INTEGRATED WATER RESOURCE MANAGEMENT

Demonstration Project

APIA WATER CATCHMENT

SAMOA
2007

SAMOA MINISTRY OF NATURAL RESOURCE & ENVIRONMENT
WATER RESOURCE **DIVISION**
In Association with
KEW Consult Ltd Engineering & Water
Conserve the Reason for Life ...

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ACRONYMS

ADB	-	Asian Development Bank
CBD	-	Central Business District
CCC	-	Catchment Coordinating Committee
EPC	-	Electric Power Corporation
EU	-	European Union
EU-WF	-	European Union – Water Facility
FAO	-	FOOD AND AGRICULTURAL ORGANISATION
GEF	-	Global Environment Facility
GIS	-	Geographic Information System
HYCOS	-	Hydrological Cycle Observing System
ICA	-	Incremental Cost Analysis
IPES	-	Institute of Professional Engineers in Samoa
IW	-	International Waters
IW SAP	-	International Waters Strategic Action Plan
JICA	-	Japan International Cooperation Agency
KEW	-	Kupa Engineering and Water
MAF	-	Ministry of Agriculture and Fisheries
MESC	-	Ministry of Education, Sports and Culture
METI	-	Matuaileoo Environment Trust, Inc.
MNRE	-	Ministry of Natural Resources and Environment
MOH	-	Ministry of Health
MWCSD	-	Ministry of Women, Community and Social Development
NEMS	-	National Environment and Development Management Strategies
NGO	-	Non Government Organisation
NWRIMS	-	National Water Resources Information Management System
NWSSC	-	National Water Sector Steering Committee
OP	-	Operational Programmes
Pacific RAP	-	Pacific Regional Action Plan
PMU	-	Project Management Unit
PPMS	-	Project Performance Management System
PUMA	-	Planning and Urban Management Agency
SDS	-	Strategy for the Development of Samoa
SIDS	-	Small Island Developing States
SLM2	-	Sustainable land management 2
SOPAC	-	Secretariat of Pacific Island Applied Geoscience Commission
SPREP	-	South Pacific Regional Environment Programme
SSDP	-	Samoa Sanitation and Drainage Project
STA	-	Samoa Tourism Authority
SUNGO	-	Samoa Umbrella Non Government Organisation
SWA	-	Samoa Water Authority
UNCCD	-	United Nationals Convention to Combat Desertification
UNFCC	-	United Nations Framework Convention on Climate Change
WaSSP	-	Water Sector Support Programme
WRD	-	Water Resources Division
WSP	-	Water Safety Plan

SAMOA'S DEMONSTRATION PROJECT PROPOSAL

A. **Country: SAMOA**

B. **Title: REHABILITATION AND SUSTAINABLE MANAGEMENT OF APIA CATCHMENT**

C. **Executing Body**

The Ministry of Natural Resources and Environment (Water Resources Division) shall be the national executing agency for this proposed Project.

D. **Cost of Project:**

In USD **Cost of Project:** $2,580,000 **GEF Funding:** $525,000 **Co-Funding:** $2,055,000

E. **Project Abstract:**

The Apia Catchment is Samoa's selected IWRM demonstration project zone. It accommodates Lake Lanoto'o and its two main tributaries – Vaisigano and Fuluasou Rivers, which are very important water sources for drinking water, hydropower, bio-diversity and tourism. Unfortunately, with increasing population and development pressures over the years, this catchment area has become significantly degraded from problems such as soil erosion, siltation, water pollution/contamination and water shortages, causing major concern to the Government.

In addressing this problem, the project aims to develop and implement a set of strategic actions to rehabilitate and sustainably manage the Apia Catchment in order to improve the quality and quantity of the water resources for enhanced water supply and hydropower generation, socio-economic advancement and reduced environmental adverse impacts.

Project implementation will be facilitated by a project management unit under the Water Resources Division of MNREM and monitored by a larger coordination body comprising key water sector stakeholders (Catchment Coordinating Committee). Essentially, the water catchment users (community, businesses, public utilities, farmers and tourism industry) will be involved at all phases of the project until its completion date (and even beyond) to ensure project sustainability. At the end of 5 years, the Apia Catchment is expected to be a well managed water resource zone with incidental benefits impacting regionally on international waters quality, reduction of land degradation and climate change variability as well as the protection of biodiversity. Lessons learnt and best practices applied during the project will be replicated in other areas of Samoa and the Pacific region.

F. **Eligibility through Linkages to GEF Programme**

Within the GEF Operational Strategy for International Waters this project tackles water and environmental problems using an IWRM approach across GEF Strategic Programme III: Balancing overuse and conflicting

uses of water resources in transboundary surface and groundwater basins (with a specific focus on SIDS to protect community surface and groundwater supplies while reducing sewage releases).

The geographical nature of SIDS allows IWRM approaches to rapidly demonstrate the multiple benefits of tackling water resource management in an institutionally horizontal manner, whilst applying a ridge to reef approach, tackling technical and socio-economic issues with communities and civil society at large to demonstrate equity, efficiency and environmental sustainability.

The project will also tackle, through IWRM approaches, many of the issues under GEF Strategic Programmes I and II through identifying and understanding multiple stresses on fragile coastal environments and linking these to freshwater and land management, especially upstream practices; IWRM will contribute to improving coastal fishstocks and biodiversity. IWRM approaches will also include methods to reduce economic and ecologic dead-zones of oxygen deficient water as a result of human and animal sewage waste.

On a regional level, the proposed project has linkages to the International Waters Strategic Action Plan (IW SAP) as it contributes to achieving the long-term objective of conserving and sustainably managing the coastal and ocean resources in the Pacific region. The mitigation actions proposed for conserving and sustainably rehabilitating Apia Catchment will have real positive impact on the International Waters and effectively prevent further threats to the marine/coastal eco-systems, fresh water supplies, fisheries, and relevant sustainable tourism activity through a cross-sectoral integrated approach. Moreover, the actions proposed for implementation under this project form part of wider actions of the Pacific Regional Action Plan (Pacific RAP) for Sustainable Water Management.

G. **Linkage to National Priorities, Policies and Plans**

The 2005 – 2007 Strategy for the Development of Samoa (SDS) which is currently under review for developing the successive SDS is built on a national vision to achieve *'improved quality of life for all'* through the enhancement of people's choices and access to opportunities. The priority strategies are aimed at promoting and ensuring economic growth that is equitable and sustainable and improves health, education and the well-being of every individual. In pursuing this vision and goals for the nation, the Government has accorded high priority to water supply and sanitation as well as water/wastewater management. A set of strategies for addressing water sector needs were developed for achieving within the 3 year time frame and a draft Water for Life Sector Plan was formulated reflecting "ensuring community access to water of suitable quality and appropriate quantities to meet all reasonable health, environmental, and economic development needs" as Samoa's water sector vision.

Existing policies and strategies such as National Water Resources Policy 2001, National Water Services Policy (draft) and National Water Resources Management Strategy are consistent with the Water for Life Sector Plan (finalisation in progress) and provide a framework for implementing this important project. The legal document which intends to enforce actions that protect and conserve water bodies and further guide the decisions of the National Water Resources division for matters such as water allocation, penalising water polluters and charging water source extractors, is currently in progress. A new water resources legislation should be in place in 2008.

Other national policies and plans that are relevant to this project are:

- National Biodiversity Policy
- National Environment and Development Management Strategies 1993 (NEMS)

- Samoa Tourism Development Plan 2002 – 2006 (under review)
- Coastal Infrastructure Management Plans (CIMS)
- National Land Use Policy
- Samoa Health Sector Plan 2007-2015

Samoa's ratification of and accession to the following international and regional conventions/agreements are pertinent to further supporting the efforts targeted under this proposal.

International:

- United Nationals Convention to Combat Desertification (UNCCD)
- United Nations Convention on Biological Diversity (BD), 1994.
- United Nations Framework Convention on Climate Change (UNFCC)
- Ramsar Convention on Wetlands, 2004.
- Cartagena Protocol on Biosafety (CPB), 2002
- Convention for the International Trade of Endangered Species of Wild Fauna and Flora (CITES)

Regional:

- Apia Convention on the Conservation of Nature in the South Pacific
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP/Noumea Convention)
- Protocol for the Prevention of Pollution in the South Pacific by Dumping, 1998.
- Protocol Concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region
- Convention to Ban the importation and to control the Transboundary Movement of Hazardous and Radioactive Wastes in Forum Island Countries (Waigani Convention), 2001.

H. Name and Post of Government Representative endorsing the Demonstration Activity

Honourable Faumuina Liuga Tiatia

Minister of Natural Resources and Environment

I. Project Background

Apia Catchment as a Selected Hot Spot:

Located on Upolu, the Apia catchment covers 85km^2 and includes Lake Lanoto'o and its two subcatchments, Vaisigano and Fuluasou. It is essential for the provision of water supply as well as hydropower generation to Apia - Samoa's capital city. This urban area is densely populated (approximately 45% of Samoa's

178,000 population[1]) and serves as the country's principal centre of administration and commercial activity. All surface water from this catchment drains into the Apia town area, which constitutes a large floodplain.

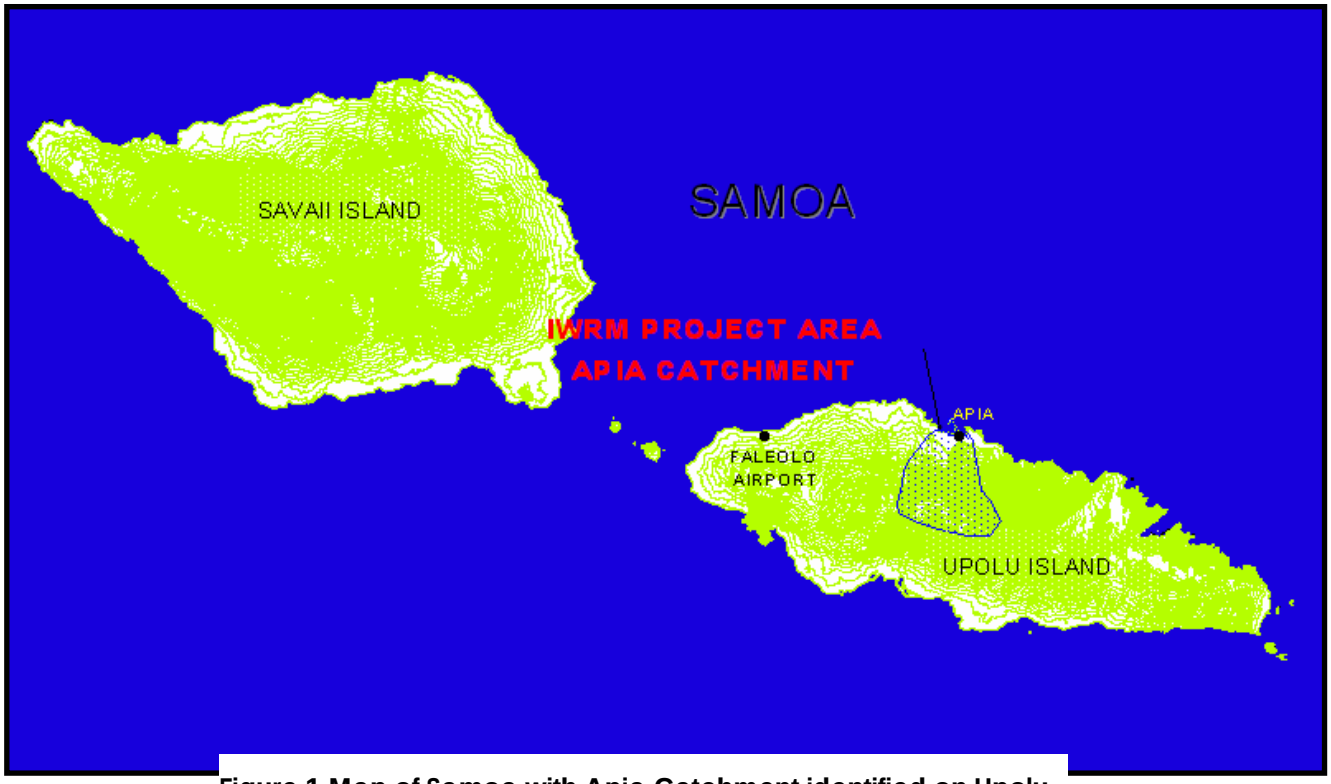

Figure 1 Map of Samoa with Apia Catchment identified on Upolu

Figure 2 Topographical Map of Apia Catchment

[1] 2001 Population Census of Samoa

Figure 3 Apia Catchment area with villages identified

Situated within the Apia catchment zone is Lake Lanoto'o, which is Samoa's second national park and protected under the Ramsar Convention because of its significant biodiversity value. It is home to rare endemic birds such as Manu Ai Pa'u La'au (Red Headed Parrot Finch), Manumea (Tooth Billed Pigeon) and Manutagi (Crimson Crowned Fruit Dove). Gold fish first introduced into the lake by German settlers in the late 1800s are also present. Three natural plant formations have been identified in the area as upland rush and reed swamps, upland swamp forest, and primary high forest. Hence not only is this particular site considered an attraction for conservationists but also to tourists.

The Vaisigano subcatchment, located in the North Central Upolu Island near the growing capital city of Apia, covers an area of 3400 hectares (34 km^2) and is being tapped to meet the increasing demands of drinking water and hydropower for the capital city and its surrounding villages. Problems such as siltation is causing interruption to power generation and water supply, while adversely affecting the natural and built-up environments and threatening thriving inland and coastal eco-systems.[2]

Figure 4: Vaisigano River after Hydro Station

The Fuluasou sub catchment covering 4500 hectares (45 km^2) is located south west of Apia and supplies drinking water to the North-West Upolu and a part of Apia. Major agricultural activities (cattle farms, taro, banana and vegetable productions) occur in this area and pose some problems to the residential and urban areas through erosion caused by the cultivation of steep slopes and threatened water supply quality from the use of pesticides.[3]

Developments that occur upland impact on the lowlands. Therefore the consequences of continued land clearing for agricultural, cattle farming, industrial and residential purposes have taken its toll on Apia's township. Those factors coupled with poor drainage, wastewater/sanitation infrastructure have resulted in water pollution/contamination in both fresh and coastal waters as well as flooding during the wet season (October to March). Such problems are associated with the presence of water-borne diseases in the urban area. In the dry season, droughts are at times experienced and often cause water supply shortages, power outages as well as poor crop growth and production due to their vulnerability to reduced moisture from the soil surface. In effect, Apia's poor watershed management practices increases its vulnerability to climate variability and change.[4]

Figure 5 Polluted Drainage in Apia

[2] FAO 1991, Vaisigano River Watershed Management Plan, Field Document No.2 (TCP/SAM/8851), P.M. Baisyet, Chief Technical Advisor, FAO
[3] FAO 1994, Management Plan for the Fuluasou Watershed, Field Document No. 6 (DP/SAM/2/003), Michiel A. Meijer, Associate Professional Officer, FAO

For the sake of guaranteeing a continued supply of water to current and future generations for human consumption, agriculture, electricity, industrial and commercial activity, recreation amongst other uses, in harmony with preserving the environmental, economic, social, historical and cultural values of Samoa, the Government (of Samoa) is committed to addressing the existing problems described above. For some time, the Government has focussed largely on improving its country's water supply while not paying much attention to the proper management of the water resources. Now, with the realisation of the vital linkages between the water resource and supply, the Government has selected the Apia water catchment area in which to demonstrate the value of integrated, sustainable water resources management.

J. Project Description

i. Objectives:

The objective of the project is to rehabilitate and manage the Apia catchment in a sustainable manner in order to improve the quality and quantity of the water resources for enhanced water supply and hydropower generation, socio-economic advancement and reduced environmental adverse impacts.

A predominant part of this proposed project will run concurrently with the EU funded Water Sector Support Programme, the ADB funded Samoa Sanitation and Drainage Project, the JICA funded National Parks & Reserves Management Project and the EU funded Hydrological Cycle Observing System (HYCOS) Project. These projects have common goals and strong synergies with the proposed project, and are expected to augment the processes for achieving the expected outcome of this demonstration project.

On a global level, it is envisaged that the outcomes of this proposed project will impact positively through both targeted efforts and their consequential benefits such as mitigating and preventing imminent threats to International Waters (IW), promoting sustainable biodiversity conservation in protected areas and production landscapes, and minimising climate change/variability risks and adverse effects on the geo-physical, social and economic environments including land degradation.

To achieve this, three key components are proposed. Component 1 (C1) targets specific policy and plans formulation and review which facilitate effective water conservation, allocation and service provision. Component 2 (C2) has a dual purpose focusing on conservation and rehabilitation of the proposed project zone. Its activities are closely interrelated with common outputs, hence the reason for combining the two sub-components. Component 3 (C3) features capacity building of watershed management for users and effective public awareness and education programmes to support and strengthen the proposed project's aims. Project Management and coordination activities are targeted under Component 0 (C0). The core activities are summarised below, under their respective components.

ii. Project Components and Activities:

C0. Project Management and Coordination

0.1 Establish Project Management Unit within MNRE-WRD

[4] Gutteridge, Haskins and Davey Pty Ltd, Urban Development Project for Apia. ADB Technical Assistance No. 2480-SAM, December 1996

0.2 Contract and appoint Project Management Unit personnel (Project Coordinator and Project Assistant)

0.3 Coordinate, develop and implement Project Monitoring and Evaluation Plan

0.4 Coordinate CCC meetings and other project meetings

0.5 Provide quarterly progress reports

C1. Policy and Plans formulation and review for effective water conservation, allocation and provision

1.1 Develop a Land Use Plan

1.2 Review of watershed management plan (Vaisigano and Fuluasou)

1.3 Develop a watershed conservation policy and plan

1.4 Develop a water safety plan for underground and surface water

1.5 Review National Water Resources Policy and finalise National Water Services Policy

C2. Conservation and Rehabilitation of Degraded Areas to Reduce Water Pollution

2.1 Collect information and update the National Water Resources Information Management System

2.2 Assess impacts of land use activities (e.g agricultural, land clearing, earthworks, infrastructural developments etc) on water (fresh and coastal), soil and biodiversity quality and public health

2.3 Implement priority mitigation measures based on findings of land use impact assessment

2.4 Implement water, soil and land use monitoring programme

2.5 Develop and implement appropriate eco-tourism activities

C3. Awareness and Capacity Building for Prevention of Water Pollution and Wastage

3.1 Water Demand management for targeted end users within the watershed

3.2 Implementation of effective public education/awareness and capacity building programmes for watershed users

The demonstration of an integrated water resources management approach is to be reflected through implementing a concurrent programme of conservation, rehabilitation and preventive measures within the Apia Water Catchment Zone. Such measures have been carefully selected by the stakeholders for implementation given the desire to achieve maximum results against the budget allocation.

C0. Project Management and Coordination

Through the recruitment of appropriate Project Management personnel, activities required include the effective coordination of project implementation tasks and inter-agency meetings (through the Catchment Coordinating Committee set-up) and reporting of project progress to the relevant authorities. To ensure that quality based actions are pursued, monitoring and evaluation of the project progress shall be coordinated by the CCC and Project Coordinator.

C1. Policy and Plans formulation and review

Gradual changes in land use practices and improvements to the environment and water resources can be expected through the creation and enforcement of effective regulations, policies and plans that stipulate

conservation and protection measures including polluter pays and water allocation principles. Currently, Samoa's water sector is undergoing policy, legislative and institutional reform which is timely in terms of the expected execution of this proposed project and particularly the emphasis given to integrating IWRM principles. It is expected that by the time this project commences, a new legislation for the management of water resources will be effective (funded under the WaSSP programme) and strengthen the pursuit of key policy goals across all sectors that impacts on water resources.

1.1 Develop a Land Use Plan

Samoa has a National Land Use Policy which is undergoing review. Implementation has not been effective to date owing to longstanding difficulties related to cultural and social links to customary land. Extensive consultation with land owners is to be pursued further under this project in developing site specific land use plans targeting priority areas identified within the Apia catchment zone.

1.2 Review of watershed management plan (Vaisigano and Fuluasou)

The watershed management plans for Vaisigano and Fuluasou developed in the early 90s shall be reviewed in conjunction with developing site specific land use plans. Actions required for conservation and rehabilitation of degraded areas within the two sub-catchments will be considered following impact assessment of land use/development activities detailed under Component 2.

1.3 Develop a watershed conservation policy and plan

The development of a watershed conservation policy and plan is considered necessary to reinforce the conservation efforts, not only for this proposed project zone but for the entire country.

1.4 Develop a water safety plan for underground and surface water

To reduce contamination risks to Apia catchment's underground and surface water sources, WSPs will be developed and implemented as an integral component of the WaSSP programme. This task would further enhance efforts towards encouraging best land use practices within the project zone.

1.5 Review National Water Resources Policy and finalise National Water Services Policy

With the Cabinet Development Committee's endorsement of the National Water Resources Strategy, the existing National Water Resources Policy will be reviewed under the project in conjunction with finalising the National Water Services Policy. The two policy documents reinforce mutual goals and aim at addressing priority concerns in the short and medium terms in order to secure sustainable water services delivery and sustainable management of water resources.

C2. Conservation and Rehabilitation of Degraded Catchment

Figure 6 Erosion of river bank

Consistent with the concept that any anthropogenic changes to hydrological processes in any one place has potential impacts to all downstream users, considerable emphasis is being attributed to conservation and

rehabilitation measures in the upper zone. It is perceived that ad hoc agricultural, livestock farming and other land use practices and developments have increased sediment loading, soil erosion and nutrient enrichment of water courses. Aquatic habitats have deteriorated and tourist attraction sites are under threat. To minimise the evident environmental degradation the following activities are proposed.

2.1 Collect data/information and update the National Water Resources Information Management System

A National Water Resources Information Management System (NWRIMS) has been developed under the WaSSP, of which data collection and update are currently departmental tasks of the Water Resources division of MNRE. For the proposed project it is envisaged that data collection/update will focus on selected priority sites of the Apia Catchment zone, covering meteorology, soil temperature, evaporation, hydrology (river discharge, sediment load, water quality, coliform tests, nutrient content in water etc) geology, topography, current land-use types, soil, vegetation and forest types for analysing and understanding the interactive nature of water resources and the physical and socio-cultural environment. The collected data will then become integrated into the NWRIMS. The national data will consequently be integrated into a comprehensive regional database (under HYCOS programme) established at the Secretariat of Pacific Island Applied Geoscience Commission (SOPAC). This activity will be coordinated by the lead agency (MNRE) in collaboration with each implementing agency e.g MAF, MOH etc. It is proposed that MNRE will develop a set of data quality objectives to guide the data collection methodology, frequency and accuracy. This would form part of a Quality Assurance Plan/Process which will ideally be developed by the proposed Project Management Unit before project implementation in collaboration with all stakeholders.

Data collected under the project will be digitised into GIS maps for future planning and modelling of sustainable land use and watershed practices. GIS mapping is currently a core function of the MNRE (Mapping Section) and its continuity will be resourced under the Government budget. The sustainability of GIS activity and objectives is supported by a local network of GIS specialists (referred to as the 'GIS USERS Group' from various sectors e.g Telecommunications, EPC, SWA etc) who meet bi-monthly to discuss and resolve issues relating to GIS work. The group also exchanges GIS layers (in relation to core work activities) that are not sensitive to their respective organisations.

2.2 Assess impacts of land use activities (e.g agricultural, land clearing, earthworks, infrastructural developments etc) on water (fresh and coastal), soil and biodiversity quality and public health

Assessments of land use activities and associated pollution related threats are being proposed from which to define specific mitigation measures to implement in conjunction with the development of water safety and conservation plans to reinforce the efforts. Assessing the soil types and classification in identified priority areas of the catchment will also guide the types of soil protection/fertility and water retention methods required for implementation, such as revegetation and replanting/reforestation of suitable native plant species, mulching and organic farming etc that produce multiple benefits such as protection from soil erosion and stabilising the water supply, enhanced livelihood of the community from food crops and timber material, and improved natural eco-systems.

Figure 7 Land Clearance for farming (insert of livestock grazing nearby) in Apia Catchment

The suggested development of land use plans will be conducted simultaneously with the assessments so that the extent of urban water catchment degradation is known and the appropriate relative land use activities recommended.

The assessment emphasis of this component is to ensure that priority and cost- effective remedial means of intervention are considered & targeted only.

2.3 Implement priority mitigation measures based on findings of land use and development impact assessments

Recommended mitigation measures for reducing erosion, pollution and associated environmental degradation will be targeted in the priority selected areas and may include declaring critical areas as protected zones (e.g water sources for drinking and electricity production, natural forest and areas of biodiversity significance), demarcating specific areas for replanting of suitable vegetative cover and plant species, e.g fruit trees and reforestation in heavily soil eroded areas, construction of embankments and buffer strips along riverbanks, clearance of river debris caused by fallen logs and deposited solid wastes and promotion/adoption of appropriate land use activities e.g conservation farming, agro-forestry and terracing systems in critical areas (derived from land use plan). It is envisaged that the involvement of community will be significant in implementing remedial actions during and after project timeframe.

2.4 Implement water, soil and land use monitoring programme

An annual monitoring plan will be developed for the implemented mitigation actions and will include field visits and a testing programme. Close dialogue with the key project players of the Samoa Sanitation and Drainage Project (ADB funded) will occur and further inform the monitoring progress of remedial actions to the drainage and floodways as well as wastewater systems in the Apia Central Business District. Impacts from the mitigation measures implemented under this proposed project together with that of the SSDP should be apparent around Apia's coastal and built up environs within 2 years of implementation (e.g r quality, less pollution and disruption of hreatened by reclamation activites in the public health) will be noted, updated in

Figure 8 Entrance to Lake Lanoto'o (old signboard, no proper carpark and unclear trail due to overgrown lawn)

ıcted by the CCC and Project Coordinator, ehicle is critically needed for regular on-

successfully deliver this output, a 4WD project vehicle is critically needed for regular on-site/field visits (e.g soil/water quality/quantity testings) project progress inspections and coordination activities. The nature of the project suggests that rugged terrain and dirt access roads would be traversed to access specific sites for implementation of assessment and mitigation activities. Given the HYCOS regional programme which focuses on water resources management systems, it is envisaged that the much needed vehicle proposed will be used for both projects (reflected in the co-funding portion provided by HYCOS).

2.5 Develop and implement appropriate eco-tourism activities (biodiversity enhancement)

Two sites have been identified for enhancing tourism/eco-tourism activity, namely Lake Lanoto'o and Loimata o Apaula. In line with ensuring that the tourism sites cater well for the visitors and comply with sustainable watershed management practices, improved sites maintenance such as track clearing to promote an interesting nature walk trail, signage for the presence of native tree/plants and birds as well as historical information and sanitary facilities are planned. This activity will be coordinated in conjunction with the Samoa Tourism Authority as part of an eco-tourism promotional incentive and to ensure that a well planned guided tour is provided. A ranger is proposed to take care of the sites and ensure safety of the tourists. The STA office will be responsible for providing a guided tour and collect charges, of which some of that (20%) may go towards a maintenance fund for the sites.

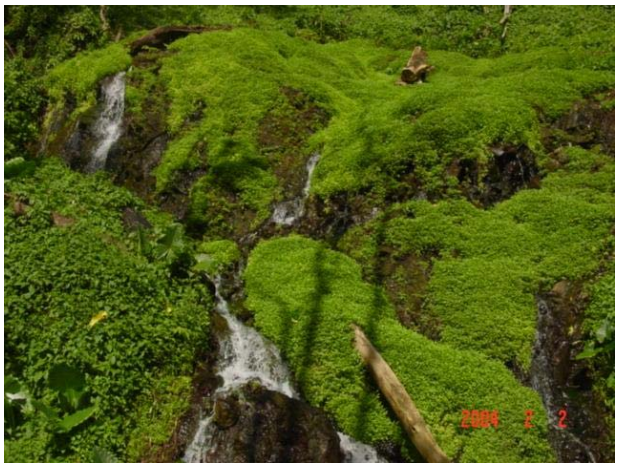

Figure 9 Loimata o Apaula

Figure 10 Lake Lanoto'o

C3. Awareness and Capacity Building for Prevention of Water Pollution and Wastage

3.1 Water Demand management for targeted end users within the watershed

Adopting effective water demand management tools is commensurate with ensuring that the water supply is adequate and available through efficient water use. Over the next three years (2007 – 2010), the WaSSP aims to assist the Samoa Water Authority to reduce water wastage and losses in the public water supply systems as well as promote demand management and reduce consumer consumption. To complement those goals in achieving sustainable water catchment management, this project proposes to confirm the significant users/sectors/competitors for water e.g EPC, MAF, the Industry, including hotels etc within the catchment for targeted training and awareness programmes. Audits of the large water consumers will be conducted with recommended demand reduction programmes to be taken up or piloted, such as designing and implementing efficiency improvement programmes within an industry (manufacturing) or sector (public schools), e.g retrofit of non-conserving plumbing fixtures in the buildings, or awareness programmes targeting tourists (in hotels) and other significant water end-users, such as farmers and the benefits of rainwater harvesting or recreational developers and the potential benefits of reusing treated urban wastewater for irrigation of parks and golf courses (Faleata golf course is included in the project zone).

The energy sector which competes aggressively for water in this catchment to provide hydro power to the country has little knowledge of its extent of water usage. By learning more about and monitoring its own usage, a more conservative approach may be adopted by the energy sector.

In terms of drought management, the experience of SWA and customers in implementing efficient practices can be beneficial during periods of water shortage. Some of the basic demand management techniques can be accelerated during supply emergencies or droughts, e.g visible display of public warning notices coupled with radio and television notices about refraining from garden watering or car washing during specific drought period. Essentially, it is more cost effective to plan ahead for drought conditions rather than react when it occurs.

3.2 Implementation of effective public education/awareness and capacity building programmes for watershed users

Increased community awareness, education, consultation and participation in water resources planning and implementing sustainable water catchment management practices cannot be emphasised strongly enough. A community based bottom-up approach in parallel with top down Government institutional roles will be adopted to place a greater responsibility on the communities and increase their levels of commitment and ownership of the project for sustainability and success. Moreover, improved coordination and strengthened partnership ties between the Government and communities for locally appropriate solutions to water conservation and curbing water pollution are paramount. Mobilisation of the affected communities including local and village based church, women and youth groups, farmers etc will be facilitated for implementing recommended mitigation action plans and effective decision-making at the field level.

Considerable awareness and education efforts will be targeted at farmers, developers, land owners etc so that any adverse landuse activities affecting the people, water and environment are discontinued or reduced and sustainable land practices encouraged and adopted. The promotion and implementation of good land use practices will be facilitated by MNRE, MAF and MWCSD in close collaboration with the affected land owners/users. They will be involved in the landuse planning process with the MNRE and MAF so that agreement and cooperation is gained and potential conflicts during implementation phase prevented. Appropriate incentives for ensuring ‘buy in’ from the affected community of farmers and developers may be considered by the Government at that stage and included in the land use plans.

Essentially, greater awareness of water issues and the benefits of conservation at the community level is bound to induce changed behaviour amongst the watershed users and increase their capacity to contribute to the project and wider water management goals.

To attain project sustainability and success, all activities will be conducted in a proper participatory and consultative manner, involving all the key stakeholders identified in a latter section. At the time of writing this proposal, clearly defined roles between the Government as facilitators of the project and the Community as initiators and implementers have already been broached through initial discussion with relevant stakeholders at the previous 4 consultative workshops. This would be reiterated to the stakeholders immediately following project commencement to secure better ownership of the local (community) people to the project.

iii. End of Project Landscape:

At the end of the project, the Apia Catchment is expected to reflect a well managed water resource zone where agricultural activity, infrastructural development and other land uses are controlled, water courses actively protected from contamination and pollution, natural eco-systems remain intact, tourist attraction sites are beautified and maintained and the Apia residents enjoy safe and adequate water supply, reliable power supply as well as improved wastewater services in the CBD. Increased awareness and understanding amongst the stakeholders about the interrelationships between water resources, their uses and the legal, policy and institutional framework within which they take place are expected to result in enhanced catchment planning, coordination, and management as well as improved information/data sharing between the different agencies. Ultimately, the water supply chain within the Apia demonstration site will be optimised through the implementation of practical remedial actions for managing and controlling water resources and demand well.

The likely collective regional environmental benefits from Samoa's showcase project will include the transfer of lessons, knowledge and best practices applied from IWRM based water resources management approaches. Apart from enhanced improvement of international waters quality other global benefits expected to derive from significant reforestation and revegetation project activities include increased biodiversity value, reduced land degradation and improved mitigation against climate change impacts, the latter resulting from forests acting as carbon sinks ($CO^{2)}$ as well as enhancing the land's resilience to extreme climate patterns. Moreover, stronger regional ties between SIDS are expected from ongoing support and information exchange on environmental issues. (An initial project management logframe with broad performance indicators is attached as Appendix A). A tabulated summary of collective short-medium-long term benefits derived from the demonstration project follows.

Table 1: Summary of Benefits Anticipated for the Local and Global Communities

Primary Benefits	**Incidental Benefits**
• Reduced contamination and pollution of water and soil • Adequate and safe water supplies for the Apia residential and business areas. • Reduced % of unaccounted for water (UFW) in Apia. • Electric power supply reliable • Improved wastewater/sanitation management in CBD • Important eco-systems in the forests and both fresh and marine waters intact • Beautification of the Lake Lanoto'o (Protected National Park) and Loimata o Apaula • Available enabling tools to regulate water resources protection and extraction • Improved land use practices e.g conservation farming, sustainable infrastructure • Integrated database available for ongoing monitoring of water resources • **Apia catchment thriving**	• Healthier public and environment • Satisfied public from adequate water and electric power supplies • Improved hydro-power capacity in order to minimize fossil fuel use for power generation • Increased pride of Samoans (future generations) in the environmental, biodiversity and historical values of Apia Catchment's natural heritages. • Empowerment of Community groups, particularly women through involvement in water catchment management • Increased eco- tourism activity (replicated to other areas of Samoa) • Sustainable livelihoods in the villages • Replication of IWRM best practices in other areas of Samoa and other SIDS • Mitigated climate change impacts • Improved quality of International Waters • Integrated WR Regional Database • Samoa's economy improved.

K. **Project Management Structure and Accountability**

The successful management of this proposed project will be the responsibility of a Project Management Unit (PMU) which is to be established under the Water Resources Division of the Ministry of Natural Resources and Environment. The key personnel of this PMU will include a Project Coordinator and Administrative Assistant. It is envisaged that the Project Coordinator will report directly to the Assistant CEO of the MNRE, who is also the current National Focal Point for IWRM and chairman of the proposed project Taskforce - the Catchment Coordinating Committee (CCC). The CCC membership shall comprise stakeholders (governmental agencies and ministries, NGOs, professional associations and community) with key water responsibilities and interests. (A Terms of Reference for the CCC is attached as Appendix B and was agreed by the interim CCC members at a special workshop on Tuesday 10 July 2007). The importance of securing a high degree of commitment from proposed members prior to formal approval of the project was highlighted for the sustainability of the project. Gender balance was sought through the composition.

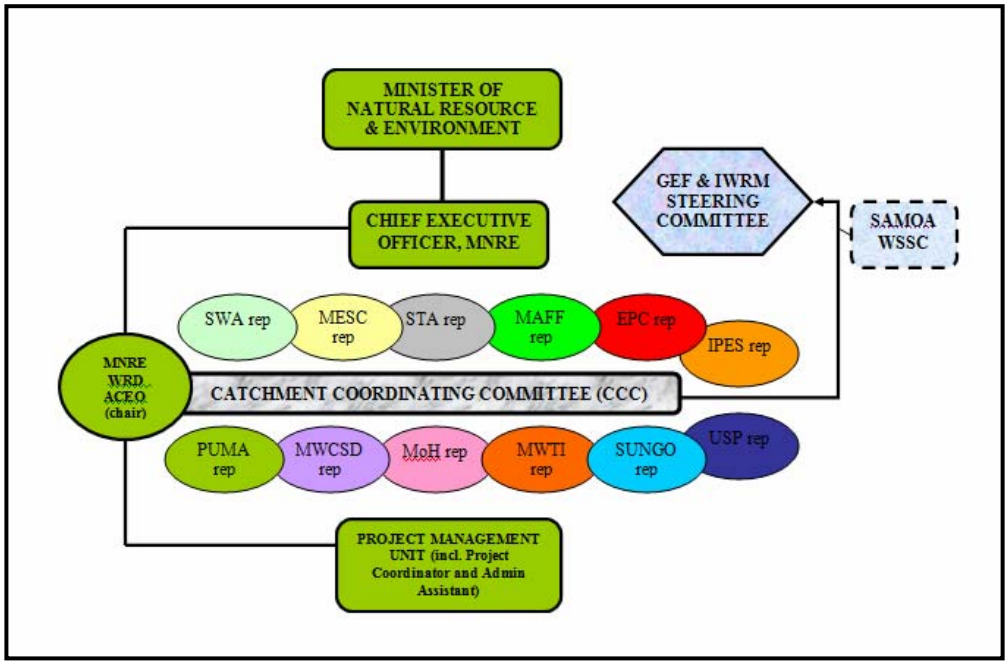

Figure 11: Proposed Project Management Structure

While the official reporting line for the CCC shall be directly to GEF-IWRM Steering Committee as the regional executing agency, it shall also assume a proactive role of informing the current National Water Sector Steering Committee (NWSSC) and other key stakeholders of its progress to ensure that an integrated and collaborative approach is pursued and common goals achieved. Current representation on the NWSSC reflects a senior executive, multi-disciplinary stratum of the Government, NGO and private sector and this proposal has already been communicated to the members, hence high level support is expected during the life of the project. Collaboration with the Minister of Natural Resources and Environment at this stage is also important for the project to receive sufficient political support and commitment.

Bi-monthly CCC meetings is proposed for the first year of the project implementation and thereafter on a quarterly basis, however the frequency of the meetings shall be at the discretion of the Committee depending on progress. The Project Coordinator and/or the Chairperson will be expected to attend regular inter-project coordination meetings currently in place for the Water Sector Support Programme and Sanitation and Drainage Project. This would strengthen dialogue and coordination between all project players and consolidate useful information for managing water resources successfully.

The execution of the daily tasks will be in accordance with the implementation plan under the core activities and by the lead agency identified.

The role of CCC is expected to demonstrate the benefits of sound cross-sectoral linkages through combined decision making over issues that will arise through the life of the project. The public will be informed of this project (objectives and progress reporting) through the CCC's communication media (TV, radio talkback, water sector website and newsletters, consultation etc) and vice versa, they will be able to use the same media channels to feedback constructively or raise questions about the project. Alternatively, formal channels of communication such as the Government's village/community representative known as the "pulenu'u" or "sui o le malo" can be used. These processes which reflect good governance at both institutional and local levels should further strengthen the overall water resources development and management functions in the catchment. While the evolvement of the CCC into a more permanent structure such as a Water Resources Board is likely, formalisation of this option will be assessed further under the WaSSP. In the meantime, the CCC is expected to be retained for such a period of time should the project be replicated in other areas of Samoa. For sustainability, although the PMU will have dissolved by the project's end, it is assumed that the personnel will be absorbed into the WRD.

L. **Stakeholders and Beneficiaries**

In line with the view that "Water is everyone's Responsibility" it cannot be underestimated how essential stakeholder participation is for project success. Their active engagement is necessary at all critical steps of the project implementation process. Identification of key stakeholders early in the planning process is also important lest a particular group of people considered influential in driving the project objectives be excluded. At this stage of project design, stakeholders have been identified according to their degree of interest in the project and the potential impact of the project on them.

The following categories of stakeholders have overlapping interests and include:

Drivers:	**Potential Beneficiaries:**	**Adversely impacted (by changes in water management)**
• MNRE (WRD) • Ministry of Finance • Samoa Water Authority • Electric Power Corporation • Samoa Tourism Authority • Ministry of Health • MESC • MAF • Schools • Donors • METI and Siosiomaga Society • SUNGO	• Apia Catchment residents • Eco-systems in the catchment • Ministry of Natural Resources and Environment • Samoa Water Authority • Electric Power Corporation • Samoa Tourism Authority • Ministry of Health • Tourists • Business community in Apia catchment • Environmentalists • Community groups	• High water users/sectors • Livestock and crop farmers in the water catchment • Water polluters

• CCC • Tourists	• Future generation • School children	
Vulnerable groups • Farmers • Land owners	**Supporters and opponents of changes to water management processes** • (Identified in the top two categories)	**Gender representation** • Sui o le Malo (Ministry of Women, Community and Social Development)

Proposed methods for fostering the support of stakeholders and securing their commitment for the project include the conduct of stakeholder workshops at various stages of the project, consultations with collaborating organisations to capture knowledge and expertise such as SUNGO and academic institutions, local consultations with selected villages and church/youth groups and ensuring that there is good representation in the management structure for the planning process. Intrinsic in this inclusive participatory process is communication and information relay/exchange. Stakeholders need to know and accept the importance of demonstrating this project and the benefits derived, starting from the top of the political ladder down to the farmer in the Apia Catchment.

M. **Long-term Sustainability Strategy**

The overall goal of this demonstration project is to ensure that the Apia catchment is sustainably managed to ensure that its water resources are continually available and current and future generations enjoy a clean and adequate water supply as well as reliable electric power. The results of poor water resources management practices in this catchment have been described in the first section of this proposal and are being targeted for intervention. However the real key to success in this project is ensuring its long term sustainability, beyond the life of the project. Consideration of a suitable sustainability strategy will look at the longer term direction that the key project stakeholders and beneficiaries should take in order to reach its goal of promoting environmental (water and habitat) sustainability and ensuring that the Apia Catchment can be a symbol of pride for all generations. This will form an integral part of Samoa's wider national strategy that already promotes sustainable development in all integrated sectors embracing land, water, wastewater, economic development, tourism etc

Institutional Factors

One of the critical factors that will bind the sustainable element of this project is for all stakeholders having and communicating a 'shared vision' of Samoa's water resources and supply in the future. Some of the national policies and plans already in place or currently under review (e.g Water for Life Sector Plan) reflect such a vision, the challenge however is in translating text into reality. This means working towards an integrated situation where the resources that are consumed and the waste generated match what is available and do not continue at an unsustainable rate. The actions proposed for implementation within parameters of this project intend to achieve this goal in parallel with common objectives of the WaSSP, SSDP and other relevant environmental projects. Furthermore at the institutional level, long term sustainability of the proposed interventions will be supported by the adoption of succession planning in all of the relevant agencies and reflected in their corporate plans as per identified government's national priorities to ensure their continuation and budget support (these are mandatory for budgetary purposes). This has been recognised as a weakness in many Government organisations, whereby after a project has completed there is a lack of succession mechanism in place to ensure continuity and pursuit of the longer-term aspirations. The

communication and transfer of lessons learnt from this project to other relevant projects, organisations and communities will also reinforce the sustainability efforts.

Social Factors

People as vital ingredients to the sustainability of any programme is emphasised through the participatory approach that will be adopted. To bring about a real difference in managing the water catchment sustainably, awareness-raising, education and capacity building programmes will aim at helping farmers and water users including residents, and businesses to make changes in their attitudes, lifestyles and working practices. At the community level, while it is best that landowners/landusers and watershed end-users take responsibility for protecting and conserving their own environment, it would seem from the MAF's past experiences that efforts to achieve firm community involvement (in similar projects) without tangible incentives offered have resulted in low success rates. The village communities in the catchment will need to be involved at most levels of planning and implementation e.g the preparation and implementation of sustainable management plans (land use and watershed management), to increase their level of ownership (of the problem and solution) and ongoing commitment to managing their area within the water catchment at a reduced cost. However, some form of incentives or financial assistance would need to be considered and offered to sustain the communal interests during and after the project. Incentives such as the provision of free seedlings for fuel wood and fruit trees as part of a replanting scheme or the guaranteed improvement of water supply to the village households were mostly welcomed. After the project, it is envisaged that the government budget will support the ongoing working relationship between the community and the institutions (e.g MNRE, MAF and Farmers Association (NGO), MWCSD, etc) for catchment maintenance, replanting schemes, farmers training and public awareness, albeit at a lesser cost given improved commitment and ownership by the community groups.

The village based awareness and educational programmes may include a training component in simple, practical water quality monitoring techniques e.g H_2S sampling testing and recording results. This would be done in collaboration with the Ministry of Health, who are responsible for engaging communities in water safety planning and as part of a wider public health promotional tool. Ongoing monitoring will likely be continued by the trained community individuals. Educational material and programmes on sustainable watershed management practices will also be promoted in all schools (from primary to college) as part of the school curriculum and may include field trips and science project competitions to sustain interest. In this respect, selected schools in the project zone may be approached to engage in a science/environmental competition involving the planting of suitable plant species or vegetation in heavily soil eroded areas and monitoring the results. The winner can be based on the best results produced after a certain period of time (not too long for fear of losing interest). The participants and winners may be awarded accordingly from secured sponsors (e.g private sector). The expected lessons learnt from the students and teachers will go a long way in changing attitudes about environmental protection.

Essentially, all of the stakeholders will be encouraged to be responsible custodians of their environment, particularly in protecting and enhancing Apia Catchment's biodiversity and nature conservation. In reinforcing such efforts, networking and fostering partnerships with a range of stakeholders, such as academic and research institutions, specific NGO's dealing with environmental issues and other national/regional organisations is proposed to ensure specialised expert advise and assistance is provided as part of capacity building and knowledge transfer to the stakeholders.

Financial and Economic Factors

To ensure financial sustainability in the longer term, strong political will and stakeholder support are required. Positive attempts will be made at addressing concerns such as water wastage and pollution as well as inappropriate and unsustainable land use practices and infrastructural developments through policy and legislation reform. Such regulatory and economic instruments will include strategies that penalise water

resources polluters, charge water extraction rates and allocate water resources to competing users in an equitable manner. While these are the subject of some debate between the water and electricity utilities, land owners, business water operators and the MNRE (regulators), resolution may be achieved through the impending Water Resources Act, associated policies and strategies and ensuing consultation/public awareness that will help to enforce compliance. The significant users such as EPC, SWA or MAF, private developers etc will be compelled to pay for water abstraction at a future date to the MNRE. As a government agency the revenue collected from this activity would be deposited into the Government treasury, however, it will resurface in annual operational budget estimates allocated for the water resources division and is likely to be reallocated towards catchment maintenance activities.

Samoa's National Water Utility is currently undertaking various innovative approaches to discouraging excessive water use by consumers and managing water demand more effectively. The activities planned under this project will augment such efforts with long term benefits being measured in terms of avoided costs, or the incremental savings associated with not having to produce additional units of water or water service. Water savings will also provide monetary savings in the necessary investments on water supply and wastewater disposal.

Regarding the eco-tourism activity, a percentage of returns is proposed be set aside for maintenance funds and will be canvassed with the private tour guide companies for support. The tours would otherwise not be available if the natural attraction sites are not properly maintained. The STA is mandated to promote environmental sustainability in their tourism plans.

Funding support or attracting investment from the public and private sector may also be developed through strengthened partnerships between the Government, regional organisations, NGOs and Community Service Obligations. It is noted however that not all of the implementation activities merit continuation when the funds are used up (within project timeframe) and therefore it would be advisable that a review of project implementation and plan for continuation of certain activities with estimated budget be conducted in the final project year. The Government budget is always available to support ongoing activities, but at the end of this project, enabling communities to institutionalise the appropriate conservation practices would be more sustainable. Hence the emphasis right from the start of the project of community engagement.

At the village or grass-roots level financial sustainability can be observed through the encouragement and adoption of appropriate agricultural farming. Apart from the MAF supporting this more sustainable effort, other foundations like the South Pacific Business Development Foundation – a micro-finance organisation aimed at improving quality of life of people living in poverty in poor island nations, may help farmers invest in cash crop production that is consistent with good agricultural practices and becoming more self-reliant in the long term.

N. **Replicability**

It is proposed that the PMU in collaboration with the CCC will at the end of the project compile a completion report detailing outputs/deliverables achieved and reflecting the successful outcome of the demonstration. The report will also include a form of strategy mapping out viable means of replicating the successful practices demonstrated and lessons learnt within both national and regional contexts. This would include the implications and potential economic-cost benefits on a wider scale, including global benefits. The consequences of not implementing much needed IWRM best practices will also be highlighted for comparative analysis. Potential financial information e.g sustainable revenues and work plans (including cost-estimates) based on demonstration results should be incorporated in the report to provide practical guidance for sequential replication. Supporting data and graphics will also be included and if possible, photos demonstrating 'before and after IWRM incorporated approaches' in the catchment. Further to the

report, effective publicity (via media, website, meetings etc) should help promote the benefits of replicating the project in other areas and depending on the budget or Government support perhaps, open public consultations may be planned to promote the replicability of the project further.

During the implementation phase, some thought should be given to potential geographical locations that may benefit from the replication of this project. Features e.g tropical, volcanic, steep, heavily developed capital hinterlands may guide selection of area. While a total replication package of the project can be developed for facile application in a similar water catchment within Samoa or even another Small Island Developing State, specific individual good practices or lessons can also be extracted from identified areas of the demonstrated water resources management process for application elsewhere.

O. **Monitoring and Evaluation Process**

The monitoring and evaluation process is most often neglected in project implementation albeit critical to ensuring the achievement of goals. A Project Performance Management System (PPMS) will be developed shortly after project implementation commences and this would be initiated by the Project Coordinator in collaboration with the stakeholders and endorsed by the CCC. This would be the tool that guides the monitoring and evaluation process of the entire project. In terms of the individual activities and tasks proposed for implementation, the proposed work plan has already incorporated the M & E mechanism at the operational level which would involve scheduled field visits and testing in the identified priority areas. Impact on the coastal receiving waters and fish habitats for example would be tested through MNRE in collaboration with MOH and MAF. The Marine Trust which was an NGO that tried to implement monitoring programmes in Samoa is now defunct; however its revival could be explored again through the timeframe of this project and consultation with the key stakeholders. The indicators of progress displayed at that level will feed into the larger PPMS for gaining a bigger picture of advancement.

The CCC shall be responsible for the project monitoring role and provide advice to the PMU for further progress should issues arise that require immediate attention. As part of the management requirements, the CCC will submit quarterly progress reports to the GEF IWRM Steering Committee. This would consolidate needed information by SOPAC to further inform the regional progress of the 14 pilot Pacific Island countries. The first progress report will include a PPMS template for approval by the Steering Committee. A template for the quarterly progress reports will be developed in due course. The advantage of having a good representation of stakeholders on the CCC from the lead implementing agencies and with sufficient authority will strengthen the follow-up process on activities that may have lagged behind or become problematic.

P. **Co-Funding Alternatives**

The objectives of the Apia Catchment demonstration project corresponds directly and indirectly with two major projects currently in progress – the EU funded Water Sector Support Programme (WaSSP) and ADB funded Samoa Sanitation and Drainage Project (SSDP) as well a JICA funded national project aimed at Enhancing Management Capacity for National Parks and National Reserves of Samoa and a regional EU-WF funded HYCOS project. The projects and in-kind contributions from the Government involving ongoing commitment to personnel input, equipment and other overheads have been identified as the main targets of co-funding for the demonstration.

A summary of co-funding support to rehabilitating and managing the Apia Catchment is provided below:

ADB funded Samoa Sanitation and Drainage Project (SSDP) = US$1,500,000

Activities:

a. Construction of a Wastewater Treatment Plant in Apia
b. Installation of a pressure sewer system to collect and dispose of wastewater
c. Rehabilitation of drainage systems and floodways in Apia

EU funded Water Sector Support Programme (WASSP) = US$235,000

Activities:

- Development of a comprehensive institutional framework for effective water governance
- Development of a sustainable water resources management framework

JICA funded National Parks and Reserves Management Project = US$100,000

- **Activities**:
  - Development of Management Plan for Vailima National Reserve
  - Upgrade of infrastructures
  - National Parks & Reserves Awareness promotion

EU-WF funded Hydrological Cycle Observing System (HYCOS) Project = US$100,000

- **Activities**:
  - Assess and monitor the status & trend of water resources
  - Establish database and information archives for data capture, processing and dissemination
  - Capacity building to mitigate climate change and land use impacts on water resources

In-Kind Government Contributions = US$120,000

- MNRE personnel
- Administrative costs
- Equipment

The compound effects of the co-funded initiatives actively reduce pressures on the Apia CBD which is located downstream of the catchment. The combined objectives help in improving coordination and knowledge development in water resources management, reducing water pollution, promoting water and soil conservation and ensuring that a good supply of water is available for drinking and electric power. Detailed

in the ICA report (Appendix C), some activities of the identified co-funds constitute direct baseline information for the demonstration project.

Total: US$2,055,000 (A full budget and work plan is attached as Appendix D).

APPENDIX A: PROJECT LOGFRAME

APPENDIX B: TERMS OF REFERENCE FOR CATCHMENT COORDINATING COMMITTEE (CCC)

APPENDIX C: INCREMENTAL COST ANALYSIS (ICA) REPORT

APPENDIX D: BUDGET AND WORK PLAN