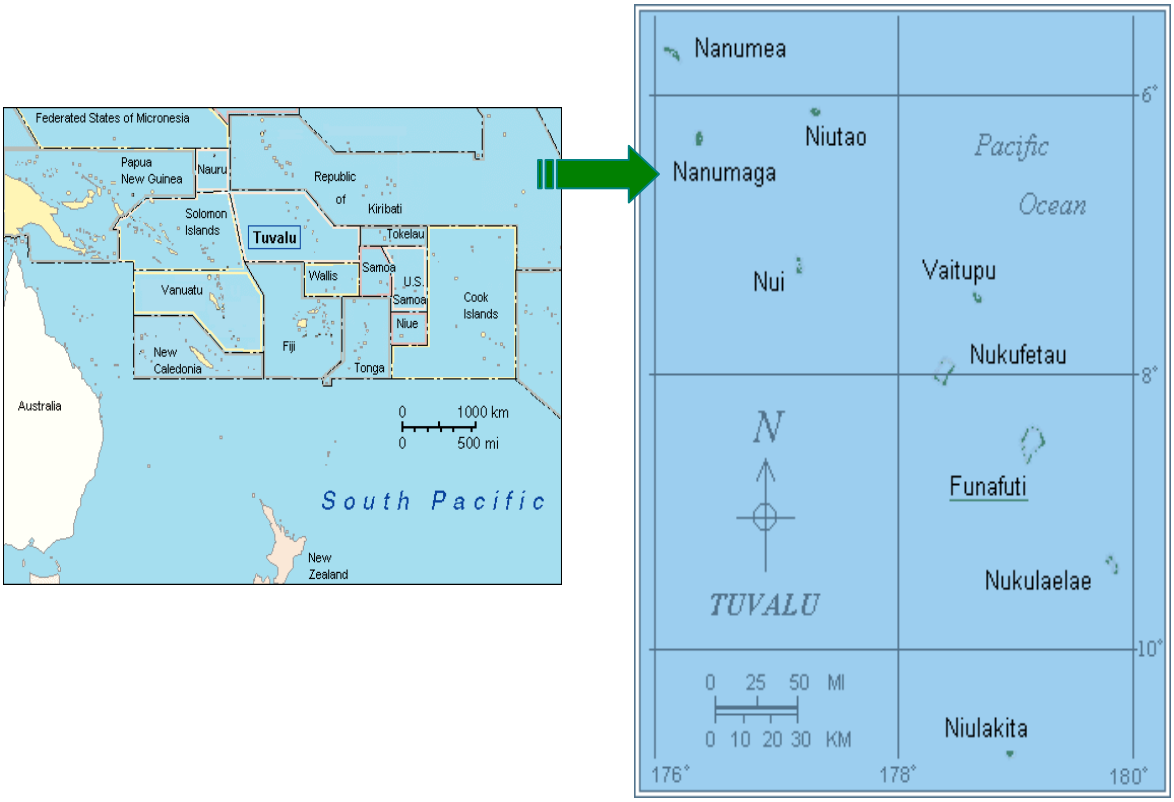
Sustainable Integrated Water Resources and Wastewater Management Project in Pacific Island Countries



DEMONSTRATION PROJECT PROPOSAL FOR TUVALU

Developed by the National Water and Sanitation Committee

Sustainable Integrated Water Resources and Wastewater Management (SIWRWM) Project

Demonstration Project Proposal

Developed by the National Water and Sanitation Committee with facilitation by Ms Loia Tausi from the Ministry of Natural Resources and Environment

A. Country: Tuvalu

B. Title: Integrated Sustainable Wastewater Management (Ecosan) for Tuvalu

C. Executing Agency: Public Works Division within the Ministry of Energy and Works

D. Cost of Project: GEF Funding $US564,000 Co-Funding: USD2,367,200

E. Linkages to SIWRWM GEF Project Priorities

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

This project addresses priorities as agreed by the SIWRWM Steering Committee and National Focal Points, such as compatibility with the Hot Spot Analysis (HSA), relevance to GEF focal areas, sustainability, affordability, potential for replication and contribution to strengthening the national and regional IWRM. The priorities are addressed as follows.

The people of the islands of Tuvalu are primarily dependent on rainwater. Freshwater supply is limited by natural and human parameters: rainfall; sufficient storage and proper construction and maintenance of rainwater harvesting systems at the national, communal and household level; and demand management. Groundwater salinity levels vary, but it is historically a non-potable secondary source in areas where salinity levels are not prohibitive. Its use as a secondary source has been severely compromised by pollution from inadequate sanitation systems on Funafuti, and

there is an increasing threat that this could also occur on the outer islands. The coastal areas of Funafuti are a major source of livelihood and also contain marine biodiversity of conservation value. These areas are also under threat from poor solid and liquid waste management. This project aims to demonstrate that improvements and innovations in the management of wastewater can contribute to the protection of water supply and reduce pollution and degradation of land, groundwater and marine environments.

1. Protection of water supply

- Reduction of demand on primary water supply (rainwater harvesting) for flushing of waterborne sanitation systems.
- Reduction of dependence on national reserves to supplement household supply.
- Protection of secondary source of water (groundwater) from pollution by inappropriate sanitation technology
- Protection of groundwater for use as a viable secondary source of water during drought, thus reducing vulnerability to climate variability
- Development and implementation of improved and co-ordinated water resources and wastewater management through co-operation of civil society and government

2. Source control of pollutants which impact on land, groundwater and marine environments

- Reduction of ingress of sewage to groundwater, lagoon and fringing reefs, and protection of marine habitat, fish stocks and livlihood
- Reduction of diffuse pollution of soil around malfunctioning and surcharging septic tanks and pour flush latrines, and protection of public health.
- Provision of organic fertiliser and renewable energy from alternative treatment of human and animal manure
- Practical demonstration of the links between water conservation, effective waste management, public and environmental health, and food security.

F. Linkages to National Priorities and Programmes

The proposal is also compatible with the following National, International and Regional Multinational Agreements to which Tuvalu is a signatory.

- Te Kakeega II

  The Tuvalu National Strategy for Sustainable Development 2006-2015, which includes specific references to water and sanitation as a key challenge confronting the health sector, and the need to review, finalize and implement a national building code, taking into account issues such as security, water, sanitation, traditional building standards, natural hazards, and ability to pay. Most of the key policy objectives for social development directly or indirectly address issues of poverty and hardship. Under Infrastructure and Support Services 2005-2015 the following objectives are noted: expand collection and storage of water for housing, businesses and other structures (especially in Funafuti); and promote water conservation through education and awareness programmes.

- The Draft Integrated Water Resources Management Plan

- Pacific Regional Action Plan on Sustainable Water Management

- Pacific Wastewater Strategic Action Plan

- Convention on Biological Diversity,
- Cartagena Protocol for Biosafety,
- Stockholm Convention for Persistent Organic Pollutants,
- Convention to Combating Desertification.

Tuvalu ratified the UN Framework Convention on Climate Change (UNFCCC) on October 26 1993 and has submitted its Initial National Communication (INC) to the UNFCCC on 30 October 1999. Tuvalu has also ratified the Kyoto Protocol of the UNFCCC on 16 November 1998. Following the preparation of its INC and Phase II enabling activities, the country has initiated efforts to mainstream climate adaptation issues into national legal frameworks.

At the national level, the proposed project will have linkages to a number of on-going UNDP-GEF enabling activities such as Tuvalu's National Capacity Self-Assessment (NCSA) activities, National Biodiversity and Action Plan (NBSAP), National Sustainable Land Management Project (SLM) in addition to other UNDP-funded activities in the area of sustainable energy including the proposed Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP).

Tuvalu has reporting commitments under other multilateral environmental agreements, including

- World Summit on Sustainable Development (WSSD) and
- Johannesburg Plan of Implementation (JPoI),
- Barbados Programme of Action for Small Island Developing States (BPoA) and the
- International Meeting on the Review of the Barbados Programme of Action (IM),
- National Strategy and Action Plan (NBSAP) under the Convention on Biological Diversity (CBD).

G. Name and position of Representatives from Government, Non-Government and Community-Based Organisations endorsing the Demonstration Activity

The members of the National Water and Sanitation Committee have endorsed the demonstration activity as follows:

- Ms Annie Homasi OBE Director of TANGO (Tuvalu Association of NGOs)
- Dr Nese Ituaso Conway. Director of the Ministry of Health
- Ms Hellani Tumua Secretary for the Kaupule
- Mr Enate E Taua. Director of Environment (Acting)
- Mr Kelesoma Saloa, Private Secretary to the Prime Minister
- Ms Misalaima P Nelesone, Secretary of Ministry of Public Utilities and Industries and Chairperson of the National Water and Sanitation Committee
- Mr Ampelosa Tehulu, Director of Public Works Department (Acting)

- Ms Susan Tuplaga, Waste Management Co-ordinator (Acting)
- Mr Uale Taleni Secretary to the Ministry of Natural Resources and Environment.
- Mr Tauala Ketea Director of Meteorology Department (Acting).

H. Project Objectives and Activities

i) Background

Tuvalu is an atoll country consisting of 9 atolls, with a total land area of 26 km^2 dispersed over 1.2 million km^2 of the Pacific Ocean. According to the Census Report of 2002 there was a population of 9561 with 4,492 residing on the capital atoll of Funafuti. Population pressures on Funafuti are high with a population density of 1600 persons per km^2. Population estimate for 2006 was 11,810 for Tuvalu.

The quantity of fresh water supply is subject to seasonality due to predominant reliance on rainfall, low rainwater storage capacity and poorly constructed communal and household rainwater harvesting systems. In addition poor maintenance of water and wastewater management at the household level can contribute to low volume and scarcity. When household supplies are depleted the community depends on the government to transport water to their homes from national reserves.

There is biological and chemical pollution of marine and ground water from wastewater seepage, solid waste leachate, household chemicals, and waste oil from garages and other light industry.

Sewage and animal waste contribute to the direct and indirect contamination of the ground water and lagoon on Funafuti and to a lesser degree in the populated outer islands of the rest of Tuvalu. Eutrophication supports the growth of algae in Funafuti lagoon, and the reef on the ocean side of the island is severely degraded. Destruction of marine habitat has been observed in the Conservation Area on the far side of the lagoon. The Conservation Area offers significant potential for eco-tourism and this is being threatened by the current lack of effective waste management. Fish habitat, stocks and biodiversity are also threatened. Groundwater on Funafuti is no longer fit for human use, but it continues to be used for some household needs especially during drought.

A Cost Benefit Analysis conducted by the International Waters Programme in 2005-2006, conservatively estimated that the cost of poor sanitation to the national economy is $AUD 475,000 per annum, of which 80% is attributable to public health costs associated with waterborne disease. This does not take into account indirect costs of lost productivity. While 87% of households reported having access to flush or pour toilets (as reported in the 2002 census), a national septic tank audit confirmed 96% of tanks were inadequately designed to operate as required to treat household inputs, and to prevent groundwater contamination. In addition these waterborne toilet systems place a considerable demand on primary water supply as they are commonly flushed with rainwater. Furthermore there is no functioning sludge management in the country, which means that most septic tanks are currently full and the only method of emptying them is by disposal of raw septage in a hole dug beside the tank, threatening household health and causing further pollution of the environment. Seawater intrusion is also contributing to these problems.

No government water authority exists to strengthen and support water or wastewater initiatives, legislation or public awareness. There is no centralised sewerage system and 100% of households depend upon on-site wastewater

systems and/or practices, so wastewater/sanitation management is entirely in the hands of the community. Most households also rely on individual or communal rainwater tanks so water management is also largely in the hands of the community. There is limited understanding of the linkages between poor sanitation, disease, degradation of the marine and aquifer environment and the indirect and direct impacts on livelihood and food security. The need to reduce demand and conserve water is also not widely appreciated, and complex cultural and land tenure conditions limit the opportunity for intervention by government.

There are a number of programs being conducted or planned to increase rainwater harvesting and storage capacity at the national, communal and household levels and to assess groundwater resources. However the challenge of how to sustainably treat and dispose of used water and sludge is not being adequately addressed.

ii) Objectives and Activities

To address the issues summarised in background information, the project proposes to demonstrate that improved sanitation technology and practices can provide protection of primary and secondary water resources, marine biodiversity, livelihood, and food security, and practically demonstrate the links between public health and the conservation of natural assets.

1. Institutional Strengthening: Take necessary steps to ensure the acceptance by Cabinet of the National Integrated Water Resources Plan including endorsing the authority and co-operation of the National Water and Sanitation Committee, and revision and enactment of the Water Resources Act and support for the relevant conditions of the Building Code.

2.Reduction of threats to public health and the environment from sewage pollution

i) Update baseline data on nutrient and pathogen contamination of groundwater in focus area prior to commencement of project activities.

Update statistics/anecdotal evidence of waterborne disease in community

ii) Conduct intensive consultation with the Funafuti community on the problems associated with poor sanitation and the possible solutions. Build on consultations and information exchange conducted during the International Waters Programme 2002-2006. Draw attention to the major areas of concern: malfunctioning and inappropriately designed waterborne toilets such as septic tanks and pour flush latrines causing pollution to groundwater and lagoon; and lack of hygienic disposal of septic sludge. Present a range of technical and management options including short and long term costs and maintenance requirements, and land use implications. Design a capacity building program based on community response to consultation.

Based on feedback from the community, design and develop an ecologically sustainable sludge disposal and treatment system either on-site or centralised, or combination of both. If a centralised system is preferred, develop an effective process for negotiating rental of land to construct treatment system to ensure long term co-operation with landowners, and sustainable management.

Ensure the co-operation and support of the Kaupule in the community consultation, capacity building and negotiations for land use. The Island Councils, renamed the Kaupule after the Falekaupule Act in December 1997, function as the executive arm of the Falekaupule. The Funafuti Kaupule has six elected local members. The Chief,

Pule *o Kaupule*, and Assistant Chief *Tokolua Pule o Kaupule* are elected from these local members. The other four members represent different development sectors within the Kaupule. One of these members is responsible for health and sanitation issues on the Islands and another is responsible for management of the Funafuti Conservation Area.

Any external issue or development matter that requires the community's support is channelled through the Kaupule before going to the Falekaupule for deliberation and final decision.

The Kaupule's role is to contribute to the enhancement of the community's livelihood by working towards the achievement of the following development goals

- Increase the ability to generate revenue within the community for its common good.
- Fund community projects that improve communities living conditions;
- Assist in developing skills and self-reliance in communities through local training;
- Enable the communities to acquire, maintain and improve community assets and resources to boost education and self-reliance.

3. Enable householders to sustainably manage their wastewater

Build on momentum established by the International Water Programme (IWP), which was focused on improving sanitation, and learn from the difficulties that this project experienced. Revise, update and use media that was developed during the IWP including the video.

Further trial non polluting dry sanitation technology in volunteer households in a broad cross section of the population and integrate with grey water management. Host households will include decision makers and those who already have flush toilets, in addition to families who have no toilet. It should be recognised that due to cultural constraints information regarding use of these systems is not likely to be shared beyond the immediate family, and understanding and acceptance of innovation will only come through direct experience. A critical mass in exposure to improved technology and practices needs to be achieved to attain a shift in community attitude and perceptions. Attention should be given to the appearance and aesthetics of the trial systems as these aspects are essential to acceptance, even if this increases per unit cost. The dry technology options need to achieve at least the status of the flush toilet. Changing behaviour in relation to sanitation is a challenge in any culture. We are all taught toilet habits at a very young age and there are many associated ingrained beliefs and attitudes which are not easy to shift. In Tuvalu there is the extra challenge that historically people prefer to 'use the beach' so any new system has to compete with the attractions of this simple no-cost practice, including the pleasant ambience.

- Provide practical training to householders and private sector on the design construction use and maintenance of waterborne and dry sanitation technology such as septic tank systems with evapo-transpiration trenches, pour flush latrines, composting toilets, bio-digestors and other applicable sanitation systems, including grey water treatment. Compare advantages and disadvantages of the various systems including costs, and environmental and public health impacts and how they actually treat sewage/ used water. Review fixed double batch composting toilet design that has been trailed during IWP since 2006 with input from host household and PWD staff on possible improvements. Also consult the family that has used the mobile double batch system since 2001. Co-operate with Alofa Tuvalu N.G.O and their development of the Amatuku Sustainable Development particularly in relation to trialling of household bio-digestors for sludge treatment, and promotion of ecological sanitation (ecosan).

- Engage trainees to construct appropriate and effective waterborne and dry sanitation systems within their village, ensuring that composting toilets are installed both as stand alone units and retrofitted inside a new or existing house

.

- Construct a composting toilet for visitor use within the Funafuti Conservation Area as part of promoting the link between improved sanitation on Fongafale and protection of the Conservation Area. This is the only public toilet recommended as this stage of introduction and should only be constructed if someone will take responsibility to maintain it (for a small fee from visitor earnings). Public toilets of any kind are often not maintained and they can become a loud negative message, as with a batch composting toilet which was built at the Waste Management Facility on Fongafale. The Conservation is maintained by the Funafuti Kaupule (Island Council) and their active involvement in design of ecological facilities for eco-tourists should be ensured.

- Maximise use of local materials and skills in design and construction, including local design and manufacture of system components such as toilet seats. Design competitions with attractive prizes would value-add to community ownership and engagement.

- Extend demonstration to selected communities in the outer islands with the assistance of TANGO and the Kaupule

iii) End of Project Landscape

At the end of the project the Funafuti community should be more able to make well informed decisions and have the necessary skills to protect their groundwater and marine environment, and conserve and sustain their freshwater supply. With this increased understanding and acceptance within the community, the government should have a stronger mandate and more effective authority to enact the necessary regulations, codes and legislation to support integrated water and wastewater management.

In particular, the following primary indicators should be present.

1. Reduced demand on freshwater supply for flushing of toilet systems

2. Sustainable hygienic options designed for collection and treatment of waterborne toilet sludge

3. Wider awareness and acceptance of non-polluting dry sanitation technology and its public health and environmental benefits, and understanding of the more demanding requirements for effective waterborne systems.

4. Establishment of an effective model for acquiring and sustaining use of private land for public use.

5. Reduced nutrient and pathogen load in groundwater in areas adjacent to composting toilets and properly constructed septic systems.

6. Reduced use of the beach for defecation on Funafuti even in drought periods

7. Upgrading of Conservation Area as an eco-tourist destination with increased funds generated by visitors to be used by the Kaupule for maintenance.

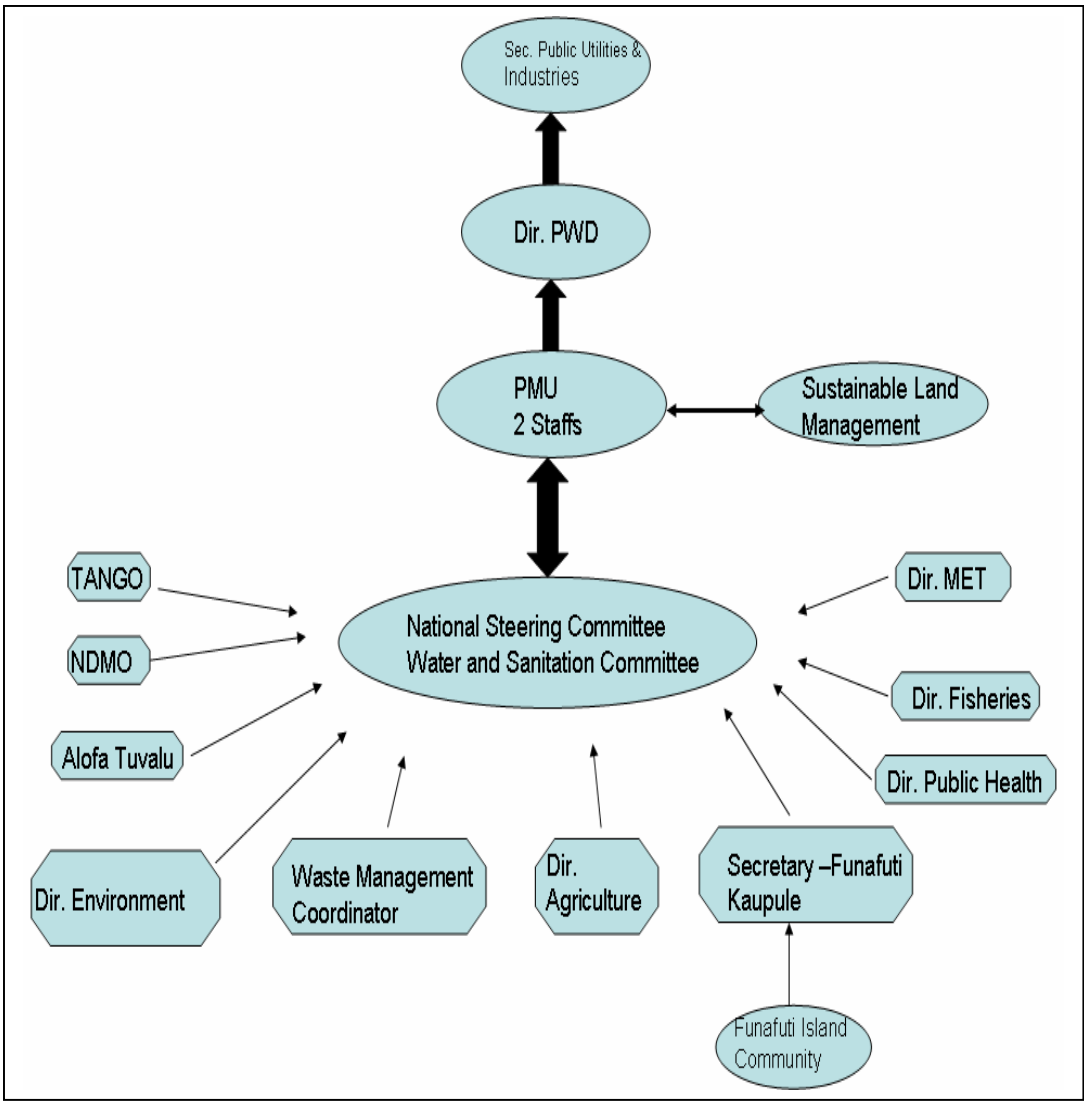
8. Effective legislation and regulations in place to support integrated and sustainable wastewater management

9. A co-operative relationship strengthened among those agencies and personnel involved with the water and sanitation sector.

10 An ecological sanitation model that can be adapted and transferred to other SIDS (small island developing states) especially atoll countries

I. Project Management Structure

A Project Management Unit (PMU) will be established under the Ministry of Public Utilities and Industries. The PMU will consist of National Project Co-ordinator and an Assistant. The PMU will be guided and assisted by the National Water and Sanitation Committee which will act as a steering committee**.**



The Committee includes representatives from relevant government departments, and non-government and community-based organisations. Other members may be invited as the project develops. The Water and Sanitation Committee is chaired by the Secretary to the Ministry of Public Utilities and Industries. The Committee will seek advice from technical experts at the various stages of design and implementation as the necessity arises.

The Public Works Department will co-ordinate the design and installation of sanitation systems and supervise maintenance, while the Ministry of Health will supervise usage, hygiene and other public health aspects of the project. The Environment Department will provide guidance and monitoring regarding environmental impacts of project activities, and the Kaupule could facilitate negotiations regarding land access and use and selection of participating villages and households, and will be responsible for any activities related to the Conservation Area. The Waste Management Unit will co-ordinate IWRM project activities with their other waste management programs.

Through the Regional Steering Committee and the Executing Agency information and guidance will also be shared with the PMU and the regional community.

J. Stakeholders and Beneficiaries

The design and implementation of the project will, by its very nature, strengthen and build the capacity of the stakeholders and beneficiaries to co-operate and more effectively manage water resources and used water. In order to develop and implement the objectives and deliverables of this demonstration project, a co-ordinated and multi-sector approach will be required from the following agencies, institutions and community groups:

Ministry of Public Utilities and Industries

Public Works Division

Ministry of Health

Tuvalu Association of Non Government Organisations (TANGO)

Department of Environment

Waste Management Unit

Kaupule Funafuti

Meteorology Department

Landowners of Funafuti and the lessors of the sludge treatment site

Community of Funafuti and Tuvalu

The Island Countries of the Pacific Region

All those listed above will also be beneficiaries of the project process in the short and long term.

K. Sustainability and Potential for Replication

As one of the aims of this project is to practically enable householders to better manage their wastewater, the benefits are likely to be sustained well after the project is completed as they will be provided with the technical skills, information and facilities to do so. For those households who have constructed non-polluting dry or waterborne sanitation technology, the ongoing use and maintenance of these systems will prevent or reduce contamination of groundwater and leaching into the marine environment. The more tangible the benefits which are directly experienced by the householders the more motivated them will be to use and maintain the systems. The more households involved in the project the greater the impact will be both on the environment and in terms of change in attitude and behaviour.

Similarly the development of a hygienic sludge treatment system/ practice will also be a useful long term tool for reduction of contaminants to the environment. The selected system would be passively operated/low tech so should be largely self sustaining. However if a pump out/desludging vehicle is needed, this will require ongoing maintenance which will be the responsibility of the government.

The Kaupule could utilise the project to raise the profile of the Conservation area and to advertise the fact that measures are being taken to reduce pollution.

The PMU will report to the government once the integrated water resource and sanitation management process has been successfully demonstrated, and will submit a proposed model for future replication based on lessons learnt and possible improvements. The report will draw attention to the long term environmental and economic cost of the "do nothing" approach compared with the cost of replicating similar management strategies throughout Tuvalu. The report will describe the experience and lessons learnt in relation to community and stakeholder initiative, attitudes and engagement, changes in land use negotiations, and institutional reform. While this report will address the specific needs and context of Tuvalu, it will have relevance to the region.

Poor sanitation is a threat to public health and natural assets throughout Pacific Island countries. The technical issues are relatively simple, although the options available are limited by local hydrology, geology, human resources and funding. However sanitation is one of the most socially sensitive and culturally complex aspects of the water sector, which is why it is often avoided in water related programs. If Tuvalu is able to demonstrate practical sustainable solutions to this intractable problem, it will be of significant benefit to the region and elsewhere. There have been small scale experiments with alternative sanitation in other Pacific Island countries but there has not been a comprehensive multi-sector community-based strategy such as is proposed in this demonstration project. The potential for replication of the lessons learnt both within Tuvalu and within the region is considerable.

It is often said that future global conflict will be centered around competing needs for water. The way in which used water or wastewater is managed is inextricably related to this issue. Developing and developed countries alike are challenged by the ongoing need to effectively manage wastewater, and as countries become more developed the technical, environmental and socio-economic challenges become more demanding.

In addition, Tuvalu could demonstrate an efficient process for dealing with land tenure and leasing and use of private land for public benefit. This is ongoing issue throughout much of the Pacific Islands, and hampers development in a range of sectors.

And in more general terms, any reduction that this project achieves in the land-based contaminants that leach into the marine environment has significance and benefit to all who share international waters and the global commons.

L Monitoring and Evaluation Mechanism

The project will be supervised by the national Water and Sanitation Committee acting as a steering committee, and chaired by the national executing agency which is the Ministry of Public Utilities and Industries. The Project Management Unit will provide a summary report to the Water and Sanitation Committee and the Executing Agencies on a quarterly basis regarding the progress of the demonstration. Annually a detailed report will be submitted through the Water and Sanitation Committee to the Executing Agencies.

The annual report will review the work plan to identify project achievements and deliveries in relation to the approved schedule, budget expenditures, recommendations to amend the work plan and budget, staff contracting and performance, and any other information required by the steering committee and/or the Executing Agencies. In

addition, the Regional Executing and Implementing Agencies will carry out monitoring and evaluation of all of the national SIWRWM demonstration activities as part of the overall SIWRWM Project.

The End-of-Project Landscape provides potential indicators for monitoring purposes (Please refer to Section H.iii). During implementation design, the PMU will develop a detailed list of indicators which will be approved by the Water and Sanitation Committee and will be submitted to the Executing Agency as part of the PMU's first Progress Report. A baseline survey covering a range of relevant technical and socio-economic parameters will provide the background context for applying the indicators as the project progresses.

M. Budget (GEF and Co-Financing)

The SIWRWM project process and the demonstration activities will require co-operation and sharing of information and skills between and within government institutions, non-government and community-based organisations, and with community members and landowners. It will also require an integrated approach among funding agencies to ensure that programmes are supportive and complimentary and do not duplicate activities or promote conflicting messages.

With this in mind the demonstration project has been designed to integrate water resource and sanitation management by complimenting and enhancing programs which are being undertaken to improve and protect water supply. These programs have also committed co-funding to support IWRM objectives as follows:

EDF / B-Envelope = Reducing Island Vulnerability = $US 0.95million

- Provision of large scale national strategic reserves to supplement households in time of drought
- Ecological sanitation on outer islands to reduce contamination of groundwater and the marine environment and reduce demand on primary water supply by waterborne sanitation systems

HYCOS = Hydrological Cycle Observing System = $US 50,000

Drought forecasting

- Groundwater monitoring including establishing baseline survey
- Data storage and analysis
- Water quality data
- Climate information

AusAID V&A =Vulnerability and Adaptation Project =$US 400,000 co-funding out of $1mil budget

- RWH Tank Construction and mould for components for sanitation systems
- Water quality and ground water monitoring
- Demand management

Other co-funding is associated with the second project goal to reduce contaminants to the coastal and marine environment, conserve biodiversity and protect habitat, fish stocks and livelihood, and includes:

Foreign Fisheries Agency Fund = Fisheries Department Activities = $US500,000 out of $1mil budget.

- National onshore fisheries management program
- Coral shelf monitoring project in Funafuti Lagoon
- Clam hatchery in Funafuti Lagoon
- Community Fishing Centres throughout islands
- Prevention of discharge from boats and ships.
- Review Fisheries Act to include run-off from land

Alofa Tuvalu N.G.O = Amatuku Center for Sustainable Development = $US200,000 out of $1mil budget

- Promotion of sustainable energy and waste management, especially of pig waste to reduce groundwater and marine pollution
- Trial of bio-digesters as sanitation management/energy generation system in model islet/household demonstration

AusAID PACTAM Project = $150,000 out of $200,000

EU-IWRM Project =$50,000

Tuvalu Government - $67,200

- Office space
- Utilities

EU- EDF10

There is also the possibility of co-funding of the sludge treatment system from the 10th EDF multi-annual financial framework for the period 2008-2013, which is considering the allocation of Euros 2.2million to waste management. The main focus will be solid waste management but it is possible that some funds could be directed toward wastewater infrastructure if all parties agreed.

The funding required from GEF is US $564,000

The total co-funding which has been committed: US $2.30 million in funds and $67,200 in kind.

Please see attached letters to Incremental Cost Analysis Report

M (i) BUDGET DETAILS

		Baseline US$		**US$**
	DESCRIPTION OF	**Scenario GEF**	**OTHER – Co-funding**	**TOTAL**

			In-Kind	Funds	Donor	
SALARIES AND ADMINISTRATION						
Project Coordinator	60 months @ $1,833.33 /month. Administration, and monitor trials	$110,000				$110,000
Administrative and Monitoring Assistant	60 months @ $1,133.00/month	$68,000				$68,000
Office Rental	60 months@$1000/month		**$60,000**		**Gov't Tuvalu**	$60,000
Communication/IT	telephone, fax, e-mail @$100/month	$6000				$6000
Utilities	Electricity, Water, etc($120 per month)		$7,200		**Gov't Tuvalu**	$7,200
ENGAGE COMMUNITY						
Community consultation and information exchange regarding sanitation options, location of trial systems, and trial progress	Radio/ video advertisement/invitations venue/transportation/ facilitation/ refreshments/equipment/ documentation /analysis /feedback	$45,000				$45,000
REDUCE CONTAMINATION OF GROUNDWATER AND COASTAL AND MARINE ENVIRONMENT						
1.Improve waterborne sanitation systems						

Feasibility study for sludge treatment and disposal options including technical and socio-economic issues	Documentation of potential designs, cost analysis, engage specialist to review on site and centralised options and design appropriate treatment system, planning and logistics.	$50,000				$50,000
Investigation of potential sites for sustainable treatment of sludge and modelling of effective process for govt/landowner agreement	Government (LMC) Land Management Committee meetings and private landowner meetings. Cost of Site Surveying/Lease Contract/transportation /documentation of land/refreshments for meetings. Negotiation of lease price/cost and conditions.	$5,000				$5000
Improve household and government waterborne sanitations systems	Review options for repair/replace all existing damaged septic tanks and addition of treatment trench Train applicants to design and install model systems in selected sites including bio-digestors	$65,000				$65,000
2. Promote dry eco sanitation systems (composting toilets and bio-digestors) Reduce consumption of primary water						

Develop appropriate design of dry sanitation system for Tuvalu	Engage specialist to review designs/usage/maintenance of composting toilets trialled by IWP and previous projects. Develop final design with community/PWD input	$15,000				$15,000
Training and Construction of dry sanitation systems on **Fongafale** (CTs)	Train applicants to build CTs at volunteer households across Fongafale and establish self Monitoring system	$170,000				$170,000
Review of sanitation options and trial of eco sanitation systems on selected **Outer Islands**	Train applicants to construct trial sanitation systems in volunteer households Trial should include comparing various building materials to reduce cost and demand on coastal aggregate etc, and local aesthetics/preferences re design and materials	$30,000		$100,000	**EU-B envelope** **Reduce** **Island** **Vulnerability**	$130,000
Co –operate with Fisheries Department to conserve and protect habitat, fish stocks and livelihood	Monitor coral shelf Inshore Fisheries Management Review Fisheries Act to include run-off			**$500,000**	**Foreign Fisheries Agency**	$500,000
Share eco sanitation promotion with Alofa Tuvalu N.G.O	Establish links with Amatuku Sustainable Development Center and model islet/household trial			**$200,000**	**Alofa Tuvalu N.G.O**	$200,000

PROTECTING WATER SUPPLY AND REDUCING ISLAND VULNERABILITY						
Disaster reduction	National Reserve Storage Improved RW collection Infilling borrow-pit Drought risk reduction			**$850,000**	**EU-B envelope** **Reduce Island Vulnerability**	$850,000
Strengthening Hydrological Cycle Observing Systems and Demand Management	Drought Forecasting Groundwater Monitoring Data Storage & Analysis Water Quality Data Baseline survey			**$50,000** **$150,000** **$400,000**	**HYCOS** **PACTAM** **V n A** **AusAID**	$600,000
Policy, Regulations, Building Code and Legislative review and Enactment	Engage community to give Cabinet mandate to enact and enforce building code and endorse Integrated Water Resources Plan Revise, update & implement Draft Water Resources & Sanitation Management Bill and Draft Integrated Water Resources Management Plan, regulations, guidelines and design of roof catchments, rain storages and sanitation systems in the Tuvalu National Building Code			**$50,000**	EU-IWRM	$50,000

	Baseline Scenario: Annual government expenditure on water sector incl. wages for water treatment, supply, consultations, and meetings	**$114,000**				
	TOTAL	**$564,000**	**$67,200**	**$2,367,200**		**$US 2,931,200**

M. (ii) WORKPLAN

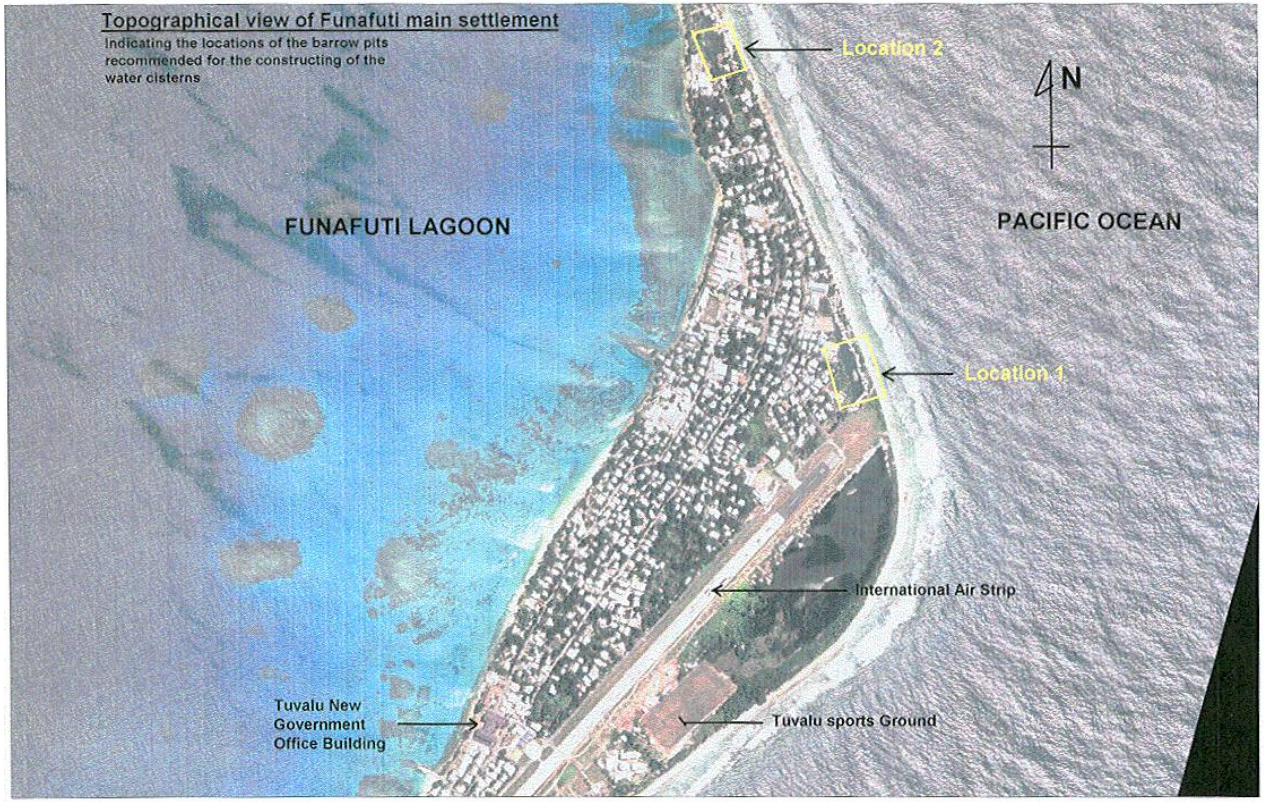
OUTPUT	ACTIVITY	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
		1	2	3	4	1	2	3	4	1	2	3	4	2	4	1	2	3	4		
1. Project Management and Administration Unit	1.1 Project Co-ordinator Contracted	X																			
	1.2 Project Office facilities established	X																			
	1.3 Water and Sanitation Committee meetings		X			X				X			X			X			X		
	1.4 Reporting to SIWRM Executing Agencies					X				X				X		X					
	1.5 Project Evaluation by SIWRWM EA/IAs											X						X			
2. Establish Baseline Inventory of relevant hydrological, biological and socio-economic parameters against which to assess project indicators	2.1 Groundwater assessment in Fongafale HYCOS	X	X																		
	2.2 Update statistics on flush toilets with septic tanks, pourflush latrines, and no toilets on Fongafale. Conduct random survey of attitudes/perceptions re different types	X	X																		
	2.3 Water quality assessments in Fongafale lagoon	X																			
	2.4 Update health statistics on waterborne disease	X																			
3. Community consultation and information exchange regarding sanitation options and location of trial systems	3.1 Present sanitation problems and potential solutions. Invite volunteer households to trial composting toilets,	X	X																		
	3.2 Review of sludge handling and options for disposal/ treatment. If community wants centralised disposal then	X	X	X																	
	3.3 Proceed with design of preferred option for sludge treatment and negotiate lease of private land if government lease site not acceptable to community. Cost and identify funding (EU-EDF10?)		X	X	X																
3. Installation of household sanitation	3.1 Develop appropriate design of dry sanitation system for Tuvalu based on feedback from current CT users,			X																	

	3.2 Conduct training sessions for government, community, private sector on common toilet systems			X															
	3.3 Construct 80-100 composting toilets in cross section of Fongafale households, and trial bio-digesters			X															
	3.4 Monitor trial sanitation systems/community response				X		X		X	X		X		X		X			
4. Develop media to support community engagement with project	4.1 Complete IWP video and circulate. Use radio to advertise community consultation and invite households for trial sanitation systems, report options and	X	X	X						X	X	X	X	X	X	X			
	4.2 Co-operate with TANGO, Kaupule, to promote links between conservation, public health, food security,		X	X						X	X	X	X	X	X	X			
5 Review of sanitation options and trial of dry sanitation systems, improved septic tanks and bio-digesters for outer islands	5.1 Record progress of demonstration project on Fongafale and conduct information exchange with									X	X								
	5.2 Conduct training sessions for government, community, private sector on common toilet systems and how to design and build effective dry and									X	X								
	5.3 Construct trial sanitation systems in volunteer households Trial should include comparing various building									X	X	X							
	5.4 Monitor trial sanitation systems/community response											X	X	X	X	X	X	X	
6. Replication of lessons and practices	6.1 Evaluate project against socio-economic and physical indicators. Refine design of trial sanitation													X	X	X	X		
	6.2 Transfer of best practices in water resource protection and conservation to rest of Tuvalu, the Pacific Region and beyond															X	X		

Funafuti Conservation Area

(southern end of Funafuti Atoll, looking west)

Topographical view of Funafuti, and the main settlement on Fongafale indicating the 'borrow pits' which are the proposed locations for construction of the national water reserves, the international airstrip, the government offices which contain a cistern in the foundations of the building, and the international airstrip which also serves as a recreation area for the community.



Annex 1

Overall Objective

Demonstration of sustainable integrated water and wastewater management and water use efficiency in Tuvalu

Project Purpose

Reduction of demand on primary water supply (rainwater harvesting) for flushing of waterborne sanitation systems drought proofing and sewage pollution entering into fresh and marine waters in Tuvalu

Project Component	**Project Activities**	**Project Outputs**	**Project Indicator**	
			Baseline Indicator	**Target Indicator**
Public health, and contamination of ground water, coastal and marine environment	• Update statistics on flush toilets with septic tanks; pour flush latrines, and no toilets on Fongafale. • Conduct random survey of attitudes/perceptions re different types of toilets and pollution of marine environment • Water quality assessments in Fongafale lagoon • Update health statistics on waterborne disease	• Established Baseline Inventory of relevant hydrological, biological and socio-economic parameters against which to assess project indicators	• Limited baseline information available on sanitation marine environment pollution and health statistics	• Updated information available on types of sanitation, marine pollutions and health statistics on water borne disease
	• Present sanitation problems and potential solutions. • Invite volunteer households to trial composting toilets, improved septic systems, and bio digester units	• Community consulted and information exchanged regarding sanitation options and location of trial	• Minimal feedback from community on preferred sanitation system	• 80% feedbacks received from community on preferred sanitation system and 100+ volunteers to trial new or improved systems

	• Review of sludge handling and options for disposal/ treatment. If community wants centralized disposal then • Government to identify leased land for potential treatment site • Proceed with design of preferred option for sludge treatment and negotiate lease of private land if government lease site not acceptable to community. Cost and identify funding (EU-EDF10?)	systems • Identified land or site for sludge treatment	• No identified land area for the sludge treatment	• Obtained land lease agreements on the 3rd year of the project
	• Complete IWP video and circulate. Use radio to advertise community consultation and invite households for trial sanitation systems, report options and negotiations for sludge treatment, ongoing community feedback on project etc. • Co-operate with TANGO, Kaupule, to promote links between conservation, public health, food security, livelihood	• Developed media materials to support community engagement with project	• Incomplete video production for use in community consultation and promotion	• Releasing of IWP educational video at the end of the 1st year to help with promotion and a release of the project video at the end of year 5 for IWRM

Promote dry eco sanitation systems to reduce consumptions on primary water	• Develop appropriate design of dry sanitation system for Tuvalu based on feedback from current CT users, previous trainees and PWD staff • Construct 80-100 composting toilets in cross section of Fongafale households, and trial bio-digesters • Replace or repair septic systems at volunteer households • Conduct training sessions for government, community, private sector on common toilet systems and how to design and build effective dry and waterborne treatment	• Promoted environmental friendly user sanitation systems (eco sanitation) • Reduced environmental stress, consumption on primary water supply, sewage entry into lagoon and public health • Sufficient trained personnel • Reviewed sanitation options and trialed dry sanitation systems, improved septic tanks and bio-digesters for outer islands	• 2 existing dry sanitation systems, improper septic tanks • Few trained people on the design of dry sanitation	• 90 dry sanitation systems complete over the 5 years within the specified or identified areas • 50% of households in identified areas with proper septic tank systems • Trained 30 people on Fogafale and 15 people on outer islands
	• Monitor trial sanitation systems/community response • Record progress of demonstration project on Fongafale and conduct information exchange with selected outer island communities • Construct trial sanitation systems in volunteer households. Trial should include comparing various building materials to reduce cost and demand on coastal aggregate etc, and local aesthetics re design and materials • Monitor trial sanitation systems/community response			

	• Evaluate project against socio-economic and physical indicators. Refine design of trial sanitation systems based on user feedback, effective treatment and • Transfer of best practices in water resource protection and conservation to rest of Tuvalu, the Pacific Region and beyond	• Practices replicated	• Dry sanitation system focused only on the capital island - Funafuti	• Extend new innovation to outer islands on the 5th year and share ideas with member countries
Protecting water supply and reducing island vulnerability	• Improve in rain water collection • Engage community to give Cabinet mandate to enact and enforce building code and endorse Integrated Water Resources Plan • Revise, update & implement Draft Water Resources & Sanitation Management Bill and Draft Integrated Water Resources Management Plan, regulations, guidelines and design of roof catchments, rain storages and sanitation systems in the Tuvalu National Building Code	• Disaster reduction – such as droughts • IWRM plans included in the Tuvalu Building Code • Reviewed legislative and enactment, endorsed policy and regulations	• Frequent water shortage • Draft IWRM Bill	• Water shortage reduced by 10 times at the end of 5 years at the target houses • Legalization of IWRM bill by the end of year 3