Final Report

Project Title: **Promoting Watershed Management in Wider Caribbean Nations by Lessons Learnt from Soufriere, St. Lucia**
Project No: **NA03NOS4630230**
Funding Agency: **US Department of Commerce, NOAA**
Total Project Cost in US$: 140,000
Duration of Project: 18 months
Reporting period: **October 1, 2004 – March 2006**
Report date: **June, 2006**

Background

The people of the Caribbean are closely bonded to the marine realm and depend on the sea for food, transportation, and recreation. This dependence has led to the evolution of towns and villages along the coastline of all the Caribbean States and Soufriere in St. Lucia is no exception. Rich in natural and cultural resources the area of Soufriere and the Pitons is the most symbolic region of St. Lucia and declared a World Heritage Site in 2005 continue to attract most of the visitors to the island.

Inherent issues with the settlement of people in small areas include degradation of natural resources and waste management. The stress on the marine resources of Soufriere was deemed critical and the Soufriere Marine Management Authority (SMMA) was formed to address the problems experienced and promoted the conservation and co-management of the existing natural resources. The Soufriere Regional Development Foundation (SRDF) was formed to promote and enhance the natural and cultural assets for economic, cultural and social development for the benefit of the community of Soufriere. All these initiatives are geared towards sustainable development and use of the marine and terrestrial resources of the area. Within this context, the initiatives in this project have the purpose of securing the necessary interventions in the Soufriere watershed to, as far as possible, reduce the harmful inputs into the Soufriere Bay, using the same community-focused and partnership approach as adopted by the SMMA. The project seeks to employ environmentally sound resource-use practices supported by a comprehensive public awareness and sensitization campaign. In the main this was facilitated by the implementation of subprojects that had been developed by the technical coordinating group of the overall project.

The Composition of the Project Steering Committee includes representatives from the following agencies:

- The Soufriere Marine Management Association (formerly: Authority – SMMA, Secretariat)
- St. Lucia Solid Waste Management Authority
- Department of Forestry
- Department of Fisheries
- Department of Agriculture
- Ministry of Social Transformation, Culture and Local Government
- Soufriere Town Council
- Pilot Site Representative (when identified)
- Ministry of Health, Human Services and Family Affairs (Environmental Health)
- Ministry of Physical Development, Environment and Housing (SDEU – Chair)
- OECS-ESDU

It was decided that the implementation approach to the project would be to focus on a number of sub-projects developed and submitted by agencies represented on the steering committee. A working group was initially set up to discuss sub-projects that could provide the basis for implementation of project activities. Participants in the working groups included:

Allan Smith, Resource Management Technologies (RMT)
Dawn Pierre Nathoniel, Department of Fisheries
Lyndon Robertson, CEHI
Julian Mathieu, SMMA
Jackie Allain, Ministry of Social Transformation, Community Development
Cornelius Isaac, Forestry Department
Kai Wulf, SMMA

The working group meetings provided the fora for extensive discussion to refine these sub-project proposals. The sub-projects were managed by the SMMA, contracted on behalf of the project. This approach was seen as contributing to a further enhancement of the project management capacity of the Association, ensuring ownership in the process and thus increasing the potential sustainability of the outcomes. OECS ESDU monitored the implementation of these sub-projects, providing financial and managerial oversight, thus ensuring their compliance with NOAA guidelines in general, and project design in particular. The reports and progress of these sub-projects are provided below.

1.0 Identification and mapping of liquid waste pollution

Sustainable development initiatives must involve the management of waste of which solid and liquid wastes are chronic problems plaguing Soufriere from the early days of settlement. Development of the solid waste management system in St. Lucia has assisted with ameliorating some of the solid waste problems and although emphasis has been placed in this area, there is much more to be desired. Liquid waste management in Soufriere poses an extreme challenge and is influenced by a number of factors including: point sources, non-point sources, hydrogeology, social, economic, political, legal, education and awareness.

In accessing the infrastructure for improved liquid waste management in Soufriere within the legislative framework existing within St. Lucia, the Caribbean Environmental Health Institute (CEHI) opted to undertake key components such as: Literature review of the national, regional and international laws governing liquid waste management, surveys of point source of pollution, surveys of non-point sources of pollution, sampling and laboratory analyses. Hence, this provided information required for the determination of the level of compliance for liquid waste management in Soufriere within the legal, administrative and regulatory framework for St. Lucia and allow for the formulation of recommendations to achieving compliance. Training is an important component of liquid waste management and can be used to improve the design, construction and operation of the systems while at the same time reducing the need for enforcement in obtaining compliance to the regulatory framework. Recommendations for reducing the possible impact of liquid waste management on the marine environment also evolved from the surveys, water sampling and laboratory analyses that were components of the Project.

The Water and Sewage Act No. 14 of 2005, Public Health (Sewage and Disposal of Sewage and Liquid Industrial Waste Works) Regulations (No 22 1978) and Public Health

(Disposal of Offensive Matter) Regulations (1978) are the main legal instruments governing the sewage and liquid waste in St. Lucia. Additionally, the Cartagena Convention and LBS Protocol is an important instrument for the protection of the marine environment from sewage and liquid waste. These legal instruments although containing shortcoming such as addressing the issue of 'grey water' which is of concern are difficult to enforce within the socio-economic and political environments. This is compounded by the existence of less fortunate localities within the community such as Barons Drive where there is a general feeling of marginalisation and discontent.

Various initiatives to protect the natural resources and enhance the community of Soufriere were taken such as the SMMA and SRDF. With specific reference to the marine environment the conservation of the resources such as conflict resolution, creation of reserves and user specified zones has to be complemented by measures geared towards the prevention of pollution by liquid waste from land-based sources. Such measures include: 'Grey water' management, 'Black water' management, appropriate disposal of effluent from household sewage disposal systems, appropriate disposal of sewage from the commercial, tourism and institutional sectors and enhancing the socio-economic status of the less fortunate residents of Soufriere.

1.1 Reduction of the Potential Impact of Liquid Waste on the Marine Environment

Reducing the potential impact of liquid waste on the marine environment warrants measures to be taken from two fronts;

- Reducing the quantity of liquid waste from point and non-point sources;
- Improving the quality of the waste reaching the marine environment from land-based sources.

In the case of Soufriere the combination of both measures are necessary to improve and sustain marine water quality to minimise the threat to the Environment and Public Health. A comprehensive system for sewage and liquid waste management in Soufriere should firstly consider a policy, plan and strategy for improvement that considers all sectors generating and the socio-economic and political aspects.

The following are recommended to reduce the potential impact of liquid waste on the marine environment:

1.1.1 'Grey Water' Management

The threats from the significant quantities of Grey Water entering the marine environment are great. Subjected to no form of treatment the 'Grey Water', loaded with inorganic nutrients is deposited in open drains and natural watercourses and ultimately reaches the sea. The ambient standard for the protection of coral reefs are 2.48 µg/l for phosphate and 9.8 µg/l for nitrate.

For household constructed with individual sewage treatment systems, it should be mandatory that all wastewater be subjected to primary and secondary treatment in a septic tank. Hence, the design and construction of septic tanks should take into consideration the necessity for a grease traps, increased associated wastewater flow rates and a tanks of suitable dimensions and capacity.

1.1.2 'Black Water' Management

The measures necessary for attaining compliance to the Public Health Regulations should be adhered to in the granting of approval for the construction and operation of a septic tank. The design of all individual sewage disposal system should be approved and the construction of all such systems should be monitored to ensure adherence to the approved design. This will allow for the efficient functioning of the system and obtaining the appropriate retention time necessary for the treatment process to be effective. This will allow at least secondary treatment of the sewage before final discharge to the environment.

1.1.3 Appropriate Disposal of Effluent from Household Sewage Disposal Systems

Individual sewage disposal systems for which septic tanks and soak-away pits is the most common in Soufriere. These may constitute a direct point source of pollution when the system malfunction and overflows in cases of properties located close to the shoreline or a non-point source where the system functions efficiently and there is percolation of the effluent into the soil. Overflowing system allows the pollutants to reach the marine environment during direct washout or via natural water courses. In this case the raw untreated or partially treated liquid waste is dumped into the sea.

Percolation into the soil by the effluent of the treatment systems allow for some measure of natural treatment, attenuation, absorption by plants, adhesion to soil particles, dilution and dispersion before entering the marine environment. In this case the less concentrated pollutant may have lower impact or reduced degrading effect due to lower potency. However, the continuous influx of this low concentration pollutant can have a more delayed impact which may be realised in the longer term.

1.1.4 Appropriate Disposal of Sewage from the Commercial, Tourism and Institutional Sectors

The commercial sector in Soufriere refers to businesses such as stores, restaurants, bars, and shops. The Tourism sector refers to visitor reception and recreational facilities. The institutional sector refers to schools, places of worship and medical facilities. The Public Health Regulations governing liquid waste require that all such premises provide for sufficient, suitable and adequate sanitary facilities and sewage treatment and disposal systems. These places are of particular interest to any plan and strategy for the management of sewage and liquid waste since they concentrate people in confined areas and hence generate relatively larger volumes of sewage. Some of these sewage treatment

systems have their biologically treated effluent entering natural water courses and all of their ‘grey water’ entering either the public drain or a natural watercourse.

1.1.5 Recommendations for Compliance

The following are recommended for attaining compliance within the legal, administrative and regulatory framework:

- Mandatory site visits prior to approval and before the completion of the sewage treatment and disposal system offering technical advice and ensuring compliance;

- Scheduled biannual inspections of individual sewage treatment systems and enforcing measures required for the proper functioning of such systems;

- Developing a form for the keeping of records associated with the ‘self-policing’ of the individual and commercial sewage treatment and disposal systems;

- Conducting house to house inspection throughout Soufriere concentrating on specific less fortunate localities such as Barons Drive, to obtain data required for the formulation of a plan to manage sewage and excreta;

- Determination of all households without appropriate and approved excreta and sewage disposal systems and assessing the measures necessary to obtain compliance on an individual basis;

- Formulation and implementation of a plan and strategy for attaining compliance with the legal instruments covering sewage and excreta disposal at the level of the household;

- Incorporating governmental and non-governmental resource management organisations, development and social services agencies such as the SRDF, Town Council, SMMA, Ministry of Social Services, Ministry of Agriculture, Ministry of Works and Ministry of Health, Ministry of the Environment, in the formulation and execution of the plan and strategy;

- The possibility of relocation of residents in the congested low–income localities and provision of assistance in obtaining better housing and suitable sewage disposal systems;

- Obtaining commitment and actions from the political directorate to enhance the standard of living and general residential environment of the Town of Soufriere with special emphasis on the less fortunate localities;

- Ensuring that the SLCGA which is the largest manufacturing plants in Soufriere in addition to treating their sewage also treat their 'grey water' to the tertiary level before discharge into the environment;

- A feasibility study for a sewage treatment and disposal plant that will produce high quality effluent within the national standards and the stipulations of the LBS Protocol should be conducted for the community of Soufriere.

1.2 Training

A number of recommendations with regard to training were also made:

- Provide training for the construction and building sectors in the design, erection and functioning of septic tanks, filtering systems, absorption pits and alternatives for attaining appropriateness;
- Develop a manual for the design, construction and operation of sewage treatment and disposal systems that are appropriate for use in the Soufriere Community;
- Promote good liquid waste management practices among the businesses of Soufriere;
- Provide training and awareness building to the management and operators of hotels and institutions in alternative waste treatment and disposal methods and the choice of appropriate systems;
- Provide training to the technicians responsible for the operation and maintenance of the sewage plants in accordance with regional standards;
- Provide training to the Environmental Health Department (EHD) in the design, construction, operation, maintenance and management of on-site and communal sewage disposal systems; and
- Provide training to the EHD in the design, construction, operation, maintenance and management of package treatment plants.

1.3 Commercial, tourism and institutional sectors

A number of recommendations with regard to commercial, tourism and institutional sectors were also made:

- Conduct an assessment of the sewage treatment and disposal facilities;
- Identify areas for improvement and retrofitting to enhance the level of treatment required, including costing effective alternatives where necessary;
- Working to develop a programme to enhance the quality of liquid waste through simple tertiary treatment systems;
- Develop an operations manual for sewage treatment and disposal systems and educate operators in the use of the manual;
- Develop inspection forms;
- Ensure that all "grey water" is subject to treatment prior to final disposal;
- Develop and implement a programme for voluntary improvement in the sewage treatment and disposal systems

- Heighten vigilance by the EHD and SDEU in monitoring the level of voluntary enhancement and determine the necessity for amendment of the relevant regulations; and,
- Ensuring that enterprises that generate large volumes of "grey water" are fitted with simple means of tertiary liquid waste treatment systems

1.4 Enhancing socio-economic status

Enhancing the socio-0economic status of the residents of Soufriere is considered a critical element for the reduction of pollution from liquid waste. In this regard a number of recommendations have been made:

- Improving the socio-economic status of the residents of Baron's Drive so that they can improve their standard of living and manage their liquid waste;
- Refurbish the communal sanitary facility at Baron's Drive and establish a management and operational system;
- Integrate the human element into the development and management plans for Soufriere;
- Promote alternate forms of livelihood to that ox extraction of natural resources;
- Allocate some generated revenue form natural resource use for reinvestment in the community; and,
- Promote interagency collaboration for the development of a policy, plan and strategy for advancement of the less fortunate residents of Soufriere

2.0 Training in marine water quality monitoring.

The equipment and methods selected for the project were based on the experience of a three-year DFID project on reef management conducted in Laborie, St. Lucia. The equipment for analysis consists of a self-contained kit including materials and incubator for analysis of faecal coliform bacteria and other variables and is well suited to operation by non-scientific personnel, with appropriate training. Accordingly, SMMA staff received training in:

- selection of sample sites;
- water sampling procedures in the field;
- sample filtration, incubation and analysis, and data recording.
- preparation of an Excel spreadsheet to automate data entry and initial analysis.

2.1 Identification and mapping of point and non-point land-based sources of marine pollution in Soufriere

This component of the project began with the identification of the skills and tools needed by the SMMA to undertake the necessary activities. The software most commonly used for GIS work is unnecessarily costly and requires extensive training but more appropriate alternatives are now available. The priorities that were identified included the following:

- the availability of affordable and user-friendly computer software for mapping and GIS that is compatible with other applications currently used in St. Lucia;
- the ability to configure GPS units to local datum and projection and to collect waypoint data in the field;
- the compilation of available mapping resources, including scanned paper maps, digital topographic maps, aerial photographs;
- training in the use of the software application Map Maker Pro to integrate the maps and photographs, incorporate GPS field data, and to generate thematic maps.

Based on these skills developed through this component the following activities are included as ongoing underway:

- bathymetric mapping, to plot the 70m depth contour with GPS to determine the seaward boundary of the management area;
- verification and mapping of fresh water inflows to Soufriere Bay;
- mapping of all mooring and demarcation buoys;
- mapping of Reef Check monitoring sites and location of temperature loggers;
- mapping of the extent of inter-tidal filamentous green algae that indicate the impact of nutrient loading in the inshore environment of the SMMA.

3.0 Soil Conservation Project - Letan / Fond St. Jacques

3.1 Establishment of database;

Bio-Geophysical information collected by staff of the Forestry Department's Cartographic Unit was used in combination with aerial photographs, and other maps, to document the topographical, land cover, tenure, and occupation status of the site. Figures 1, 3, and 4 were output from that exercise. Further, a meeting of all stakeholders was videotaped by staff of the Information Unit of the Ministry of Agriculture, Forestry and Fisheries as preparatory work towards the production of a project documentary. Most field exercises such as distribution of plants, terrace construction, and improvement of access improvement were photographed for future reference.

3.2 Community sensitization on soil and watershed conservation;

Several meetings and consultations were held with farmers from the project area. Their purpose was to inform on the broader context of soil conservation, review work done to-date, constraints, and focused on participatory methods for development and implementation of planned activities. For example, one of the issues discussed was the source, cost, and manner in which bamboo would be supplied to the site for the construction of soil conservation terraces. It was at such a meeting that training needs were finalized. Additionally, field technicians from the Agricultural Extension Services and the Forestry Department frequently met individuals with interest in the project area on a one-to-one basis, to dialogue on project issues.

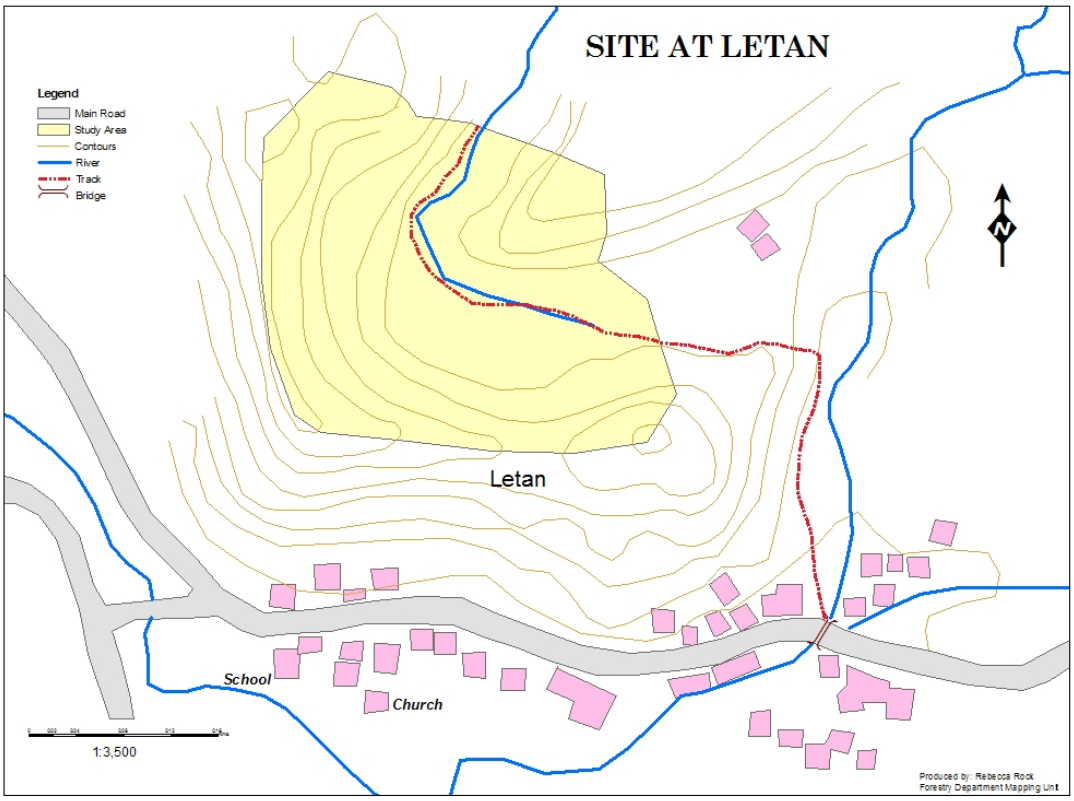

Figure 4. Topography of project area.

Several site visits were undertaken by different organizations and agencies to obtain information relating to the relevance, potential impacts, and feasibility of the project. They included staff of the Forestry Department, Directors of the Management of Slope Stability in Communities (MOSSAIC) project, Steering committee members of the Soufriere Watershed project, Extension and engineering Officers of the Ministry of Agricultural, and students from the University of Vermont, USA. Most visits were directed by a representative of the Fond St. Jacques farmer group along with a field technician.

3.3 Training of farmers in soil conservation practices;

To make the results of the project sustainable, it was decided that project partners needed to be trained in concepts, methods, and maintenance of conservation infrastructures. Towards this end the following sessions were planned;

- Orientation Field trips
- Project management
- Drainage design, construction, and maintenance
- Slope stabilization
- Yield and chemical application
- Group dynamics
- Public responsibility

However, due to time and other constraints, the following were conducted;

(a) Orientation Field trips – This was done on three separate days, all of which were facilitated by the Engineering Division of the Ministry of Agriculture, Forestry and Fisheries. The purpose was to impart site specific knowledge to the farmers on the type of conservation measures needed to be undertaken within the scope of the project. Twelve farmers participated in these exercises.

A second field trip was conducted for orientation purposes. This occurred at demonstration sites located in the north of the island. The specific objectives were to;

1. Sensitize farmers on soil conservation issues.
2. To meet farmers involved in similar activities and exchange ideas.
3. To impart new conservation techniques.

The two principal sites visited were Skate Town and Talvan. At Skate Town, the Farmers were told of the experiences of the residents in terms of damages caused by land slippage as a result of uncontrolled surface runoff. Farmers observed efforts being made by residents in constructing drains as part of their work to manage the excess runoff. Participants also observe the construction of an inexpensive form of durable drainage, locally known as star drains.

At Talvan, farmers met with members of an environmental group whose main objective is to mobilize the community around the issue of a safe supply of portable water. They had discussions with the host personnel on the question of group formation and efforts being made to keep the group together. The Letan farmers face similar challenges in working together as a conservation group. The farmers also observed tree planting initiatives undertaken by the Talvan group and had discussions on aspects of soil and water conservation practices, and the need to continue efforts for future generations.

(b) Group dynamics – This was a one-day exercise which was organized for the farmers of the project area as the targeted beneficiaries. This was seen as critical since sustainability of the project output depended on the farmers working together, and building capacity to innovate, share experiences, resources, knowledge and skills, and generally strengthen their social capital. The workshop was facilitated by the senior agricultural extension officer. Topics covered included, group formation and organization, the participation process, social capital, and issues of sustainability.

(c) Drainage design, construction, and maintenance – This workshop targeted field staff of both the Forestry and Agricultural Extension Officers who work within the region where the project site is located. In addition to Drainage design, construction, and maintenance, the workshop also covered a wide range of subjects such as the management of hillside farms, crop combination for hillside farms, and the effects of siltation on the marine environment.

3.4 Implementation of soil conservation works;

Most of the interventions applied were not new to the farmers. This was indicated by the existence of degraded conservation infrastructures. What the project sought to do was to integrate and upgrade the material resources, skills, and technologies available to the farmers for soil conservation works. Towards this end, they were assisted with means to acquire a fresh supply of bamboo for terrace construction, tree crops to augment the effectiveness of trees systems towards slope stability, and technical expertise and assistance to construct drains with adequate water control effect.

A total of four hundred and sixty-seven (467) meters of drains were constructed. The main drain was dug two feet wide and three feet deep. Extensive debris had to be cleared as preparatory work for drainage construction. This was all done manually by the farmers under the supervision of a senior Agricultural Engineer of the Ministry of Agriculture, Forestry, and Fisheries.

Approximately 260 meters of bamboo terraces were constructed. To be considered effective, farmers were encouraged to construct terraces with a minimum height of one (1) foot. Most of these were aligned along the contour, since their primary purpose is to conserve the top soil and therefore, reduce the amount of silt reaching the stream and ultimately the marine area. All materials were obtained within close proximity of the project area, which is quite good for purposes of future supply of materials for maintenance of the structures.

The project provided for and distributed 170 citrus plants to farmers. Although many planted and naturally occurring tree species existed before project intervention, in many cases, they were in a poor state of health and needed replacing, or were located in places not considered as having a high risk for landslide. Therefore, the plants provided to farmers by the project were intended to strengthen weaknesses in the existing system, without significantly decreasing the area available on which to grow cash crops.

3.5 Lessons learnt

3.5.1 Stakeholder analysis

When the process of engagement begun, a few meetings were held with persons thought at the time to be KEY stakeholders. Some were known to have direct involvement with the project site since they were seen cultivating within the area. Others held prominent community positions such as the chairperson of the local Community Development Group; a voluntary organization. It was with this group that the proposal was detailed and finalized. Then the group instructed that a community meeting be held at which formal election of leadership would occur. This led to the emergence of a completely new set of leaders, supported mainly by a younger generation of farmers. They were could be characterized as a set of individuals who did not form a coherent group, were inconsistent at attending meetings, were seeking employment with direct monetary rewards, and in most cases had a remote connection with lands located within the project area.

This new set of individuals caused significant delays with implementation. A new process of group formation had to be undertaken. The issues of group objectives, leadership, group structure, norms and discipline, decision-making, group activities, record keeping, and generally, group dynamics were now important factor for project personnel to consider. Several planned meetings failed to materialize because of absenteeism, as the group struggled with matters relating to social bonding, cooperation, trust, collective action, and group cohesion. However, although late, a group of committed farmers emerged to begin the construction of conservation structures. For a project whose duration spanned only two growing seasons, the loss of an entire growing season due to stakeholder group dynamics compromised the rate of implementation of activities in that area.

The lesson here was that in the absence of a systematic stakeholder analysis and mapping, one could end up spending time on group formation with individuals having demonstrating differences in their level and type of interest. Given the time constraints of this project, it could have been more efficient to identify and work with existing group formations who have built some level of social capital, instead of trying to create formal groups. This will have the effect of avoiding the infant stages of drop outs, the numerous delays in activity implementation, and loss of enthusiasm by committed individuals as reflected in a lack of compliance to agreements and rules of engagement. Starting new groups require a lot of investments in time and resources from the farmers as well as participating organizations.

3.5.2 Participation

Most of the literature described participation in community projects as rising slowly at first, accelerating to a maximum, and then increasing at gradually slower rates. Our experience showed that, farmer participation followed a *"U*" shaped curve, with high participation at the initial stages of the process, followed by a dramatic decrease, and a slow increase towards the end of the project.

Women participation throughout the project life was small, even though quite a few were contacted in the field. However, it appears that whenever they expressed a commitment, it was always fulfilled. This suggests that the project failed at finding an effective means of reaching the women who could have strengthened local commitment to the project.

3.5.3 Timing of events

In addition to problems relating to group formation and participation, many farms were in a fallow state during the first several months of project life. The reason advanced by many farmers was that they were engaged in farming elsewhere. Farmers shift from region to region and did not rely only on the project site for income. Additionally, the cultivation of dasheen (a root crop) is done during a specific time of year, so that even when funds became available for doing field work, a large percentage of the work occurred near the end of project life. This was the time that farmers returned to the project area and were ready to access the facilities provided by the project, especially in the area of terrace construction.

This project never sought to develop anything in isolation from the farmer. This means that the norms practiced by them had a significant bearing the outcomes. Therefore, if a farmer decided to allow his farm to fallow, nothing could have been done until he or she decided to cultivate. The timing of an intervention was controlled not only by the availability of project resources, but more importantly by facts of the farming culture.

3.5.4 Externalities

To the subsistence farmer, timing of events is a critical factor to his or her success. This project did not allow sufficient time for a normal adoption process to occur. It was restricted to the narrow window of one full growing season. The result was the exclusion of some farmers who were unprepared for reasons advanced above.

Notwithstanding the constraints expressed above, most of which could have been addressed with significant success if the life of the project were greater than the one and a half growing season, the important gains made by that activity in securing farmer interest in the adoption of soil conservation techniques served to attract funding interest in the form of a medium-size sustainable land management project proposal currently being developed for the wider Fond St. Jacques region. The project is to be funded by Global Environmental Fund (GEF) and seeks to address issues similar to the NOAA funded sub-activity and to support the application of similar techniques of soil conservation. In fact, the same agencies and individuals who implemented the Letan project have been asked to provide leadership to this bigger project.

3.6 Conclusions

The aim of the project was to implement appropriate anti-erosion infrastructures that are sustainable and compatible with traditional crops grown on steep and unstable slopes.

The project area drains through the Soufriere River that ultimately empties into the Soufriere marine zone which is Management by the Soufriere Marine Management Area (SMMA).

Project activities included the establishment of a database, community sensitization on soil and watershed conservation, training of farmers in soil conservation practices, and implementation of soil conservation works.

The participatory management structure adopted to facilitate implementation of activities included a Project Management Committee responsible for overall administration of the project and Project Technical Operations Committee which was responsible for day to day works. This committee was directed by a senior Agricultural Officer.

Several lessons were learnt, the main ones being within the areas of stakeholder analysis and mapping, participation in terms of the extent of participation, type of participation, and participation of women. Lessons were also learnt in the areas of timing of events, and the impacts of externalities.

Due to the successes of this project, a medium-size sustainable land management project proposal is being developed for the wider Fond St. Jacques region. It is hoped that it will be funded by the Global Environmental Fund (GEF).

4.0 Public Awareness Activities

4.1 SMMA "Enviro-Fiesta"

Target Audience: General Public

The SMMA in its continued effort to educate persons about the importance of conserving coral reefs, held its first major public awareness activity in the form of a grand public show on Sunday February 26th 2006 at the St. Isidore Hall in Soufriere which commenced at approximately 4pm. This activity stemmed from a sub-component of the NOAA project (Solid Waste Disposal Component) was aimed at sensitizing persons about the negative effects of liquid and solid waste on coral reefs and the marine environment on the whole.

The opening remarks were made by Mr. Keith Nichols, Head of OECS/ESDU. The show featured performances by the following community youth groups who displayed theatrical performances in the form of drama, song and dance depicting various forms of liquid and solid waste pollution and their negative impacts on the marine environment:

- **The Soufriere Action Theatre (SAT):** Known for their famous jingle "Mi Jab La", portrayed plastic as being an evil product in relation to the environment and that many of its users, those who are aware as well as those who may not be aware of the dangers posed by this product, seem to be blinded by its negative effect on the environment.

- **The Barons Drive Youth Organization:** portrayed how fishermen and other local users of marine resources are caught in the middle; trying to earn a living but at the same time, threatening the sustainability of their livelihoods as a result of the damage caused by the dumping of plastic bags, plastic bottles and other destructive items that are detrimental to the coral reefs and other marine life.

- **YATICKA** portrayed how people maliciously pollute the environment with the mindset that Scavengers and other persons employed to keep the environment clean would not have a job if they don't litter.

- **Grow Ed Pre-School:** Vigor and enthusiasm engulfed the stage as the pre-school kids highlighted a strong message to the audience through their poetic presentation. Stop the pollution! They chanted, Stop the pollution now!

The audience was entertained by the Sulphur Stars Steel Pan Group who delivered some melodious renditions.

A Certificate of Appreciation was presented to each group for the special effort made in participating in the event. The event was video taped for documentation.

This initiative was indeed a success and the SMMA looks forward to a bigger and better ENVIRO FIESTA 2007.

4.2 Essay Competition

Target Audience: Students at the Secondary Schools

An essay competition was held among two Secondary Schools in the South namely Soufriere Comprehensive Secondary School and Choiseul Secondary School. The objective of this activity was aimed at helping to encourage the youth to better appreciate their environment and develop a stewardship attitude towards solid waste management.

The students were to write an essay in the form of a letter to the Prime Minister on one of the following topics:

1. A Plan for the Recycling of plastics in Saint Lucia
2. A Plan for National Composting in Saint Lucia
3. The Re-Introduction of "Litter Wardens" or "Police Zordi" in Saint Lucia – Breaking the Cycle.

The essays were marked by three members on the NOAA Project Committee

The results were as follows:

1st place - The Choiseul Secondary School
Ms. Alicia Thuraman
(A Plan for the recycling of plastics in Saint Lucia) 85.66%
Prize: EC$200.00

2nd place - The Choiseul Secondary School
Mr. Darrion Louis
(A Plan for the recycling of plastics in Saint Lucia) 85%
Prize: EC$150.00

3rd place - The Soufriere Comprehensive Secondary School
Mr. Terrence Alcee
(A Plan for national composting in Saint Lucia) 72.33%
Prize: EC$100.00

The winning letters are published in a local newspaper.

4.3 Production of Public Service Announcements (Effects of Liquid Waste on Coral Reefs)

Target Audience: General Public

A suite of ten Public Service Announcements (PSAs) had been produced using footage taken in Soufriere and other surrounding districts with the aim of sensitizing the general public via media about the effects of liquid waste on coral reefs and the marine environment in general. Three of these PSAs (on plastics, water and littering and respectively) were aired on the local channels with support from the project. Additionally, the development of a PSA on pollution was supported by the project.

5.0 Project Closure

The official closing ceremony for the project was held on Friday June 23, 2006. Remarks were received from Mr. Kai Wulf, Manager, SMMA; Mr. Methodius Faucher, Ministry of Agriculture, Forestry and Fisheries; and Mr. Keith E. Nichols, Head OECS Environment and Sustainable Development Unit and project coordinator. Additionally, a number of awards were presented to persons that had contributed to the success of the project. These were:

Bellevue Farmer's Co-operative

Mr. Hilary Monlouis
Mr. Charles Herelle
Mr. Lambert Joseph
Mr. Augustine Joseph
Mr. Cameron Joseph
Mr. Bernard Joseph
Ms. Julita Jn. Paul
Ms. Cassilda Jn. Philip
Ms. Marcia Modeste
Mr. Francis Jn. Philip
Mr. Jonathan Alexander

SMMA Enviro Fiesta

Mrs. Jacqueline Allain-Francois
Mr. Dave Augustine
Mr. Michael Eugene

Essay Competition

Ms. Alicia Thuraman	1st Place Winner	Choiseul Secondary School
Mr. Darrion Louis	2nd Place Winner	Choiseul Secondary School
Mr. Terrence Alcee	3rd Place Winner	Soufriere Comprehensive Secondary School

Awardees and speakers at project closing ceremony

Summary of end-of-project status with regard to expected products and outcomes

Project Products	Product status	Outcomes	Outcome status
Establishment of a multi-stakeholder grouping for the management of watershed areas in Soufriere – project report	Project steering committee and subproject working groups provide multi-stakeholder groupings	A fully integrated network of stakeholders representing terrestrial and marine jurisdictions in place and addressing the issues of sustainable use of natural resources in Soufriere	Achieved: The SMMA board, project steering committee and sub-project working group will continue to provide a focus for decision making.
Issues of non-beneficial inputs to the marine environment identified and alternatives for sustainable use identified – project report	Stakeholder survey of residents of the town of Soufriere was conducted and its analysis resulted in identification of non-beneficial inputs to the marine environment.	Pollutant inputs to the marine environment reduced enhancing the survivability of reefs.	Unknown; it is not yet possible to determine whether this outcome has been achieved. – It will be sometime yet to determine if this outcome has been achieved.
Enforcement mechanisms enforced or established – project report	A variety of compliance mechanisms were recommended and some are being implemented voluntarily	Greater compliance with established measures – more beneficiaries using sustainable measures	Achieved: as a direct consequence of the soil conservation subproject, more of the beneficiaries have been utilizing sustainable methods in the upper watershed areas. Additionally, voluntary compliance with agreed methodologies has increased.
Information Management system in place – project report	Creation of a mechanism for more efficient acquisition and sharing of information was facilitated by	Stakeholders are kept informed and abreast of developments as it pertains to the management of the	Unknown: while mechanisms have been out in place, it is at present too

Project Products	Product status	Outcomes	Outcome status
	provision of the required soft- and hard- ware to SMMA A structure is in place to provide information which will be added to the website. A Soufriere watershed map has been generated by the consultant and a series of GPS reference points have been taken at the site, and were integrated in the general GIS of the SMMA	resources, aiding more informed planning and decision-making	early to determine whether stakeholders are actually being kept informed with the consequential aid to "more informed planning and decision-making"
A public awareness and information dissemination system in place - project report	The PA & ID system was facilitated using the Public Awareness and Sensitisation sub-project entitled "Towards Attitudinal Changes Regarding Solid Waste Disposal" which had as its primary objective the encouragement of enhanced solid waste disposal practices in Soufriere and environs	Enhanced information sharing informing, and leading to greater compliance and stewardship attitudes among stakeholders – measures accepted and installed	Achieved:
Stakeholder involvement and participation in management of the use of natural resources secured - project report	The creation of the mechanism for the involvement of communities was achieved via the medium of the formation of a multisectoral/stakeholder Advisory Committee.	Ownership of the process leads to greater compliance and stewardship attitudes – reduced non-beneficial inputs to the sea	Achieved: greater compliance and stewardship attitudes have been developed among stakeholders, particularly the youth that participated in the essay competition and the farmers that were involved in the soil conservation subproject.
Model watershed management	Not accomplished due to temporal	Project further informs the	At least partially achieved:

Project Products	Product status	Outcomes	Outcome status
project developed – project report	insufficiency	development of the Coastal Zone Management Unit in St. Lucia and replicability in other Member States demonstrated	appropriate "lessons learned" can be applied to other Member States. The lessons learned are important to informing the adoption of the methodology applied in this project. However the project was not able to develop the actual model.
Recommendations for policy, legal and institutional reform developed – project report	A fairly large suite of recommendations have been made for policy, legal and coming out of the various subprojects.	Endorsement of recommendations by national authorities	Likely, the projects findings would go a long way towards informing this outcome. The actual drafting of legislation was not possible given the limited resources of the project.
Sustainable use practices adopted and practiced	Practices were adopted by way of the sub-project entitled the "Soil Conservation at Fond St. Jacques Project"	Reduced environmental degradation leading to reduced pollutant discharges into the sea	Unknown; it is not yet possible to determine whether this outcome has been achieved to the extent that this project has been demonstrational - A full scale project would have achieved a greater level of compliance

Annex 1.

Selected results from survey of Soufriere residents for identification of non-beneficial inputs to the marine environment.