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EU EDF 8 – SOPAC Project Report 20:  
Reducing Vulnerability of Pacific ACP States

**PROCEEDINGS OF THE 2<sup>ND</sup> NATIONAL TUVALU  
MULTI-STAKEHOLDER CONSULTATIONS**

Telecom Conference Centre, Funafuti, Tuvalu  
29<sup>th</sup> October 2003

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**Compiler:**

Stephen Booth  
SOPAC Secretariat  
December 2003

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## **EXECUTIVE SUMMARY**

The 2<sup>nd</sup> National Tuvalu Multi-Stakeholder Consultations (MSC) on the SOPAC-EU EDF8 Project were held at the Conference Room of the Telecommunications Offices, Funafuti, Tuvalu on Wednesday 29<sup>th</sup> October 2003. The objective of the meeting was for the representatives of Tuvalu to endorse the draft Work Plan and advise the Project on other emerging issues upon which the Project might need to focus.

At the 1<sup>st</sup> MSC in April 2003, it was decided that the Project's primary intervention area would be Funafuti, along with some selective coastal activities associated with Nanumea, Vaitupu and Niutao.

However, it became clear during this 2<sup>nd</sup> MSC and associated external discussions, that there are a number of additional emergent issues and significant interest in various outer island needs, and these have been reflected in the amended Work Plan (Attachment C)

The MSC Project Steering Committee undertook to progress the advertisement for and recommendation of an in-country Intern to represent the Project as soon as possible.

The MSC Project Steering Committee also undertook to discuss and decide upon the best in-country location for installation of the Resource information Centre hardware and associated MapServer.

# RECORD OF PROCEEDINGS

## Introduction

The 2<sup>nd</sup> MSC on the SOPAC-EU EDF8 Project was held at the Conference Room of the Telecommunications Offices, Funafuti, Tuvalu on Wednesday 29<sup>th</sup> October 2003.

Mr. Lutelu Faavae, Permanent Secretary for Natural Resources (positions and affiliations of all participants are listed in Attachment A) and Chair of the meeting, called the Workshop to order at 09:00hrs. After giving the opening prayer, he thanked the stakeholders present for attending and stressed how important their continued contribution was, as they formed the “national steering committee” for monitoring Project progress and delivery. He also expressed gratitude to Mr Booth, Project Leader, for his attendance and noted with regret that two other Project Specialists, Mr M. Bonte (Risk Assessment) and Mr A. Tawake (Aggregates Specialist) who had also been programmed to attend, had been unable to get their flights confirmed.

The proceedings were officially opened by the Minister of Natural Resources & Land, the Hon., Samuelu P. Teo, followed by a round-table introduction of each participant within the meeting.

## SOPAC and Project Overview

Mr Booth made an initial presentation, outlining the general regional progress of the Project to-date and placing Tuvalu in context with the other seven Project countries. Mr Booth stressed the principal objectives of the present meeting, being to review, rationalise and refine the tasks detailed in the draft Tuvalu Work Plan, to endeavour to prioritise and endorse them, and if possible to identify key in-country contact personnel. Mr Booth also reviewed the procedure for appointment of an in-country Intern to work with the Project, and stressed the need for Tuvalu to take the initiative and proactively seek to advertise and recommend an appointment as soon possible. Mr Booth also stressed the need for the MSC Project Steering Committee to discuss and decide upon the best in-country location for installation of the Resource information Centre hardware and associated MapServer.

## Discussion on Work Plan

Following the project overview by Mr Booth, the draft Work Plan was considered by the meeting on a task-by-task basis, with the floor open for discussion. Generally, most existing tasks were endorsed, with specific additional comments noted below:–

### **Result 1: Sustainable development of coastal zones, in particular through identifying alternative sources of aggregates**

TV 1.2.1 Kelesoma suggested that the task should also include the beach gravels on the “ocean side” of the island, and not only the lagoon side.

TV 1.2.5 Kelesoma raise his concern about Government proposals (US Army Engineers/ PWD) to fill in the borrow pits; where would they dump the rubbish if all the borrow pits are filled up?

TV 1.4.2 Regarding the Local Act, Faatasi clarified that the authority lies with the Town Council (Foreshore Act) when extracting gravels etc from the shore – jurisdiction extends down to high tide line only?. This was also supported by the representative of the Town Council, saying that people have to get a license for extraction via offshore activities. Aggregate sells at \$100 per 1.5 cubic metres. Task would sit better as TV 1.2.3

TV 1.5 Faatasi raised that the Project should also look at the southern side of the group toward Fiji and Futuna because of the great number of seamounts on that side. Mr Booth noted the benefit of such data for Fisheries and deployment of FADS. Kelesoma supported that because there were unused maps from the previous US surveys projects in 1995. Considerable discussion and interest in defining the southern boundary of the EEZ. Filipino suggested that SOPAC can consider the survey to proceed further now that we have the maps and identified the baselines.

TV 1.6 Hilia asked whether the survey techniques would help explain why some of the coral is dying. She was also concerned about potential oil spills (for example from the TEC). Fisheries interested in current distributions

TV 1.7 Kelesoma was concerned that the wastewater that flows into the lagoon from the desalination plants may contain elevated concentrations of nutrients and bacteria. Mr Booth noted that these baseline water quality uncertainties were targeted under TV 2.2.3, so it might be somewhat premature to consider hydrodynamic modelling.

## **Result 2: Improved planning practices installed for safe and adequate water supplies and sanitation systems.**

TV 2.1.1 Kelesoma questioned why the project choose Fualefeke, as it is a shifting islet only. Mr Booth noted that comparison of the satellite imagery with historical aerial photographs would help validate the spatial and temporal scale of such changes.

TV 2.1.2 Pusineli, Sec for Works and Energy, questioned why not the outer islands apart from Funafuti. Mr Booth responded that the decision to concentrate the Projects efforts on Funafuti was made by the 1<sup>ST</sup> MSC.

TV 2.3.3 Annie raised her concern about POPS, with the importation of vehicles (second hand) and these would increase the pollution. She is asking for assistance to look at the status of damages these might have caused. Mr Booth noted that these solid waste issues were actually under the mandate of SPREP, but there were clear interlinkages regarding water pollution impacts.

## **Result 3: Implement comprehensive hazard and risk management tools within the framework of an Integrated Holistic Approach for Sustainable Development (Island Systems Management)**

TV 3. 5.2 Hilia raised her concerns regarding flooding in the low areas. The Met Station in times of high tide, is flooded and is very dangerous because of live cables etc. The rain gauges were also filled with water. She requested assistance to raise the ground with fill etc.

## **Result 4: ISM infrastructure established and in use in each country**

Faatasi asked everybody/participants whatever data they have to contribute for the GIS

## **Result 5: Strengthening the capacity of Pacific ACP States**

TV 5.2.2. Proposal from women to know what would be the womens interests and assistance in the environment, society and economy. Mr Booth acknowledged the importance of involving the womens groups, particularly during the Project advocacy, community awareness and education campaigns

## Emergent Issues

The following issues were identified during meetings and consultations held outside of the MSC. The principal agency involved and provisional task numbers for the amended Work Plan are noted in italics.

- Investigate/review coastal seabed bathymetry at site of the “Aug’02 wave surge”, 200m south of runway (*Natural Resources; TV 1.1.2*)
- Sand requirements for intermediate & final cover for the Landfill (*Env; TV 1.2.4*)
- Fill requirements for the borrow pits (*PWD; TV 1.2.5*)
- Vulnerability of Met Office infrastructure to high tides; requirement for fill (*Met; TV 1.2.6*)
- Liaison with SPC on positioning of FADS (*Fisheries; TV 1.5.1*)
- Liaison with NAPA (climate change) for water source location – Vaitupu (*Env; TV 2.1.5*)
- Rainwater tanks on Nui and cistern on Nanumanga (*TANGO; TV 2.1.6*)
- Tafua Pond Development Project (*TANGO; TV 2.3.4*)
- Pulaka Pits on Niutao &/or Nui (*Agriculture; TV 2.3.5*)
- Advise/liaise on “drought back-up” systems for Nukufetau, Niutao, Nanumea & Vaitupu (*NDMO; TV 2.4.4*)
- Liaison with IWP on lagoon water quality issues (*Env; add to TV 2.6.2*)
- Advice to new Water Committee on 2004-14 Water & Sanitation Plan (*PWD; TV 2.8.2*)
- Review Tuvalu Laws in relation to water & sanitation legislation (*PWD; TV 2.8.3*)
- Emergency [cyclone] communications for Niulakita & Nukulaelae (*NDMO; TV 3.3.1*)
- Maximise potential Project advocacy through Womens interests and assistance in environment/economy/society (*TNCW; TV 5.2.2*)

## Follow-Up Actions

It was agreed that Mr Booth would produce and circulate a draft report for comment, detailing the MSC’s, follow-up discussions and the amended Work Plan.

The MSC Project Steering Committee undertook to progress the advertisement for and recommendation of an in-country Intern to represent the Project as soon as possible.

The MSC Project Steering Committee also undertook to discuss and decide upon the best in-country location for installation of the Resource information Centre hardware and associated MapServer.

**ATTACHMENT A: STAKEHOLDER PARTICIPATION LIST**

<b>NAMES</b>	<b>TITLE</b>	<b>TELEPHONES AND EMAIL</b>
Ms Hilia Vavae	Director , Tuvalu Met. Service	688 20736 hilia@tuvalu.tv
Mr Ioata Taulialia	Labour Officer, Department of Foreign Affairs	688 20169
Mr Kelesoma Saloa	International Water Coordinator	20064 tuvinp@tuvalu.tv
Mr Faatasi Malologa	Acting Director, Department of Lands and Survey	20170 mautama@hotmail.com
Ms Malama Lipine Paeniu	Coordinator, Tuvalu National Council of Women	20822 mlipinepaeniu@yahoo.com
Ms Saini Simona	Director of Women	20329 iniona@hotmail.com
Mr Teo Pasifika	Secretary Chamber of Commerce	20917 tpasefika@hotmail.com
Tupulaga Poulasi	Fisheries Officer	20345 tpoulasi@yahoo.com
Mr Enate Evi	Environment Officer	20162 enate_e@yahoo.co.nz
Mr Itaia Lausaveve	Acting Director – Agriculture Department	20825 <a href="mailto:mnre@tuvalu.tv">mnre@tuvalu.tv</a> mnre@tuvalu.tv
Ms Annie Homasi	Coordinator, TANGO	20758 <a href="mailto:tango@tuvalu.tv">tango@tuvalu.tv</a> tango@tuvalu.tv
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Mr Uluao Lauti	Planner and Development Officer	20422
Mr Timaia Auega	Manager TSEIS (Energy Department)	20615
Mr Seluka Seluka	Coordinator Climate Change	20171 <a href="mailto:piccap@tuvalu.tv">piccap@tuvalu.tv</a> piccap@tuvalu.tv
Mr Filipino Taulima	Director of Works	20300 DL/ftaulima@yahoo.co.uk <a href="mailto:DL/ftaulima@fyahoo.co.uk">DL/ftaulima@fyahoo.co.uk</a>
Mr Aunese Makoi Simati	Acting Secretary Communication and Transport	<a href="mailto:Mouhala@tuvalu.tv">Mouhala@tuvalu.tv</a> Mouhala@tuvalu.tv
Mr Pusineli Laafai	Acting Secretary Works and Energy	<a href="mailto:Minwe@tuvalu.tv">Minwe@tuvalu.tv</a> minwe@tuvalu.tv
Ms Olioliga Iosua	Assistant Secretary Natural Resources	20066 <a href="mailto:oiosua@yahoo.co.uk">oiosua@yahoo.co.uk</a> oiosua@yahoo.co.uk
Mr Lutelu Faavae	Secretary Natural Resources	20827 <a href="mailto:mnre@tuvalu.tv">mnre@tuvalu.tv</a> mnre@tuvalu.tv

## Acronyms

IWP	International Waters Programme (SPREP/UNDP)
MAF	Ministry of Agriculture & Fisheries?
MFEP	Ministry of Finance & Economic Planning
MH	Ministry of Health
MHARD	Ministry of Home Affairs & Rural Development
ML&S	Ministry of Lands & Survey
MNRE	Ministry of Natural Resources & Environment
MW&E	Ministry of Works & Energy
PWD	Public Works Department
SOPAC	South Pacific Applied Geoscience Commission
TANGO	Tuvalu Association of Non Government Organisations

## ATTACHMENT B: RECORD OF FOLLOW-UP DISCUSSIONS AND MEETINGS

### INTRODUCTION

Prior to and following the MSC, described in the main body of this report, additional discussions and consultations were held with specific focus groups and relevant stakeholders. This section provides a record of these meetings, the participants and the issues discussed.

### 1. Ministry of Natural Resources & Environment

Date : 15:00hrs – 16:45hrs; 27/10/03

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Kelesoma Saloa	IWP Co-ordinator	tuviwp@tuvalu.tv ksaloe@yahoo.com
Susan Tupalagh	Environment Officer/Technician	
Seluka Seluka	NAPA	

#### *Record of Meeting Discussion*

**Susan Tupalagh – Solid Waste:** Waste and Environment portfolios now come under the office of the Prime Minister. Recently had a clean-up campaign for Independence Day, involving 8 island communities. Collected 130 truck loads, which cost A\$10,000, comprising \$4000 for community payments, \$3000 for truck hire and \$3000 for landscaping etc. There is a daily rubbish collection – different days for different areas. Organics, cans etc are segregated; plastics give wind blown problems. There was a stated need for sand to use as intermediate and final cover on the landfill. Residents pay \$30/annum for waste collection service; organised by the Kaupule (local Town Council). Need legislation to help deal with solid waste/environment issues – may be ready by Nov'03. Ian Fry is their (Australian) Environmental Advisor – he also deals with climate change issues with two local personnel, namely Seluka Seluka and Poni Faava. Dr Frank Griffin (SPREP) assists with Pollution Prevention control. They have no operational conductivity/ salinity meter to allow water quality testing around the landfill site. May be GIS application ref Kiribati “rubbish GIS”

**IWP,** Kelesoma: Community have accepted a trial area for pilot project but awaiting final community agreement. Will probably concentrate on the most congested area of about 100 houses. TAFEE Global – AusAID to help with nutrient assessment and microbiological sampling. May also drill some boreholes during the last quarter of 2004. IWP are funding an MSc in Chemistry to undertake thesis work on water quality in their chosen community area – may be scope for our Project to add value (extend to whole island; logistics of getting drill rig; water quality of lagoon)

**NAPA:** Seuka Seluka (knows Atu in SOPAC) – now working on the National Adaptation Programme of Action (NAPA), funded from GEF via UNDP, focussing on 5 least developed countries. Will be looking at rainwater and groundwater sources, bottom-up approach. Noted a large groundwater well on Vaitupu – most drought problems; secondary school on the island. Seluka also interested in air quality. Team, comprising Fisheries, Agriculture, waste will be visiting Vaitupu

### 2. Ministry of Natural Resources

Date : 09:30hrs – 10:00hrs; 27/10/03

Location : Minister's Office

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Sam Teo	Minister	

#### *Record of Meeting*

Sam's portfolio includes Fisheries, Agriculture, Lands & Surveys. He is interested in application and planting of mangroves, casuarina pine etc to help arrest coastal erosion. He mentioned a big wave surge about 200m south of the runway in Aug'02, which occurred at low tide with a strong onshore wind. Mr Iakapo Molotii

Tel:20596 has a video of the immediate aftermath. Older residents say it has happened before in that place – seafloor bathymetry may shed some light on wave approach conditions. Hardware storeman has built his own small seawall.

### 3. Ministry of Public Works & Energy

Date : 10:15hrs – 10:00hrs; 27/1003

Location : Minister's Office

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Filipo Taulima	Director of Works	ftaulima@yahoo.co.uk

#### *Record of Meeting*

Filipo noted that when the old government building was demolished in 1999, they temporarily lost a lot of rainwater storage capacity – it of course coincided with the Drought, therefore the desalination plant was brought in as an emergency measure. This plant has recently been moved and recommissioned and is running well. It is kept running all the time as a top up for storage. They have one delivery truck only; and a back-up tractor and trailer/tank

Water Committee task force has been established, already had 2 meetings, looking at revamping the old 10 year plan (1993-2002) to establish a new 10 year plan (2004-2014). Ministry of Works chairs, with Health, IWP, Env. may meet again in 2 weeks time. My advice and comments would be welcomed regarding the new draft plan. Also a stated need to look at the Laws of Tuvalu in relation to water legislation.

Filipo keen to increase storage to ease drought fears.

The need for a Water Quality Officer has been established in MOW, to check “water-as-sold” before it gets to the public.

### 4. Ministry of Health

Date : 10:30hrs – 11:00hrs; 27/1003

Location : temporary quarters

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Laima Mafa	Secretary for Health	

#### *Record of Meeting*

Laima stated that diarrhoeal diseases remain a major problem, but that the water supply (catchment storage) had improved a lot. Noted that Home Affairs had been involved with water tanks for women in outer islands. Some well water used, for animals mostly. People still moving in to Funafuti from the outer islands.

Sanitary Assistants collect water samples on a regular basis? but suffering budget cuts on things like test kits. There is a separate lab for Public Health, apart from the one in the new hospital. Future contact for Public Health Unit at the new hospital is PH Inspector Ms Falealiai , Tel 20480. Nurses operate a school health programme, and Health Education Promotion Officer (Avanoa) does radio talks.

### 5. Meteorological Office

Date : 11:00hrs; 27/1003

Location : MO

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Hilia Vavae	Director of Meteorological Services	hilia@tuvalu.tv

### Record of Meeting

Brief meeting to look at potential office location for Resource Information Centre. They already have house and coordinate the GPS for the Sea Level Network and Seismic for the US Geol Survey? who are paying for the installation of Broadband. Note they have lots of problems with ISP. Hilia would like a copy of the 1<sup>st</sup> stakeholder report emailing.

## 6. TANGO

Date : 11:45hrs; 27/1003

Location : TANGO

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Annie Homasi	Co-ordinator of TANGO	hilia@tuvalu.tv

### Record of Meeting

A \$132,000 proposal for TANGO to assist Nui has been submitted to EDF9, to replace 10 year old (Save the Children Fund) rainwater tanks which have crumbled. TANGO is an Affiliate Member of FSPI and will be involved with the NDMO Workshop between 03-07/11/03.

They also have a proposal with Forum Secretariat for a Tafua Pond Development Project, would welcome Project advice/assistance with EIA – they will send details of TOR.

## 7. Ministry of Natural Resources

Date : 14:00hrs; 27/1003

Location : Fisheries

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Samuelu Telii	Fisheries	

### Record of Meeting

No organised fisheries industry in Tuvalu. Seaweed farming on a trial basis failed in Funafuti lagoon – Govt looking for a bigger donor. Pearl farming may be feasible – they have their own research guy. Foreign vessel licensing has decreased, 140 in 2002, 50 in 2003.

Local boats only within 1 mile offshore; trawling, handlining, net fishing, diving.

Milkfish farming tried in Vaitupu in the '80's, but land tenure problems.

Some seamounts between the 9 atolls – no atoll is greater than 1.5 days steaming away from Funafuti

Fisheries Division is split into:–

- Research
- Extension
- Licensing (distant water fishing nations)
- Mechanical
- Admin

The Town council operate a licensing system for small local boats.

SPC Noumea (Lindsay Chapman; Steven Beverly) are working on a FADS programme. A\$6000/FAD, due soon? Therefore background seabed info would be useful for deployment in depths of 800m-1000m on a flat plain, not too close to main atoll(s).

## 8. Ministry of Natural Resources

Date : 15:00hrs; 27/1003

Location : Agriculture

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Itaia Lausaveve	Acting Director of Agriculture	

### *Record of Meeting*

Main agricultural activities are coconut based (rehab & thinning programme – 9.3m spacing), mixed with vegetables, cassava, breadfruit, pandanus. Research Station (ODA based) is on Vaitupu, with 1 extension staff on each island. Looking for FAO assistance. Mainly outer islands where assistance is required. Pigs and chickens all depend on coconut.

Agricultural Agreement signed with Taiwan will set up a mission looking to import topsoil (invasive species difficulties – e.g. nematode problem with pawpaw and Taro beetle (also attacks bananas) all over S. Tarawa.

A proposal was submitted to SOPAC in May '02 for assistance with Pulaka pits (swamp taro) in the natural swamp areas on Niutao. Request for Project to take this up as a Task.

## 9. NDMO

Date : 17:00hrs; 27/1003

Location : temporary quarters

Participants :

Name	Position (Affiliation)	Email
Stephen Booth	Water Resources Specialist (SOPAC)	stephen@sopac.org
Sumeo	NDMO	

### *Record of Meeting*

Niulakita & Nukulaelae are especially prone to cyclones and always have communication problems.

Advice and liaison requested with Canadian funded “drought back-up” systems utilising groundwater and involving two solar pumps and overhead tanks for Nukufetau (underway), Niutao, Nanumea (awaiting) & Vaitupu (installed)

## **ATTACHMENT C: SOPAC / EU EDF8 PROJECT: REDUCING VULNERABILITY OF PACIFIC ACP STATES**

### **TUVALU WORK PLAN**

This Work Plan has been developed from initial Project planning and ongoing consultations with participating countries. It thus outlines the high level Project planning, which in turn provides the intervention logic to be applied individually in each country. The structure of the Work Plan is based upon the revised Project Log Frame.

It is expected that the activities/tasks will be refined as ongoing country consultations advance. The Work Plan is a project management tool, which will evolve as project implementation advances.

<b>Intervention Logic</b>
<p><b>Overall Objective / Project Goal:</b></p> <p><b>Reducing Vulnerability of Pacific ACP States through Integrated Planning and Management (Island Systems Management) at the Sectoral level, especially in the sectors impacting on hazards, aggregates and water resources</b></p> <p><b>Project Purpose:</b> The project purpose is to strengthen the capacity of the Pacific ACP States including through: the identification of alternative sources of aggregates for construction purposes; the planning of safe and adequate water supplies and sanitation systems; the development of comprehensive hazard and risk management tools for safeguarding of communities; and the provision of database and management tools for ISM.</p>

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
<b>Result 1: Sustainable development of coastal zones, in particular through identifying alternative sources of aggregates.</b>				
1.1	Coast to ocean surveys of selected sites	<i>Capacity [data and skills] strengthened to respond and adapt to coastal changes</i>	<i>Information and advice accessible for use by stakeholders</i>	
TV 1.1.1	Conduct bathymetric survey around all nine of Tuvalu's atolls.	<i>Bathymetric data and imagery completed</i>	<i>Data available on GIS</i>	
TV 1.1.2	Review seabed bathymetry at site of "August 2002" wave surge, some 200m south of the runway (see TV 3.5.1)			
1.2	<b>Aggregate assessments completed</b>	<i>Capacity [data and skills] strengthened to identify and assess aggregate resources</i>	<i>Resource information accessible for use by member countries</i>	
TV 1.2.1	Incorporate into GIS system, monitoring and extraction data from both oceanside and lagoonside shorelines of Funafuti Atoll	<i>Data incorporated in GIS system</i>	<i>Data being used by in-country members</i>	
TV 1.2.2	Review the effectiveness of the current monitoring system for extraction of aggregate from Funafuti Lagoon.	<i>Review completed</i>	<i>Report available for use by in-country members</i>	
TV 1.2.3	Review & advise on legislation governing beach aggregate extraction	<i>Guidelines developed</i>	<i>Guidelines used by in-country members</i>	
TV 1.2.4	Liaise with & advise Environment on sources of sand for intermediate & final cover for the landfill			
TV 1.2.5	Liaise with & advise PWD on dredging proposals to fill the Borrow Pits			
TV 1.2.6	Liaise with & advise Met Office on sources of fill to protect infrastructure (see TV .3.5.2)			
1.3	<b>Baseline geophysical information and related technical advice of proposed development sites provided</b>	<i>Capacity [data, knowledge and skills] strengthened to optimise development options</i>	<i>Information and advice accessible for use by stakeholders</i>	
TV 1.3.1	Conduct surveys of bridge/causeway sites proposed for Nanumea	<i>Survey completed</i>	<i>Report available for use by in-country members</i>	
TV 1.3.2	Conduct surveys of bridge/causeway sites proposed for Vaitupu.	<i>Survey completed</i>	<i>Report available for use by in-country members</i>	
TV 1.3.3	Conduct surveys of ramp site proposed for Niutao	<i>Survey completed</i>	<i>Report available for use by in-country members</i>	

<b>ID</b>	<b>Activities/ Tasks</b>	<b>Verifiable Indicators</b>	<b>Sources of Verification</b>	<b>Assumptions</b>
<b>1.4</b>	<b>Coastal engineering assessments and advice provided</b>	<i>Capacity [knowledge and skills] strengthened to respond and adapt to coastal changes</i>	<i>Information and advice accessible for use by stakeholders</i>	
TV 1.4.1	Liaison with NZAID Tuvalu Reef Channels Project	<i>Discussions with project staff held</i>	<i>Notes on discussion available for use</i>	
<b>1.5</b>	<b>Bathymetry and seafloor imagery maps (“habitat maps”) for ecosystem management produced</b>	<i>Capacity [data, knowledge and skills] strengthened to manage marine resources</i>	<i>Map products and information accessible for use by stakeholders</i>	
TV 1.5.1	Liaise with Fisheries & SPC on positioning of FADS			
<b>1.6</b>	<b>Baseline physical oceanographic data of proposed intervention sites acquired</b>	<i>Capacity [data and skills] strengthened to monitor and manage resources sustainably</i>	<i>Information and advice accessible for use by stakeholders</i>	
	No activities identified			
<b>1.7</b>	<b>Hydrodynamic models of selected sites provided</b>	<i>Models and technical advice provided to optimise development and management decisions</i>	<i>Information and advice accessible for use by stakeholders</i>	
	No activities identified			

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
<b>Result 2: Improved planning practices installed for safe and adequate water supplies and sanitation systems</b>				
<b>2.1</b>	<b>Technical advice on appropriate resource abstraction techniques and approaches promoted for rainwater, surface and ground water resources provided</b>	<i>Capacity (data &amp; skills) strengthened to optimise development of water resources in Tuvalu.</i>	<i>Resource development information accessible for use by Tuvalu.</i>	
TV 2.1.1	Undertake reconnaissance water resource survey on Fualifeke.	<i>Field Survey &amp; on-site staff training completed</i>	<i>Field data analysed and incorporated into GIS</i>	<i>Tuvalu provide timely assistance with island access, logistics,</i>
TV 2.1.2	Undertake reconnaissance water resource survey on Tepuka	<i>Field Survey &amp; on-site staff training completed</i>	<i>Field data analysed and incorporated into GIS</i>	<i>Tuvalu provide timely assistance with island access, logistics,</i>
TV 2.1.3	Review feasibility of infiltration gallery abstraction technique on Funafuti.	<i>Feasibility study undertaken</i>	<i>Report</i>	
TV 2.1.4	Identify & promote possible alternative rainwater harvesting methodologies that may be appropriate to Tuvalu.	<i>Resource Information Officer trained to undertake international literature review.</i>	<i>Review completed &amp; reported</i>	<i>Public &amp; private sector willing to trial alternative techniques</i>
TV 2.1.5	Advise NAPA (Environment) concerning water source(s) on Vaitupu			
TV 2.1.6	Advise TANGO concerning rainwater tanks on Nui and cistern on Nanumanga			
<b>2.2</b>	<b>Technical advice and capacity building in hydrological monitoring and resource assessment</b>	<i>Capacity (data &amp; skills) strengthened to assess water resources in Tuvalu.</i>	<i>Resource assessment information accessible for use by Tuvalu.</i>	
TV 2.2.1	Acquisition of baseline monitoring data pertaining to quality of groundwater on Funafuti	<i>Review of historical data and field sampling programme undertaken</i>	<i>Data records, laboratory analyses and incorporation into GIS</i>	<i>Groundwater sampling points available</i>
TV 2.2.2	Acquisition of baseline monitoring data pertaining to quality of private domestic, public communal and Govt., rainwater storage systems on Funafuti.	<i>Review of historical data and field sampling programme undertaken</i>	<i>Data records, laboratory analyses and incorporation into GIS</i>	<i>Access to rainwater storage systems available</i>
TV 2.2.3	Acquisition of baseline monitoring data pertaining to water quality of Govt desalination process plant on Funafuti	<i>Review of historical data and field sampling programme undertaken</i>	<i>Data records, laboratory analyses and incorporation into GIS</i>	<i>Access to desalination plant available</i>
TV 2.2.4	Review national laboratory capability for water quality monitoring and analysis; advise and initiate relevant capacity building.	<i>Complete review with relevant government Ministries</i>	<i>Summary report</i>	<i>Government Ministries wish to centralise laboratory services</i>
<b>2.3</b>	<b>Technical advice and capacity building in integrated and sustainable management and protection of water resources provided</b>	<i>Capacity (data &amp; skills) strengthened to sustainably manage water resources in Tuvalu.</i>	<i>Resource management information accessible for use by Tuvalu.</i>	
TV 2.3.1	Feasibility study to maximise utilisation of runway runoff and other sources of 2 <sup>nd</sup> class water.	<i>Feasibility study undertaken</i>	<i>Report</i>	<i>Govt keen to maximise available water resources</i>

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
TV 2.3.2	Acquire data, review and advise on any water resource impacts of near-shore and onshore beach aggregate extraction activities on Funafuti.	<i>Data obtained &amp; review completed</i>	<i>Advisory Report</i>	<i>Govt keen to protect available water resources</i>
TV 2.3.3	Review and advise on any water resource impacts of solid waste disposal practices on Funafuti.	<i>Data obtained &amp; review completed</i>	<i>Advisory Report</i>	<i>Govt keen to protect available water resources</i>
TV 2.3.4	Assist TANGO with baseline environmental data collection for the Tafua Pond Development Project			
TV 2.3.5	Investigate saline incursion problems of Pulaka Pits on Niutao and/or Nui			
<b>2.4</b>	<b>Drought vulnerability and response strategies developed</b>	<i>Drought vulnerability assessment tools &amp; response strategies developed for Tuvalu.</i>	<i>Tools and strategies available for use by Tuvalu.</i>	
TV 2.4.1	Provide assistance to Met. Office with application of Drought Indices to improve drought preparedness	<i>Drought resilience improved</i>	<i>Drought response strategy formulated - Met Office able to forewarn other Govt depts and public</i>	<i>Public/private sector willing to respond and plan accordingly</i>
TV 2.4.2	Review and advise on PWD drought demand management strategy.	<i>Obtain data on existing reserves and strategy,</i>	<i>Demand management guidelines drafted</i>	<i>Existing PWD strategy made available for review</i>
TV 2.4.3	Review the practical “drought benefits” of the Desalination Plant?	<i>Identify historic utilisation and operational costs</i>	<i>Benefits &amp; disbenefits compared</i>	<i>Relevant monitoring data exists</i>
TV 2.4.4	Advise (NDMO) on “drought back-up” systems for Nukufetau, Niutao, Nanumea & Vaitupu			
<b>2.5</b>	<b>Technical advice and capacity building in water demand management and conservation approaches and technologies promoted</b>	<i>Capacity (data &amp; skills) strengthened to reduce water demand of urban water supply systems in Tuvalu.</i>	<i>Water demand management information accessible for use by Tuvalu.</i>	
TV 2.5.1	Review and assist PWD with comprehensive updating of rainwater storage assets on GIS database on Funafuti.	<i>Updated survey of rainwater storage assets completed</i>	<i>Survey results incorporated into GIS</i>	<i>PWD allocate staff for survey assistance and training</i>
TV 2.5.2	Review and advise on water supply demand forecasts, options and impacts of existing and proposed Public/Private Sector developments within Funafuti.	<i>Relevant data obtained and reviewed</i>	<i>Report on forecasts and impacts</i>	<i>Interdepartmental cooperation and census data release</i>
TV 2.5.3	Undertake a Community Awareness & Education programme on rainwater storage and water conservation methods.	<i>In country Resource Information Officer active with relevant NGO’s, schools etc</i>	<i>Relevant literature and support programmes produced and disseminated</i>	<i>Suitable in country Resource Information Officer can be recruited</i>
TV 2.5.4	Improve water conservation approach by identifying unaccounted water/ leakage issues?	<i>Leakage factors are identified during TV 2.5.1</i>	<i>Rehabilitation &amp; maintenance strategy document produced</i>	<i>Existing water conservation &amp; maintenance practices can be improved</i>
<b>2.6</b>	<b>Technical advice and capacity building in wastewater facility management, specific focus on on-site sanitation and hygiene promotion provided</b>	<i>Advocacy, awareness and capacity (data &amp; skills) strengthened to manage and use urban and rural wastewater facilities in Tuvalu.</i>	<i>Technology management information and community participation approaches available for use by Tuvalu.</i>	

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
TV 2.6.1	Acquire data on location and water resource risks and impacts deriving from sanitation, intensive piggery farming and landfill disposal practices within Funafuti	<i>Water resource risk analysis survey undertaken</i>	<i>Survey results incorporated into GIS</i>	<i>Govt allocate staff for survey assistance and training</i>
TV 2.6.2	Liaise with IWP on septic tank trials & lagoon water quality issues.	<i>Water resource expertise and guidance provided to IWP</i>	<i>Minutes of meetings</i>	<i>IWP Programme active &amp; wish to cooperate</i>
TV 2.6.3	Acquire and review health morbidity data relating to waterborne disease.	<i>Data collected from MOH</i>	<i>Survey results incorporated into GIS</i>	<i>MOH release data</i>
<b>2.7</b>	<b>Technical advice and capacity building in disaster preparedness of water and wastewater systems provided</b>	<i>Capacity (data &amp; skills) strengthened in disaster preparedness of utilities/service providers in Tuvalu.</i>	<i>Disaster preparedness information available to supply system managers in Tuvalu.</i>	
TV 2.7.1	Review the vulnerability of primary water supply sources to natural and man-made disasters	<i>Expert review undertaken</i>	<i>Report</i>	<i>Resilience can be improved</i>
TV 2.7.2	Advise on stand-by facilities and alternative, emergency sources and facilities to cover temporary loss of distribution/collection infrastructure.	<i>Expert advice provided</i>	<i>Report</i>	<i>Resilience can be improved</i>
<b>2.8</b>	<b>Technical assistance with the development of national legislation, policies, guidelines, strategies and plans for water and sanitation provided</b>	<i>Capacity strengthened to develop national water &amp; sanitation policies, strategies and plans in Tuvalu.</i>	<i>National initiatives to develop policies, guidelines, strategies and plans for water &amp; sanitation established for Tuvalu.</i>	
TV 2.8.1	Review and advise on roof catchment and rainwater storage guidelines contained in National Building Codes.	<i>Existing NBC guidelines obtained and reviewed</i>	<i>Report</i>	<i>NBC guidelines require updating</i>
TV 2.8.2	Provide technical support to Water Committee on drafting the 2004-2014 Water & Sanitation Plan	<i>Discussions with relevant Govt Ministries Assistance with drafting text provided</i>	<i>Minutes of meetings</i>	<i>Govt willing to support the initiative</i>
TV 2.8.3	Review Tuvalu Laws in relation to water & sanitation legislation	<i>Assistance with drafting text provided.</i>	<i>Draft text</i>	<i>Govt willing to support the initiative</i>
TV 2.8.4	Promote co-ordination of water sector projects between various Ministries & Donors to harmonise Aid initiatives	<i>Undertake regular liaison with relevant bodies</i>	<i>Minutes of meetings</i>	<i>Govt willing to support harmonisation</i>

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
<b>Result 3: Implement comprehensive hazard and risk management tools within the framework of an Integrated Holistic Approach for Sustainable Development (Island Systems Management)</b>				
3.1	Risk Management processes integrated into national development planning (Island Systems Management)	<i>Tuvaluan capacity (strategies and procedures) developed for national risk reduction programmes</i>	<i>Tuvaluan policy statements produced and CHARM teams established</i>	
TV 3.1.1	Consultation with govt., NGOs and private sector on ISM model	<i>List of persons and organisations consulted in each country</i>	<i>Trip Reports by country</i>	<i>Govt., NGOs and private sector unfamiliar with ISM and Integrated Planning Approaches for Resource Management</i>
TV 3.1.2	ISM Training Needs Assessment completed	<i>TNAs completed</i>	<i>TNA Report</i>	<i>Major stakeholders will cooperate with TNA</i>
TV 3.1.3	Consultation with govt., NGOs and private sector on national and regional ISM strategy	<i>Nbr and Type of consultations conducted</i>	<i>Report of Consultations</i>	<i>Govt. NGOs and private sector willing to change existing ways of doing business to adopt ISM approach</i>
TV 3.1.4	National ISM (Integrated Planning & Management) case study completed	<i>One case study completed</i>	<i>case study report</i>	<i>Country example exists and people willing to write up case study</i>
TV 3.1.5	Train one National ISM trainer	<i>One person trained</i>	<i>Report of training done</i>	<i>Able to identify one person and obtain release of person for training as national trainer</i>
TV 3.1.6	One national ISM workshop conducted	<i>One national workshop completed</i>	<i>Workshop Report</i>	<i>Support from stakeholders to commit time &amp; staff</i>
TV 3.1.7	Follow up to national ISM workshop	<i>Nbr and types of activities</i>	<i>Report of activities</i>	<i>Follow up activities will be identified at the workshop</i>
TV 3.1.8	Follow up consultation with govt., NGOs and private sector on ISM model and reporting back of ISM activities	<i>List of persons and organisations consulted in each country</i>	<i>Report of Consultations</i>	<i>Govt., NGOs and private sector unfamiliar with ISM and Integrated Planning Approaches for Resource Management</i>
3.2	<b>Disaster Management Legislation and Planning Arrangements strengthened</b>	<i>National Disaster Management legislation and plans reviewed and/or developed in all member countries</i>	<i>National Disaster Management Acts/Plans understood and being applied to prepare for, respond to and recovery from disasters</i>	
	No activities currently identified for the country			

<b>ID</b>	<b>Activities/ Tasks</b>	<b>Verifiable Indicators</b>	<b>Sources of Verification</b>	<b>Assumptions</b>
<b>3.3</b>	Disaster Preparedness, Response and Coordination strengthened.	<i>Participating member countries capacity (planning, training and resources) strengthened to more effectively prepare for and manage the impacts of disasters</i>	<i>Disaster response communications and coordination systems and processes operating effectively and plans being exercised on a regular basis</i>	
TV 3.3.1	Review and advise on emergency [cyclone] communications for Niulakita & Nukulaelae (NDMO)			
<b>3.4</b>	<b>Vulnerability assessment tools developed and applied in selected study areas</b>	<i>Vulnerability assessment tools developed to address identified hazards and risks in participating member countries</i>	<i>Vulnerability assessment tools being applied</i>	
	No activities identified			
<b>3.5</b>	<b>Integrated scientific hazard assessment and risk reduction solutions promoted and applied in selected study areas</b>	<i>Number of scientific hazard assessments conducted and number of risk reduction solutions promoted</i>	Scientific Reports	
TV 3.5.1	Review wave surge hazard, some 200m south of the runway			
TV 3.5.2	Review flooding problems of low lying areas, particularly around Met Office			
<b>3.6</b>	<b>Regional risk information infrastructure developed and maintained</b>	<i>Participating member countries capacity (tools and database) developed to access risk management information</i>	<i>Database being utilised by NDMOs and other users</i>	
	No activities identified			

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
<b>Result 4: ISM infrastructure established and in use in each country</b>				
<b>4.1</b>	<b>Acquisition, optional customisation, and integration of spatial and remote sensing data for member countries at SOPAC</b>	<i>Appropriate images and data selected, acquired, optionally customised and delivered to stakeholders</i>	<i>Quantity and type of images and data delivered to stakeholders per annum</i>	
TV 4.1.1	Acquisition of imagery for all Tuvalu atolls			
TV 4.1.2	Training and technical assistance with the rectification, interpretation and incorporation of remote sensed data into GIS			
<b>4.2</b>	<b>Appropriate, cost effective and sustainable technologies, and tools such as GIS and Remote Sensing for resource management promoted and used</b>	<i>Capacity in the use of these technologies and tools strengthened to manage resources</i>	<i>Resource information interpreted and accessible</i>	
TV 4.2.1	Acquisition of relevant hardware and software and training in the use of appropriate cost-effective GIS systems	<i>Equipment purchased as planned</i>	<i>Equipment installed and signed off by country</i>	
TV 4.2.2	Study of country facilities and development of an action plan	<i>Action plan published</i>	<i>Report published in SOPAC library</i>	
<b>4.3</b>	<b>Establishment of National GIS and Remote Sensing open access data centre in SOPAC island member countries</b>	<i>National GIS and Remote Sensing data centres established and capacity developed</i>	<i>Number of centres established per annum and extent of capacity for sustainable operations</i>	
TV 4.3.1	Establishment and support of Tuvalu National GIS/RS data centre with international communication capabilities.	<i>National GIS and Remote Sensing data centre established and capacity developed</i>	<i>Time of establishment of the centre in country</i>	
TV 4.3.2	Promotion of a GIS/RS data sharing policy which is open to a maximum of stakeholders	<i>Drafting of the policy</i>	<i>Numbers of parties signatory of the policy</i>	
<b>4.4</b>	<b>Technical support and capacity building for stakeholders in the development and management of information and communication systems.</b>	<i>Capacity (data, infrastructure &amp; skills) strengthened in participating member countries</i>	<i>Asset information accessible for use by participating member countries</i>	
TV 4.4.1	On-going capacity building in ICT and specifically in running and maintaining the Tuvalu GIS/RS data centre.	<i>Nationals able to operate and maintain the data centre</i>	<i>Number of nationals trained and affected to the data centre</i>	
TV 4.4.2	Assist PWD with comprehensive updating of rainwater storage assets on GIS database on Funafuti.(ref ActivityTV 2.5.1)			
<b>4.5</b>	<b>Technical support and capacity building for stakeholders in the use and application of information and communication systems</b>	<i>Capacity in stakeholders strengthened in the use and application of these tools for asset management and planning</i>	<i>Number of stakeholders supported per annum and extent of capacity for sustainable operations</i>	
TV 4.5.1	Training Backdrop Production			

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
TV 4.5.2	Training and technical assistance with the rectification, interpretation and incorporation of remote sensed data into GIS			
TV 4.5.3	On-going integration of the datasets inside the GIS/RS data centre with training of the stakeholders	<i>Numbers of datasets integrated in the data centre</i>	<i>Access to the data centre datasets</i>	

ID	Activities/ Tasks	Verifiable Indicators	Sources of Verification	Assumptions
<b>Result 5: Strengthening the capacity of Pacific ACP States</b>				
5.1	<b>Develop effective regional advocacy and communication</b>	<i>Information brochures published</i> <i>Regular press releases written</i> <i>Email news-service maintained</i>	<i>Information brochures available in all participating countries</i> <i>Press and stakeholders aware of project development</i> <i>Project related email activity and information sharing</i>	
	No activities currently identified for the country			
5.2	<b>Establish effective project information delivery at community and all stakeholder levels at the national level</b>	<i>Temporary resource information intern recruited at national level</i>	<i>Project information available at all project levels, and stakeholders aware of project activities and outputs</i>	
TV 5.2.1	Appoint country Intern			
TV 5.2.2	Maximise potential Project advocacy through womens groups (TANGO, Dir. Of Women and Tuv. National Council of Women			
5.3	<b>Establish effective project management including finance, staffing and administrative systems</b>	<i>Project meetings held and minutes recorded</i>	<i>Meeting minutes available</i>	
	No activities currently identified for the country			
5.4	<b>Ensure appropriate equipment purchases and ongoing maintenance</b>	<i>All project staff availed of appropriate and fully operational equipment</i>	<i>Project equipment audits complete and reported issues addressed</i>	
	No activities currently identified for the country			