



# GEF PACIFIC IWRM PROJECT RESULTS NOTE

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RSC 4 2012

## Improvement and Sustainable Management of Neiafu, Vava'u's Groundwater Resource



*Groundwater sampling of Neiafu*



*Setting up sanitation monitoring*

### **Top 3 Project Results**

1. A 60% increase in community engagement in water management in Neiafu reflects the focus of this project on the community solving local water and sanitation challenges
2. The first assessment of sustainable yields from the Neiafu aquifer may ensure the long-term sustainability of an aquifer that has seen increasing salinisation due to over-pumping
3. The provision of infrastructure and services to meet community-led directions on providing the 5,000 Neiafu residents with access to sustainable sanitation

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## 1. PROJECT OBJECTIVE

*Sustainable water resource assessment and protection of the fragile Neiafu Groundwater Resources through:*

- A. Mitigation of threats from contaminants;*
- B. On-the-ground protection; and*
- C. Development of a Water Resource Management Plan*

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## 2. RESULTS: PROCESS

*By focusing on stakeholder engagement, the project has supported a community with failing sanitation systems and minimal understanding and engagement in water and sanitation management, the project has strongly engaged the Neiafu communities into developing and implementing targeted solutions to local water and sanitation challenges.*



*The formation and subsequent work of the Neiafu Aquifer Management Committee has been pivotal in the changes seen. With strong commitment to awareness raising and capacity building programs, this committee has raised community awareness and stakeholder engagement. This significant increase in community engagement has enabled targeted strategies to be delivered to improve household water and wastewater management and agricultural practices.*

*The aquifer management committee was a new concept in Tonga, as is the current development of an aquifer management plan, piloting aquifer management strategies in the Pacific region. This has been supported by the first assessment of sustainable groundwater yields from the aquifer and the identification of system leakage. Both of these studies should support important decisions managing local water resources.*

*The project has re-invigorated the Tonga APEX body, which had not met for over a year, and is supporting the development of a national indicator framework and IWRM planning.*

**Figure 1** Community Audits of Rainwater Tanks



## **2(a) INDICATOR#1: PROPORTION OF COMMUNITY ENGAGED IN WATER RELATED ISSUES**

Target: 30% increases in attendance at awareness raising activities  
30% increase in active engagement activities

At the project inception, communities were not engaged in the centrally-controlled water management in Neiafu, to the point where householders were forbidden from fixing household problems without written permission from government. Household surveys indicated a lack of knowledge on the importance of managing of water resources and sanitation and there were few opportunities for communities to be engaged in water management, with no power in decision making.

The project has dramatically raised community engagement through consultative meetings, direct engagement on the Steering Committee and several community initiatives, such as household audits. Gender mainstreaming and community engagement initiatives have been met with strong positive community responses, with a demonstrable increase of about 60% in community engagement in both awareness raising and active engagement activities. People now have the opportunity to state their opinions in an open forum and to use their local knowledge and skills on managing water resources.



**Figure 2** Falaleu Community Training



**Figure 3** Fungamisi Community

## **2(b) INDICATOR#2: AQUIFER MANAGEMENT COUNCIL ESTABLISHED**

Target: Neiafu Aquifer Management Committee endorsed by Minister

The centralized management of Neiafu's aquifer prior to this project meant that decisions were often made with minimal local input and in turn, the Neiafu community had minimal understanding or ownership of their water resources. Under these arrangements, there was limited understanding of how to protect the aquifer, or even the need to do so, and the lack of an aquifer management plan or an understanding of the resources had resulted in over-pumping and salinisation of many wells.

The establishment of the Neiafu Aquifer Management Committee has rapidly addressed several of these issues. The raise in knowledge and capacity of the committee has been reflected in the broader community with targeted communication and capacity building strategies through a community-focused subcommittee. The committee and community ownership of the aquifer has been fundamental in the successful re-establishment of septic pump-out and disposal systems, providing broad access to sustainable sanitation in Neiafu.

The Neiafu Aquifer Management Committee is empowering local communities through the establishment of town water committees for each community in Neiafu, to plan their own water resources, reduce threats to groundwater, increase the safety of household drinking water and reduce waste of resources in water loss (leaks and careless). The project is supporting the Neiafu Aquifer Management Committee and town water committees in the development of an aquifer management plan and establishing a policy and funding framework to sustain these committees beyond the project.



**Figure 4** Neiafu Aquifer Management Committee Members (30th of May 2012)

### **2(c) INDICATOR#3: MULTI-SECTOR APEX BODY ESTABLISHED**

Target: Replication demonstrated by end of project

Prior to the project, the APEX Body had stopped meeting and no longer provided a focus for national water management. Decisions of individual agencies were being made in isolation, and the National Water Bill and National Water Policy progress had stalled.

The project reinvigorated this committee through a targeted retreat at the project site, bringing the members together and identifying strategies to increase sectoral and national coordination. During this retreat, the Neiafu Aquifer Management Committee and the APEX body worked closely on strategies to improve groundwater management and increase community engagement in water management. The APEX Body has subsequently progressed the National Water Bill and National Water Policy, and was fundamental in supporting the development of a co-funded AusAID project to extend the GEF IWRM demonstration project to an integrated water and coastal management (IWCM) project.



**Figure 5** APEX BODY members at the meeting in Vava'u (demonstration site)



### 3. RESULTS: STRESS REDUCTION

*Neiafu relies heavily on groundwater for water supply. However, the sustainability of this resource is threatened by a combination of pollution from septic tanks and agricultural practices and over-pumping to supply water through a system with significant leakages. The project is addressing both these threats through a combination of on-ground works, guideline development, targeted training, community engagement and overarching IWRM strategies and plans.*

*Prior to the project commencement septic tanks were failing across Neiafu due to a lack of pump-out facilities. This challenge has been addressed through the establishment and operation of pump-out facilities, supported by awareness campaigns to support uptake. Further reductions have been achieved through the installation of eleven trial sanitation systems, including a compost toilet.*

*Studies have identified agricultural impacts and training has been provided to farmers to improve land management practices and reduce threats to the groundwater.*

*Assessments of sustainable groundwater pumping rates and supply system leakage have identified key areas for improvement to mitigate stresses on the aquifer.*



**Figures 6 and 7** Workshop on the proper handling and use of agrochemicals

#### **3(a) INDICATOR#1: NITROGEN POLLUTION DISCHARGED TO GROUNDWATER IN NEIAFU**

Target: 20% reduction in nitrogen discharged to groundwater (equates to 80% Neiafu residents with access to septic pump-out)



**Figures 8 and 9** Nutrient monitoring in to assess reduced nitrogen discharges to groundwater. Sampling site (left) and testing (right)



Prior to the project commencement, Neiafu had been without septic tank service facilities for many years, causing many of the town septic tanks to fail, creating unsanitary conditions around many tanks and dramatically increasing groundwater pollution. At the request of the Neiafu community, the project reestablished a septic pump-out management system. Households were surveyed to identify failing septic tanks and advice provided through a combination of media (television, radio and a school-based awareness competition). Trial sanitation systems have been installed to demonstrate reduced groundwater impacts, including sand filtration and compost toilets.

The pump-out service has been established with a sustainable financial model and has already been used by approximately 20% of Neiafu households, representing a 5% reduction in nitrogen and organic pollution of groundwater. It is anticipated that, by project completion, the target of 20% reduction in nitrogen pollution of groundwater will be achieved. This will be augmented by almost complete reduction of pollution from the eleven demonstration site households.



**Figures 10 and 11** Vacuum truck and sludge management beds at Kalaka Site

### **3(b) INDICATOR#2: REDUCTION IN WATER LEAKAGE LOSSES IN VAVA'U**

Target: 40% reduction in water leakage from system in Vava'u supplying 5,000 people

The Neiafu town water supply (approx. 5,000 people) is groundwater sourced; however over-pumping of some wells has increased water supply salinity to levels that are approaching undrinkable. The need for the high level of pumping was thought to be high system losses; however no reliable assessment had been undertaken prior to this project.



**Figure 12** Old infrastructure associated with 70% leakage losses. A key study suggest that old valves may be contributing significantly to losses



**Figure 13** Leak detection in Neiafu

As part of the project an assessment on Neiafu Groundwater and sustainable management has been completed, which identified 70% water losses. This figure is much higher than previously anticipated and has focused thinking on cost-effective responses. The assessment concluded that the majority of water loss was attributable to failing old infrastructure, including leaking pipes and valves. The project is working in partnership with Tonga Water Board to reduce water leakage from the system through a combination of leak detection, targeted on-ground works and system management.

Additional water leakage losses are being targeted by the project at the household level, with audits being undertaken to identify household losses and improve household water use efficiency. This work is being supplemented by trial household level treated wastewater reuse schemes.

#### 4. RESULTS: WATER RESOURCE AND ENVIRONMENTAL STATUS

*A project survey identified that over 90% of Neiafu was operating failing sanitation systems. A further small percentage had no access to improved sanitation. Through the project, it has been possible to pilot the rehabilitation of ten failing systems, install two demonstration compost toilets and service the failing systems to ensure access to improved sustainable sanitation. Household level audits currently being developed will enable the Neiafu communities to ensure that all sanitation systems are functioning sustainably.*

##### 4(a) INDICATOR#1: POPULATION WITH ACCESS TO IMPROVED SUSTAINABLE SANITATION

Target: 90% increase in Neiafu residents with access to improved sanitation through provision of sludge collection and disposal system (4,500 people)



**Figure 14** Composting Toilet at Fungamisi

Prior to the GEF IWMR project, the failing sanitation systems in Neiafu meant that people needed to dig out septic tank sludge and were dealing with leaking and overflowing system. In a hilly community with relatively high rainfall, this also resulted in unsanitary conditions across much of the community. A project Household Survey on sanitation and water supply identified the high sanitation system failure rate, largely attributable to the lack of a pump out system available. Through a combination of establishing a septic pump-out and disposal system, ecosanitation and household level treatment trials, the project is removing many of the risks associated with failing sanitation systems and also barriers to improving household sanitation. Household level guidelines are being developed in partnership with communities through this project to raise the awareness of results and aid to uptake. Current monitoring suggest that over 20% of Neiafu systems are now sustainable, and by project completion, should reach the 90% target.