republic
Key Lessons Learned: Assessment of Success Factors

Social:
To demonstrate the capacity of the project to contribute to social development, by responding to questions of community development in planning and implementation, addressing community priorities, etc.

Community involvement in planning
Although the project was conceptualised at a governmental level, and executed to some extent by external consultants, opportunities for influencing the project planning process and the crafting of on-the-ground activities occurred during the implementation phase, where some modifications occurred in order to respond to the identified needs of stakeholders and to reflect the outcomes of the consultancy work. The PMU was guided and instructed by a Project Steering Committee (PSC) which comprised representatives of relevant government departments, community representatives, one non-governmental organisation (NGO), and representatives from the private sector. The representatives of the PSC were:

1. Mr. Cromwell Williams – Chairman – Manager/Water Engineer
2. Mr. Randolph Edmead – Director, Department of Physical Planning and Environment
3. Ms. Melnecia Marshal – St. Kitts Tourism Authority
4. Mr. Calvin Pemberton – Director, Public Works Department
5. Mr. Serwano Mukasa – Law Revision Commissioner
6. Mr. Ellis Hazel – Representative of the private sector, Christophe Harbor
7. Mr. Elston Tuckette – Community (Bird Rock) representative
8. Mr. Ashton Stanley – Director, Dept. of Agriculture
9. Mr. Ian Liburd – GEF-IWCAM Demonstration Project Manager

Unfortunately, the ability to truly influence the implementation of the project may have been missed as the PSC members were not appointed by Cabinet until the later stages of the project.

However, there was an initial consultative process which involved public stakeholder meetings, personal interviews and a household survey that was tabulated and collapsed into summaries which were used in the planning documents. The drafting of the original project proposal originated in the Department of Physical Planning and Environment and the various groups listed below were targeted during the development of the proposal document. The various groups targeted included:

i) Residents in the BVA
ii) Farmers Cooperative
iii) The St Christopher Heritage Trust
iv) Various Government Ministries
v) Tour Operators and Guides
vi) Environmental Management Consultants
vii) Clarence Fitzroy Bryant College
viii) Saint Kitts Tourism Authority
ix) Other Private Sector Groups

Addressing community priorities

The rationale behind involving communities in project planning as well as execution is to facilitate the harnessing of local knowledge as much as possible and to avoid gaps emanating exclusively from strict scientific data gathering practices or perceptions of reality expressed by political appointees or government bureaucrats. Moreover, the advancement of exclusive scientifically assessed conclusions or politically motivated decisions over community priorities, often lead to host community hostility at best and no relevance to community priority needs, at worst. This reality presents a major justification for ensuring that community priorities, related to the project objectives, are given precedence.

To this end, detailed information on current trends in the watershed was derived primarily from a survey of persons resident in the BVA and stakeholder consultations. Some of the major issues that emerged from the survey included a lack of awareness of the functioning of a watershed and poor understanding of the need to utilize its resources in a sustainable manner. Residents raised concerns about pollution as a cause of environmental degradation and the problem of chronic flooding.

The impressions, issues and concerns which drew attention at stakeholder and other meetings were used as observations during the execution of the project. For example, the short list of decision criteria to screen the potential park development in the BVA included the risk to the aquifer, local support, initial and operational management costs, revenue generation, security needs, tourist attraction, educational potential and others. Many of these concerns had been raised at stakeholder meetings.

Garbage collection is executed at least weekly, but the community survey revealed that the volume of waste being generated appeared to be far greater than the collection capacity of sanitation service vehicles. Respondents from the Conaree settlement, for example, indicated
that the existing landfill at Conaree lacked the capacity to accommodate the volume of waste being generated.

“The estimated waste production for this population at 1 kg per day is 1,825 metric tons per year, and this does not include waste generated by the tourism, agricultural or industrial sectors. In the more rural communities of the watershed, the survey indicates a growing practice of informal dumping on vacant lands and waterways.” (Oceanearth, 2009, Executive Summary)

The Director of the EHD has confirmed that the existing landfill site has surpassed its design capacity. The Saint Christopher National Physical Development Plan has allocated approximately 19 acres of land space for the construction of a new sanitary landfill to address the existing capacity issues at the present landfill site.

Domestic garbage collection remains a critical priority for many communities, as it represents immediate inconveniences for residents and is visibly offensive. However, the project priorities were to address aquifer protection as the impacts from domestic garbage did not represent a major threat to water quality.

Gains were made in terms of water conservation. Equipment to help prevent unnecessary water losses in the distribution system was purchased and installed. The WSD installed automated tank level controls at two locations within the Basseterre Valley to prevent storage reservoirs from overflowing. As a result, hundreds of thousands of gallons of water were saved. In addition, bulk water meters were procured and installed in strategic locations throughout the distribution system so that water losses can be quantified, and leaky pipes located and repaired quickly.

**Using community skills/talents above imported ones**

The technical skills required for projects of this nature are generally outside of the technical skill-set available in most rural communities. However, historical hydro-geological research on the BVA was first done by local hydro-geologists in the 1970s. The summary findings of its characteristics were based on limited drilling logs, water table maps, pumping tests, water quality sampling and groundwater level fluctuations. These skills were all locally available within the public service of Saint Kitts and Nevis.

International consultants were contracted to update and acquire new data on the aquifer using a novel technical called Multi-Electrode Electrical Resistivity (MER), which was used to map the aquifer rather than the traditional method of drilling. (See section on Environment: Innovative and Appropriate Technologies for more details on this technology). The WSD provided significant oversight of the international consultants.
A training session in best practices for design, construction and maintenance of onsite wastewater treatment options was held before the end of the project. This was a 5-day workshop held in February 2011 on best practices related to design, construction, inspection and maintenance of onsite wastewater treatment technologies for 32 participants including staff from Environmental Health Dept., DCPB, Building inspectors, local architects and engineers.

**Livelihood enhancements of local community**

Connecting project outputs with economic livelihoods are addressed under the section on Economic Impacts. However, the general enhancement of the socio-economic conditions of host community persons always presents an indication of the projects ability to meet sustainable livelihood enhancement indicators.

Project activities were not specifically geared towards the goal of enhancing economic livelihoods. In the future however this would be realized with the full development of the National Park.

**Increased access to physical assets by the community**

Access to physical assets is also tied to community priorities. The ability of host communities to support environmental initiatives that sometimes provide an inconvenience or require adjustments in behaviour should be accompanied by some social or economic benefit in return for the inconvenience or loss of resource use. In other words, host communities must receive social or economic benefits “sufficient for local people to value, and therefore protect their wildlife heritage area as a source of income” (Harold Goodwin) or social enhancement. This is not to say that the people of Saint Kitts cannot be responsible custodians of the environment. The problem usually arises when persons perceive that they do not benefit from the establishment of a National Park or Botanical Garden for example, and that these entities were not priorities to them, and they are deprived of the traditional uses of the areas now so designated. Recognising this fact, the Park Management Plan makes allowances for facilities and features to be made available to the Basseterre community. These include a combination of outdoor botanical plaza, visitor centre and hillside amphitheatre; multi-use trails for walking, jogging and cycling; parking lots on perimeter to access trail system; playing fields and open spaces; as well as a restored windmill and interpretation site. These social amenities will also demonstrate the connection between aquifer protection and other sustainable non-polluting economic activities which can occur above the aquifer without contaminating the water source below.
Increased appreciation of local culture

As communities become more sophisticated and increase access to modernization, there is always the fear that they lose an appreciation of local culture and traditions, which are often agents of social cohesion and community stability. In this regard, it should be noted that the concept of Visitor Centre complex was the product of the consultative process with stakeholders. It is anticipated that this facility will provide an avenue for local cultural performances, plays, concerts, community fairs and other special events and programmes.
Environmental

To demonstrate the capacity of a project to contribute to an improved environment by responding to questions of solid and liquid waste management, improving water quality and conservation practices, innovative appropriate technologies, etc.

Improved solid and liquid waste management practices

There are no municipal sewage collection or treatment facilities for the city of Basseterre. With over 5,000 residents, most homes use septic/soak-away systems. Fortunately, more than 50% of the population resides in the lower parts of the watershed, where sewage leachates may not pose a significant bacterial threat to water quality in the aquifer. However, rural settlements that have developed in linear patterns along the main access roads that follow the river valleys also use septic/soak-away systems and associated bacterial loads may directly threaten the aquifer if settlement densities increase in the future (H. Sahely et al, 2010).

The industrial developments to the north and northwest of the well-field pose a serious threat of contamination by petroleum products. The release of petroleum contaminants in the area by the Generation Division (Power Plant) of the Electricity Department was identified as a major threat to the well field and underlying aquifer. There are procedures in place for the disposal of these and other pollutants by the electricity supplier which should significantly address these concerns. However, it should be noted that no wells were available to sample the groundwater for potential gasoline or fuel oils. It is imperative that wells specifically designed to sample the surface of the ground water table for these contaminants are constructed as recommended in the Water Resources Management Plan (WRMP).

The project sought to address two pollution sources. It collaborated with the St. Kitts Electricity Department to install an oil / water separator at the Needsmust Power Plant. This activity has reduced the threat to the aquifer and the adjacent coastal area by intercepting oily waste before it is discharged outside the boundaries of the plant. Thousands of gallons of oily waste have been intercepted and pumped from the separator for safe disposal since March 2011.

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.
With respect to solid waste, one of the major point sources of pollution affecting the well field area is the indiscriminate dumping of garbage. The Solid Waste Management Corporation (SWMC) has in the past attempted to address this through its public awareness programme; however this intervention has resulted in minimal impact thus far.

Removal of livestock from the well-field area was planned during the project but was not implemented. This required sensitive negotiations with the farmers as well as collaborative work between two government departments namely the Department of Physical Planning and Environment (DPPE) and the Department of Agriculture. The GEF-IWCAM Project Manager tried to facilitate these discussions in the last six months of the project without any success. There were unforeseen delays in the allocation of alternative lands for the farmer and as such the DPPE was reluctant to issue an order to the farmer to vacate the land and negatively impact the livelihood of the farmer. Although the project lifetime has ended, negotiations continue and it is hoped the livestock would be removed in 2012.

**Innovative and appropriate technologies**

Mapping of the aquifer using a technique called Multi-Electrode Electricity Resistivity (MER) is a geophysical method of mapping the subsurface geology by creating a vacuum arc which is an electric current discharge between pairs of electrodes. MER is the technique used in the hydro-geological evaluation of the BVA to map the aquifer. For rapid assessment of aquifers, this is an appropriate technique over drilling which is time consuming, labour intensive, and costly.

MER provided a wealth of new information about the BVA, at a reasonable cost and without the boring of holes. Each hour of mapping using MER is equivalent to 56 boreholes. The results of the MER analysis of the BVA has proven to be an excellent method for delineating the upper parts of the aquifer as well as the depth and variations between fresh and salt water. It also provided information about the salt and fresh water interface and the implications for long-term pumping or water extraction. Moreover, the use of the MER methodology now allows aquifer managers to determine the thickness and distribution of sediments throughout the aquifer; determining areas of greater or lesser porosity so as to determine where water may flow more easily; as well as delineating zones of contamination.

**Improving water conservation or quality practices**

The hydro-geologic evaluation of the BVW also included a computer groundwater modelling effort. The particle tracking model simulation, MODPATH, as it is referred to, was performed as an initial step in understanding the general behaviour and flow patterns of the groundwater through the watershed, and the effect of the pumping wells on groundwater distribution. The
modelling also attempted to identify areas where geologic and hydro-geologic data were lacking, and was intended to facilitate a mapping and monitor well construction program across the watershed that would enable a more comprehensive and accurate groundwater model to be developed in the future.

The hydrogeology study noted a trend of declining static water levels observed in the Basseterre well-field. This decline ranges from 1.5 to 2+ feet according to available data extending back into the 1970’s. The decline in water levels appears to have accelerated between 1999 and 2009 with an increase in groundwater withdrawals. Continued water extraction from the aquifer may lead to increased areas of salt water intrusion and declining potable water quality within the well-field. Three zones of salt water intrusion have already been identified in the well-field area by the MER mapping. (OET, 2009, Executive Summary)

Water samples were taken from a total of ten supply wells and three surface water sites. The analyses were designed to evaluate potential contaminant levels in the supply wells, observe salinity and total dissolved solids (TDS) levels that may be related to salt water intrusion. There were no measurable levels of pesticides, herbicides, semi-volatile or volatile organics in any of the well water samples analyzed. With respect to continued good water quality, wastewater collection and treatment were identified as key to maintaining a safe drinking water supply for Basseterre Valley residents. For example the MODPATH particle tracking model simulation revealed that “a pollutant originating from the airport will reach most supply wells within 1-2 months, and no later than 6 months from the time they are introduced to the groundwater system.” (OET, 2009. pg. 40.) This groundwater model indicates that adjusting the efficiency and location of some wells within the current well field is a viable option for establishing a more efficient well-field.

In addition, various water loss prevention initiatives were implemented before the end of the project including:

1. Installation of district area meters to help determine degree of water losses in the BVA distribution system
2. Installation of tank level control which would automated pump shutoff once a tank is full and thus avoid overflow

**Improving soil conservation and reduction in sedimentation or erosion**

The soils of Saint Kitts have been well surveyed and include studies dating from the 1940s and culminated in the soil survey by Lang and Caroll (UWI) 1966 which included a detailed map identifying the occurrence of each soil described. This map and information from the soil survey were used to identify the present soils in the watershed and the areas they covered.
The valley area soils are deep, coarse textured soils with variable amounts of stones and larger material. They are very well drained soils due to their coarse, sandy texture and will tend to dry out quickly in surface layers during periods of low rainfall or drought.

In the lower and flatter areas, the slopes are not impacted by erosion due to the rapid infiltration rates. For the same reason, flooding is also not a major problem, as flood waters run off the gentle slopes and drain rapidly through the soil profile.

In view of these realities, soil conservation was never perceived as an area warranting serious attention by the project.

**Environmental management systems planning**

A key deliverable of the GEF-IWCAM Demonstration Project was the draft Saint Kitts and Nevis Protected Areas Conservation Trust (PACT) Act, which among others makes allowance under PART V for the “Establishment of the Saint Kitts National Capitol Park”. The Act proposed establishment of the Park in the Basseterre Valley “...for the purposes of ensuring a sustainable water resource and natural open space so that the public and visitors may benefit from opportunities for education about Saint Kitts’ important natural, cultural, and historic heritage, scientific study, recreation use and enjoyment, visitor attraction, tourism economic development, employment, professional development, increased land values, and enhanced quality of life.”

The sensitive well-field area was officially designated as the St. Kitts National Capitol Park under the National Conservation and Environmental Protection Act (1987) on April 21, 2011.

The vision for the National Park is to be an icon of national pride for all and an attraction for visitors to St. Kitts-Nevis. Towards that end, the management goals for the Park are to:

1. Protect the water aquifer in the Basseterre Valley;
2. Restore and maintain native flora species for education and recreation purposes;
3. Provide open space in an increasingly urban setting;
4. Provide active and passive outdoor recreation opportunities;
5. Serve as a high-valued tourist attraction;
6. Contribute to economic welfare and development;
7. Serve as an outdoor classroom and laboratory.
A systematic structure for managing environmental impacts, which may include monitoring, auditing and continuous improvement or environmental efforts, is a fundamental component of measuring the impact of activities on a resource, and by extension, the sustainability of a project. To this end, the development of a management plan for the Saint Kitts National Capitol Park, to be managed by a Protected Areas Conservation Trust (PACT), represents an excellent tool for environmental management planning.

A Protected Areas Conservation Service (PACS) will be responsible for implementing and administering the decisions of the Board of Directors of the PACT as described in Part IV of the Act. Under Part VII of the Act, provision is made for specific management plans for “each protected area or cluster of areas” developed by the PACS in consultation with the Ministry of Sustainable Development and to be approved by the Board of Directors. The management plans should include elements for natural resource monitoring, particularly water quality, carrying capacity, as well as financial and product quality issues.

Another feature of environmental planning is related to the potential for agricultural business development, covered in greater detail in the subsequent section describing Economic indicators of success. The WRMP explains that the areas designated for small-scale agricultural initiatives should not be dependent upon irrigation from ground water, but should be areas where rainfall is good and surface water is reliable. Given the need for environmental protection, it was further recommended that areas designated for agriculture should not be susceptible to soil erosion (relatively flat) and should be on the most fertile soils that are available within the catchment.

**Education and awareness building activities**

Environmental educational activities should lead to change behaviour by the beneficiaries of a project intervention. This is the basis upon which any attempt to educate persons or build awareness about a particular activity or action should measure success. In this regard the project engaged in activities designed to increase understanding and appreciation of the BVA and the management required for improved water quality. These included a media tour, several print articles, a jingle, a video programme and a tour of the BVA by schools in the community. A nature walk called “Sightseeing with Splishy Splash” took place in late-June 2010 and involved fourteen primary schools. The WSD, the Ministry of Education and the St. Kitts Information Service (SKNIS) collaborated in the tour which introduced students to the BVA, its importance and how it can be protected. “Splishy Splash” workbooks were prepared and distributed and teachers were encouraged to use brochures, also distributed, as well as the workbooks as teaching aids in bringing attention to the BVA. Other PEO activities included a week-long programme for World Water Day 2011 which featured: promotion of water conservation;
promotion of the National Park; a live television panel discussion; visits to primary and secondary schools; an exhibition at Independence Square; and a one-day motorcade to engage with community members. In addition, there was sensitization of government departments on issues related to the BVA through a series of four half-day seminars.

The WSD is also expected to continue its national education awareness programme. Printed articles are being published and brochures containing information on the project will continue to be distributed. In addition, the designation of the National Park was marked during the Demonstration Project’s Official Closing Ceremony which was held in the well-field area for surroundings communities in June 2011.

**Economic**

*To demonstrate the capacity of a project to contribute to viable and sustainable economic activity connected to conservation or protection activities including viable small businesses, evidence of entrepreneurship, employment creation, etc.*

The development of the Saint Kitts National Capitol Park presents several opportunities for viable economic activities that have the potential to generate opportunities for entrepreneurial activity leading to employment creation either through small to even large business initiatives. This has been well articulated in the WRMP and is described in the section below.

**Potential for viable small businesses**

The WRMP recommended that small-scale agricultural zones should be designated as part of the physical plan so they do not develop as *ad hoc* spontaneous agricultural business initiatives. The NPDP (2005) has indicated that lands between the 500’ and 1000’ contour will be identified for agricultural diversification. A wide range of small-scale agriculture is permissible in the watershed (Daniel et al, 2008), provided that best management practices are applied in respect of soil conservation, irrigation, and fertilizer/pesticide application. These cash crops include fruit trees (pineapple, citrus and papaya) which are usually most economically feasible as plantation crops, as well as a range of small-scale mixed-farming enterprises such as root crops (yams, cassava, sweet potato, peanuts), vegetables (onions, cucumbers, tomatoes, peppers, beans, eggplant, corn etc.). It was noted that fruit tree plantations are becoming less popular due to the problems with the Green Vervet Monkeys which are attracted to the freshwater and ripe fruit, and that the control of the pests would be an important variable in determining business viability.

The WRM plan also recommends that organic-farming should be promoted for the local tourism market, as there is an increasing market for this kind of produce. If the problem of
monkey praedial larceny can be managed, mango, citrus, avocado, passion fruit and dwarf golden apple are all fruit crops that would probably do well in these areas and for which there is a demand, especially out of season varieties. A market survey to assess the feasibility of developing organic orchard farming over some recharge areas presently under abandoned cane-field will complement this approach.

Finally, the plan suggests that consideration may also be given to putting some of the cane lands under hardwood forests that can be harvested cyclically over a period of years and still yield high returns as a productive land use. According to the FAO, the most widely cultivated commercial hardwood species in the tropics are Rosewood \((Dalbergia sissoo)\), Mahogany \((Swietenia macrophylla)\), and Teak \((Tectona grandis)\). Development of these kinds of forests will protect the aquifer, retain ground cover, prevent soil erosion, provide an alternative to urban encroachment, sequester carbon, and protect natural forests that are being decimated for tropical hardwoods. In determining the feasibility of this, the water demand needs to be properly estimated, and the availability of supply discussed with the WSD.

**Opportunities for entrepreneurial activity and employment**

Whereas viable small businesses associated with agriculture and agro-forestry will also provide employment opportunities, tourism presents perhaps the most readily available entrepreneurial and employment opportunities. The Saint Kitts National Capitol Park is intended to be an icon of national pride for all and a renowned attraction for visitors to Saint Kitts. Apart from its primary objectives to protect the aquifer in the Basseterre Valley, the management goals for the Park include the creation of a high-valued tourist attraction to experience and enjoy Saint Kitts. The Park is expected to create 18 jobs ranging from management, enforcement and educational officers to rangers and maintenance personnel. Other ancillary services to be offered at the Park mainly through concessions will include gift shops, guide services, food service and other forms of merchandising. The economic spin-offs from these activities, if marketed well and linked to other attractions in the general vicinity like the Sugar Train, could be significant.

**Access to finance for spin-off business initiatives**

The project was not expected to commence exploration or speculation for attracting finance for business and other entrepreneurial activities. However, the Park Management Plan refers to securing a low interest international developmental loan to be secured by the park management with an annual pay-off of \$220,000.00\ over a 15-20 year period. This loan is to be used for the capital development of the Park. This is an indication of the size and magnitude of the proposed investment, which obviously speaks to the potential, based on proposed
business, to attract finance for business development initiatives. Project outcomes therefore clearly demonstrate the ability or potential for viable business development opportunities capable of attracting sizeable development financing.
Demonstrated Best Practice

Broad criteria to help determine the feasibility and demonstration value of a project will provide the framework for lessons learned and good practice. (See Feasibility and Demonstration value on p11 above.)

Community participation

The ability of the project to address community priorities; communicate effectively with community stakeholders, and the receptivity and response of the host community to the project are important measurements of project success. The extent to which this is achieved may provide useful best practice scenarios for replication. To this end, the participation of the host community at all levels from planning to implementation is critical.

Unfortunately, the opportunity to get greater community participation was missed by delays in appointing the Project Steering Committee. However, the role of this Committee as an instrument of community inclusion in decision making was well conceived and intended as a source of host community empowerment. Although the project was largely executed by consultants, given the very technical nature of the physical planning required, the involvement of the host community is very evident in the project reports. The WRMP includes some very clear prescriptions for the communities that reside in the Basseterre Valley, if the aquifer is to be protected from pollution. These include regularization programmes for the squatter communities located at Conaree, which are currently located outside of the BVW, but could easily expand, if not checked, across the eastern boundary and into the “no development zone”. The involvement of these communities on the Park Management Committee, even in the post project phase, will be critical in continuing to address host community issues and to monitor development expansion. In this regard, the Citizen's Advisory Committee of the PACT will provide an important avenue for channelling information between residents and park management.

In preparation of the National Park Management Plan (NPMP), the consultants provided significant information on watershed resource users, attitudes and practices which could inform future public education and outreach activity. In the lead up stages to establishing the National Park, public education and awareness work could significantly increase buy-in by stakeholders. This should focus upon providing background information on the watershed and aquifer; their importance to the people of St. Kitts; present threats to water quality and availability; the rationale for designation of the National Park; systems being put in place for future management; and the roles of various stakeholders. Benefits of the National Park will have to be emphasised.
The NPMP significantly provides for the establishment of a Citizens Advisory Committee as part of the National Park structure which would be responsible for public information, education and transparency. This is meant to ensure that public input is sought and that stakeholders are consulted, and not marginalized, in the future.

**Technical local capacity and Institutional arrangements**

The institutional arrangements for watershed management in Saint Kitts and Nevis are quite complex with different agencies having responsibilities for differing aspects of water and forest management. For example, whilst the WSD has responsibility for water distribution and supply, the use of water for agricultural irrigation is the purview of the Department of Agriculture. The Agriculture Department also has responsibilities for watershed conservation.

Given that the primary objectives of the project were to address protection of the aquifer as a source of water, the proposed establishment of the SKN Protected Areas Conservation System (PACS) provides a near excellent institutional arrangement for the integrated management of the Basseterre Valley Watershed. This system of protected areas is designed “to protect and preserve for future generations the use and enjoyment of nationally significant natural resources in order to ensure the sustainability of social, economic and community values associated with the natural resource protection and enhancement...” (SKN Park Management Plan, p10).

The creation of the PACS emanates from the proposed SKN Protected Areas Conservation Trust (PACT) Act, and its purpose is as follows:

1. The creation of the SKN Protected Areas Conservation System comprised of nationally significant lands and waters legislatively designated as protected areas by the Cabinet;
2. To establish the SKN Protected Areas Conservation Trust as a non-governmental organization charged with responsibility to implement this Act, comprised of a Board, Citizen’s Advisory Committee and Service (agency);
3. To create the SKN Protected Areas Conservation Service as the professional administering agency within the Protected Areas Conservation Trust charged with implementing this legislation;
4. Establishment of the Saint Kitts National Capitol Park;
5. Authorization for the Protected Areas Conservation Trust Fees and Charges;
6. Creation of the SKN Protected Areas Citizen’s Advisory Committee;
So whereas the project may not have implemented a system for IWCAM of the BVW, it clearly developed the legislative framework and management plan with institutional arrangements to enable this.

**Enabling policy and legislative environment**

A comprehensive review of the legal enabling environment was undertaken by the project. This review revealed that although there are over five separate statutes with various functions for water resources management in Saint Kitts and Nevis, there remained several critical gaps in the legislative framework. A few of these issues have been identified and discussed below.

The Waterworks and Watercourses Ordinance is outdated and therefore not relevant to addressing the myriad of issues related to watershed management and particularly to the approach being proposed by the IWCAM project. More specifically, groundwater, recharge areas and well-head areas are not specifically protected in the law. There is no formal provision for the licensing of private abstraction or companies seeking to supply water to the public (e.g. resort or residential developers), and there is no formal water quality standards requirement. There is also no provision in the law for trade or sewage discharge licenses, and no effluent discharge standards to monitor these.

With respect to the institutional arrangements for water resources management, presently the WSD operates as a Department of Government and does not possess the statutory authority to operate as an independent agency. Its primary function is water supply to domestic and commercial customers, and there is no provision in the legislation for hydrological assessments to determine flooding and storm water disposal. There are presently more than six separate agencies involved in water resources management. This presents an obstacle to integrated master planning for the water resources of Saint Kitts. The project recognized that there is a need to redefine the water services department within the context of a fairly autonomous body with roles and responsibilities that integrate watershed management responsibilities.

There is also a need for the development of a National Water Resources Master Plan or Water Sector Policy, which will provide periodic master planning for the country’s water resources. Issues such as urban encroachment into the aquifer lands and the expansion of supply to meet population growth or developments could be more effectively addressed through improved strategic water resources planning. In this regard, a new comprehensive piece of legislation is needed to facilitate modern integrated water resources management.
The GEF-IWCAM Demonstration Project has provided a roadmap for revamping of the legal enabling environment in Saint Kitts and Nevis as it relates to water resources management. Designation of the well-field area as a protected area under the NCEPA (1987) is a very significant legal step. The establishment of the Saint Kitts National Capitol Park around the sensitive well-field area is a novel approach to aquifer protection by involving community stakeholders.
Conclusion:

The Saint Kitts & Nevis GEF-IWCAM Demonstration Project attempted to accomplish several very specific things in addressing the issues relating to rehabilitation and management of the aquifers in the BVW. The project proposed to: mitigate threats from contaminants such as agricultural and domestic pollutants; improve land usage and eradicate inappropriate development of the lands immediately above and adjacent to the aquifer, and by extension, protect the valley and its ecosystems; and develop a resource management plan to mitigate leakages and wastage.

The overall purpose of the project was to demonstrate the proper management and protection of the Basseterre Valley aquifer. In response, the project delivered two very important documents: (a) A Water Resource Management Plan for the Basseterre Valley Aquifer and (b) A Management Plan for the Proposed SKN Capitol National Park in the Basseterre Valley.

The WRMP is the product of a very detailed study that conducted a hydrological evaluation of the Basseterre Valley; prepared a geophysical mapping of the proposed St. Kitts National Capital National Park\(^1\) for the protection of the water supply and recharge capabilities; surveyed the natural resources within the watershed; and reviewed the current policy and legislative framework for water resources management.

These studies provided information regarding the capacity of the aquifer, as well as its status and revealed that the water quality in the Basseterre well-field is good, even though there were early signs of salt water intrusion that should be monitored and pollution sources that should be addressed urgently. The value of the study is in pointing out the incumbent threats to the aquifer and what actions should be taken to address them. The Water Services Department is now better able to make rational and informed decisions over both the short and long term.

Most importantly, the project produced draft legislation for the establishment of a land- and water-based protected areas conservation system for the entire country that included management policies, an institutional framework, human capacity requirements and a financial strategy. The recognition that creating a single protected area without the framework for a system for protected areas including how they should be administered and funded, could lead to disorganization, competition amongst various future protected areas and even internal

\(^1\) The title of “National Park” may have been misleading in the project document and project objectives, as a highly disturbed area as the Basseterre Valley may not comprise the attributes for a national park. The area however refers to 500 acres of land originally occupied by canelands in the upper Basseterre region.
conflict. The SKN Protected Areas Conservation Trust (PACT) Act fulfils one of the GEF-IWCAM criteria for watershed and coastal areas management, as it addresses coastal area management and biological diversity conservation.

Further, the designation of the Saint Kitts National Capitol Park and its expected development as a recreational facility for both visitors and locals, whilst not dealing specifically with tourism development policy and planning, demonstrates how a recreational facility could provide an excellent non-invasive, environmentally friendly alternative use for a sensitive ecologically area. Having said this, it is indirectly a Government policy statement on integrating tourism development with sensitive natural resource management procedures. This was demonstrated by the keen interest in the establishment of a system for protected areas expressed by Government officials during the preparation of the draft PACT Act.

Whilst the proposed title of “National Park” may have been misleading in the project document and project objectives, as a highly disturbed area such as the Basseterre Valley may not comprise the attributes for a national park, the management system developed in the proposed SKN PACT Act meets similar sustainability criteria as used in the conduct of this case study. It attempts to provide an economic incentive for the declaration of the Valley as a special protection area; it addresses environmental management issues; as well as social imperatives such as incorporation of host community priorities and access to physical assets.

The challenge for future IWCAM approaches to the management of the BVA, lies in the commitment of the government of Saint Kitts & Nevis to pass the PACT Act, and to provide financial resources for the establishment of the PAC Service. The recommendations made in the WRMP regarding actions which can be replicated to protect the aquifer from further saline intrusion and pollution from ground water sources, must be adopted by the respective Government Ministries.
References:


Sahely, Halla (2010) Combining Sound science, legal action and stakeholder involvement to protect a vulnerable coastal aquifer on the island of Saint Kitts. (Unpublished)CEF-5