



**PACIFIC ISLANDS APPLIED GEOSCIENCE COMMISSION**

**AND**

**WORLD HEALTH ORGANIZATION**

**REPORT**

**PACIFIC WATER SAFETY PLANS PROGRAMME**

**FOLLOW UP MISSION 1**

**WATER SAFETY PLANS**

**TONGA**

**12 - 16 MARCH 2007**

**An AusAID Funded Project**

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## **PACIFIC ISLANDS APPLIED GEOSCIENCE COMMISSION**

To : Manager Community Lifelines, Director SOPAC, Deputy Director SOPAC,  
SOPAC, Water Sector.  
From : Davendra Nath  
Date : 23/03/07  
Subject : Tonga-Water Safety Plans –Follow Up Mission 1

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### **Tonga Water Safety Plans –Follow Up Mission 1**

**Mission Dates: 12 -16 March 2007**

#### **Introduction**

The mission to Tonga was jointly fielded by the Director, Pacific Islands Applied Geosciences Commission (SOPAC) and the WHO Representative, South Pacific following the request from the Tonga Water Board (TWB) through the SOPAC focal point for Tonga, the Ministry of Lands and Natural Resources. The follow up mission 1 was arranged to assess the urban and rural pilot supplies and to compile an improvement schedule and finalize the Water Safety plans for Nuku'alofa and Lomaiviti and to identify partners for a pilot project to implement Water Safety Plans by reference to the risk management strategies. The team comprised of the Project Officer of SOPAC and the technical experts from New Zealand Ministry of Health.

The main drinking water source of urban areas in Tonga is ground water and for rural areas rainwater, with some utilisation of surface river water. Due to the hardness of the ground water, Tonga's supplement their ground water supply with household rainwater catchment systems and purchase filtered groundwater. For Nuku'alofa urban supply, water is pumped from 36 borehole to six reinforced concrete storage tanks located on the adjacent hill and allowed to run under gravity through the main distribution pipelines. Production of the well fields has steadily increased to 5.1 ML/day in 1991. The calculated average domestic consumption is around 90 l/person/day. It is stated that the consumption is artificially low due to the inadequate capacity of the distribution system.

The villages on Tongatapu are equipped with one or more wells and water is pumped to overhead storage tanks. The water then flows under gravity through pipe system to individual houses. The villages in the Hihifo (Western District) are served by a common pipeline from three wells at Umutagata.

Responsibility for water supply distribution, operation and maintenance in urban areas and of village committees in rural areas is that of the Tonga Water Board. Monitoring is carried out by the board in urban areas and by the Ministry of Health in rural areas. Urban water supply for the capital Nuku'alofa comes from 36 boreholes in the Mataki- Eua and Tongan well fields to the south-west of the city where it is pumped from the bores and collected in large concrete tanks and gravity fed into house connections throughout the city. The only

treatment it receives is chlorination, however the chlorination dosing system is often broken down and manual mixing is done.

Data from Ministry of Health suggests that there has been an increase in water related diseases since 1996. Reported cases of diarrhoea and gastro-enteritis have increased from 2281 to 3667 (almost a 33% increase) over a four year period. In urban Nuku'alofa, the Tonga Water Board conducts monthly water quality analysis from fixed sampling points at wells, water tanks, and in the distribution system. Water samples from urban centres are analysed for salinity, total and faecal coliform, and residual chlorine.

### **Purpose/Objective**

- To review and finalise the Water Safety Plans for Nuku'alofa urban supply, Lomaiviti rural supply and Rain Water Catchment Tanks.
- To carry out field assessment with the New Zealand experts (engineer and drinking water assessors) for the three systems.
- To formulate improvement schedules for Nuku'alofa, Lomaiviti and Rain water tanks system.
- To provide a cost analysis of the improvements on the three systems.
- To meet the steering committee and other stakeholders and inform them of the future steps.
- To meet Tonga Trust and discuss on the contract for the preparation of IEC materials and public awareness programmes.
- To meet with the WHO country liaison officer-Tonga and Ministry of Health official and discuss on the workshop and public awareness programmes in relation to the Water Safety Plans.

### **List of People Met**

<b>NAME</b>	<b>POSITION</b>	<b>ORGANISATION</b>	<b>CONTACT</b>
I. Malin.N. Takai	Deputy	National Emergency	makai@kalianet.to

	Director of Works	Management Office	
2.Niu Fakakovikaetau	Public Health Inspector	Ministry of Health	nfakakovikaetau@health.gov.to
3.Simi Silapelu	President	TANGO	tango_nukualofa@yahoo.com
4.Kutusi(Quaddus) Fielea	Acting Chief Engineer	Tonga Water Board	quaddusfielea@yahoo.com.au
5.Ofiu Isamau	Senior Health Inspector	Ministry Of Health	oisamau@health.gov.to
6.Dr.Raynold Ofanoa	Medical Officer	Environmental Health Section, Ministry of Health	rofanoa@health.gov.to
7.Linisi Lavemai	Coordinating Officer	Tonga Water Board	llavemai@yahoo.com.au
8.Taniela Kailahi	Project Engineering Officer	Tonga Water Board	nelakailahi@yahoo.com.au
9.Alfred Vaka	Project Officer	Tonga Trust	a.vaka@tcdt.to
10.Kalolaine Kavaefiafi	Finance Manager	Tonga Trust	kalo.k@tcdt.to
11.Kelepi Mafi	Principal Geologist	Min of Lands/Survey and Natural Resources.	geology@kalianet.to
12.Vao Lagi		TANGO	seiuhila@yahoo.com
13. Saimone Helu	C.E.O	Tonga Water Board	twbhelu@kalianet.to

## Executive Summary

The one week Follow Up Mission 1 was from 12 – 16 March 2007 as per the annexed programme. (Annex 1). The mission was headed by Davendra Nath, Project Officer, Water

Safety Plans Programme from SOPAC and four experts from Ministry of Health, New Zealand also accompanied the mission. They were Judy Williamson, Drinking Water Assessor, Country Facilitator, MoH –NZ, Scott Rostrom- Drinking Water Assessor, MoH – NZ, Rebecca Fox, Drinking Water Assessor, MoH-NZ and Roly Hayes, Engineer, Water Supply.

The official request was made by the Director of SOPAC via letter to the Tonga focal Point for SOPAC Dr. Sione Hala Tuituia, Secretary of Lands Survey & Natural Resources & Surveyor General. An official request was also sent to Mr. Saimone Helu, the chairman of the steering committee and Tonga Water Board. The team worked mostly with Tonga Water Board officials and also met with the officials of Ministry of Health.

The purpose of the mission was to assist and review the Water Safety Plans for the urban, rural and tank systems in Tongatapu and to assess the three systems and formulate the improvement schedules with cost analysis. During the mission a number of government and non-government officials were met. Meetings were conducted with the steering committee for the Water Safety Plans programme and the future activities were discussed.

The mission was successful as all the officials were met and the objectives of the mission were achieved. Three Water Safety Plans and improvements were compiled during the mission. The officials of Tonga trust were met and commitment was received to do the proposed tasks on the preparation of IEC materials and raising public awareness in relation to the WSP. Officials of the Ministry of Health were met and discussions held on the utilization of funds from WHO country allocation in relation to WSP programme. The environmental section of MoH Tonga agreed to put a proposal on the activities for the workshops and awareness programme. A wrap up meeting was held with the steering committee to plan for the future steps and obtain the commitment of all the stakeholders.

## **Daily Activities**

Daily activities occurred as planned with the assistance of the officials of Tonga Water Board. The programme for the week long mission is attached as per Annex 1.

### **12 March, 2007 - Monday**

On Monday the mission team met with Tonga Water Board officials at the board's conference room. Since the Chairman, Tonga Water Board Mr Saimone Helu was on leave the officers met were the coordinator Mr Linisi Lavemai, the Acting Chief Engineer Mr Katusi (Quaddus) Fielea and Taniela Kailahi from engineering section. The coordinator Mr Linisi was well informed of the mission through the letters from SOPAC and as such the steering committee was well informed of the mission programme. The mission team and the local partners introduced themselves and had discussion on the Nuku'alofa Water supply system and the role of Tonga Water Board. The two engineers also exchanged their views on the system and related problems.

At 10.00 am a steering committee meeting was conducted and chaired by Mr Simi Silapelu. The other members present were from Ministry of Health, Disaster Management Office, TANGO, Tonga Trust and Tonga Water Board. The interim chairman Mr Simi Silapelu welcomed the members and the mission team. He also informed on the WSP programme and the purpose of the mission. Davendra briefed on the programme for the week and requested for the support of the steering committee. He also thanked the steering committee for the completion of the Water Safety Plans for Nuku'alofa and the Rain water Tanks. Judy Williamson briefed on the revision of the Waters Safety Plans and the assessment of the two systems for the formulation of the improvement schedules. The country coordinator Mr Linisi informed the meeting on the function of the committee and the completed plans. The committee was very supportive of the mission and thanked all the members for their contribution.

At 11.30 am a field trip was done by the New Zealand team with Taniela for the assessment of the Rain Water Tank system. Later in the day the completed plans were reviewed. The team also carried out some of the test for the water from the tanks to ascertain, pH and free available chlorine.

At 2.00pm the New Zealand team of Roly, Judy, Scott and Rebecca went for the field trip with Linisi to the Nuku'alofa supply. The inspection and assessment of the supply was done and some onsite water analysis was performed to ascertain the quality.

At 2.00pm Davendra and Niu Fakakovikaetau went to the Ministry of Health, and met the staff from the Environmental Health Section to discuss on the Water Safety Plans Programme. Since the WHO Country liaison officer was on leave I met the Secretary Ms Lina. The health officials were informed of the funding provided by the WHO that could be utilised for the promotion activities for the WSP. This would include the public awareness programmes and workshops for the water managers and the rural communities. The medical officer Dr Raynold Ofanoa supported the move and requested Niu Environmental Health officer to submit a project proposal for the allocated sum for approval. Mr Ofiu Isamau, Senior Environmental Officer from the Ministry of Health was also informed of the programme, who assured his support.

### **13 March 2007-Tuesday**

Once again the team meeting convened at Tonga Water Board and the discussion with Linisi from TWB and Niu Fakakovikaetau from Ministry of Health focussed on the WSP and improvement schedule.

A number of reports on the Nuku'alofa system were referred and the monthly and annual report of TWB was viewed for relevant information.

At 10.30 the team with Linisi and Niu went for a field inspection to Lomaiviti Rural Water supply. The two 20,000 litres elevated tanks were seen and the pumping of the water by diesel pump was from the borehole nearby. There were a number of risks noted in the

system such as seepage of diesel oil and waste water into the borehole. A committee member present on site explained the process and informed that it is managed by the village water committee. The assessment of the system helped in the revision of the plans and formulation of the improvement schedules.

In the afternoon Roly and Rebecca worked on the compilation of Improvement Schedules for the Nuku'alofa system and Judy and Scott revised the Water Safety Plans.

Discussion was held with Linisi and Taniela on the review of WSP for the Rain Water Tank and Taniela agreed to revise the plans with help of Davendra and Linisi.

#### **14 March 2007 -Wednesday**

Once again the team met at TWB and had discussion with the staff of TWB. The team spent the day analysing the WSPs and the improvement schedules. Roly and Rebecca worked on the improvement schedule whereas Judy and Scott reviewed the WSP for the Nuku'alofa. Davendra and Niu Looked at the Lomaiviti Rural supply plan. In the afternoon the completed WSP for the Water Tanks was reviewed by Linisi and Davendra. The team members had a lot of discussion and used all reference material for the preparation of the WSPs.

In the afternoon the team briefly visited the TWB laboratory, the two lab staff were away on leave and so Linisi explained the functions of the lab and sampling procedures.

#### **15 March 2007 -Thursday**

The team met with the staff of the TWB and had discussion with Linisi and Taniela on the improvement schedules for the rain water tanks.

At 09.30am Davendra went to Tonga Community Development Trust office and met Alfred Vaka, Acting Project Officer and Caroline Kavaefiafi finance manager and other staff. A discussion was held in relation to the WSP programme. Reports were provided to Tonga Trust on the WSP programme and were informed that the steering committee has consented to their engagement in the preparation of IEC materials and public awareness programme. The Executive director Mr Sione Fakaosi was not met as he was on duty travel in Fiji. The contract for the task was discussed at length and Alfred was requested to submit a proposal which could be approved prior to the funding allocation in the vicinity of 12,000 panga. Alfred agreed to submit the project proposal in consultation with the director.

At 11.00 am Davendra went to the office of Lands, Survey and Natural Resource and met Mr Kelepi Mafi, senior hydrologist. A discussion took place on the WSP/IWRM programme and the need to work together with Tonga Water Board to address the water problem in the country. He was provided with all the information and reports on WSP missions and workshop. Mr Kelepi availed the new Water Management Bill and gave a copy to me for reference and he confirmed his support for both the programme and agreed to work together.

In the afternoon the team worked together at TWB. Davendra and Taniela once again inspected the Rain Water Tanks to assess the problem and do the cost analysis for the improvement schedules.

## **16 March 2007 -Friday**

Met with TWB Staff and Mr. Niu from MoH and had discussion on the Improvement schedules for Lomaiviti Rural Water Supply and Rain Water Tank Supply.

At 10.00 am a wrap- up meeting with the steering committee was conducted and chaired by Mr Saimone Helu, chairman of TWB. Mr. Silapelu a steering committee member briefed the members on the week long activities and thanked them for their effort in preparation of the plans and the improvement schedules. Davendra and Judy also informed the members about the finalizations of the plans and the improvement schedules and cost analysis. The members had many concerns and resolutions were made. Some of the important issue raised were that the catchment area should be clean and animals excluded. Second major issue brought up was the taste of the drinking water on the island. Many people preferred drinking rain water collected in tanks. The tanks are dirty and contaminated as difficulties in cleaning are noted. Training of the water committees is necessary for the rural areas. Members supported the WSP programme as it would improve the water supply systems and bring about changes in attitude and sustainability. Some of the key findings are listed in the next section. The meeting concluded at 12.30 pm.

In the afternoon a meeting was held with Linisi and Taniela who were briefed by Judy and Scott on the completed Water Safety Plans and improvement schedules for Nuku'alofa. Electronic copy of the report was given to TWB. Taniela also agreed to compile the cost analysis of the Rain Water Tanks once the improvement schedules were completed. Niu was given the task of completing the improvement schedules for the rural Lomaiviti Supply and compile the cost analysis since he was aware of the needed improvements and the local cost.

## Key Findings and Recommendations

Key Findings	Recommendation	Action
1.The steering committee agreed to work together for the water related programme	Strengthen the existing steering committee and possibly with a legal base	Saimone Helu/ and Kelepi Mafi
2. To improve the catchment area and avoid the contamination of the source.	Fence the catchment area and protect the bore head. Exclude animals and construct proper pump sheds.	Tonga Water Board
3. Improve the taste of the drinking water as people prefer drinking rainwater which is contaminated.	To install water softener	TWB/Government
4. Training of the water committee for the rural areas as they operate the rural supplies.	Training of the water committees and managers is necessary.	Ministry of Health/steering committee
5.There is low pressure in the reserve tanks due to the lack of water supply	More bore wells are needed for the Nuku'alofa Supply	TWB/ Govt
6. The TWB is under financial constraint and improvement of the reticulation system is impracticable	Funds should be allocated to improve the reticulation system	TWB/Govt/steering committee
7.Chlorination of the Nuku'alofa system to be improved	New system of chlorination is required with upgrading of the infrastructure	TWB/Govt/
8.Public awareness on the Water Safety Plans is necessary to change the attitude of the community	Development of IEC materials and workshop for the community(water managers and the target population)	Tonga Trust/ MoH
9. Improvements to the Rain Water cement tanks is necessary as many people use rain water for drinking in urban and rural areas	Tanks should be upgraded and risk of contamination removed. First flush device should be used with regular cleaning of the tanks.	Community/MoH/Tonga Trust
10.Water Safety Plans should be made for the three system mostly used on the island ( Nuku'alofa supply , Village supply and Rain Water Tanks)	The steering committee should complete the three different Water Safety Plans.	Steering committee. NZ experts MoH/TWB
11.Assessment reveals that major improvement are required in all the three system on Tongatapu	Improvement schedules and cost analysis for the systems is required for the implementation of the WSP	Steering committee/TWB /MoH
12.All funding allocated should be shared in accordance with the roles and responsibilities for the organizations involved	Project proposals should be made for major tasks by the responsible agencies so that it's easy to allocate funds.	Tonga Trust/ MoH/Lands Survey/ TWB

## Work plan for Tonga Follow Up Mission I

12 – 16 March 2007

**Venue: Tonga Water Board Conference Room.**

Day/dates	Session	WSP Activities	Facilitators/Team
Monday 12 March	8.30 am	Meeting with Chairman Tonga Water Board- Mr. Saimone Helu, coordinator Mr. Linisi and Engineer Mr. Taniela	Tonga Water Board
	10.00 am	Meeting with WSP steering committee (MOH, DOE, Tonga Trust)	All
	12.00 pm	Courtesy visit to SOPAC National Rep, Dr Sione	TWB/team 3
	2.00 pm	Field visit to urban and rural supply.	TWB and Teams 1/2/3
Tuesday 13 March	9.00 am	Field visits to urban supply Field visit to rural supply Water quality testing	TWB /Teams 1 and 2
	2.00 pm	System Assessment ,urban/rural ,check distribution system	
Wednesday 14 March	9.00 am	Review and Complete WSPs Complete risk assessment & prioritisation Check SOP	Team 3
	2.00 pm	Complete Improvement Schedules Cost Analysis	Team 2 Team 1
Thursday 15 March	9.00 am	Finalize WSP (Further input into WSP draft, if required)	All teams/ TWB
	2.00 pm	Finalise Improvement Schedules Preparation for wrap-up meeting	
Friday 16 March	10.00 am	Wrap up meeting with steering committee and others consulted	All teams/ steering committee
	2.00 pm	Any follow ups Finalize mission report and distribution to counterparts.	

Team 1: NZ Engineer, Tech Expert 1 (Drinking Water Assessor -NZ)

Team 2: Local Engineer (TWB engineer), Tech Expert 2 (Drinking Water Assessor- NZ)

Team 3: Facilitator SOPAC – Davendra Nath / Facilitator NZMoH – Judy Williamson, TWB  
-Tonga Water Board