

2009

# Wastewater Management Training - Fiji Islands

Improving Sanitation and Wastewater  
Management for Pacific Island Countries

June 29<sup>th</sup> – 3<sup>rd</sup> July 2009  
SOPAC Secretariat  
Suva, Fiji Islands



## Partners



## List of abbreviations

<b>IAS</b>	<b>Institute of Applied Sciences</b>
<b>FSMed</b>	<b>Fiji School of Medicine</b>
<b>UNESCO-IHE</b>	<b>UNESCO- Institute for Water Education</b>
<b>UNEP-GPA</b>	<b>United Nations Environment Programme (Global Programme of Action for the Protection of the Marine Environment from Land Based Activities)</b>
<b>FSPI</b>	<b>Foundation for the Peoples of the South Pacific International</b>
<b>NIWA</b>	<b>National Institute of Water &amp; Atmospheric Research</b>
<b>EMA</b>	<b>Environmental Management Act</b>
<b>DoE</b>	<b>Department of Environment</b>
<b>SOPAC</b>	<b>Pacific Islands Geoscience Commission</b>

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## Introduction

The first wastewater training for the Pacific was carried out in Fiji from the 24-28<sup>th</sup> of October 2005 and has since been replicated in 5 other Pacific island countries. The principal partners were the UNESCO-IHE and GPA who also facilitated the training. Alongside with SOPAC, UNEP-GPA has successfully been able to train local Fiji partners in the administration and delivery of the training aptly renamed *Improving Sanitation and Wastewater Management for Pacific Islands*. The training has so far seen more than 60 participants across the Pacific sufficiently trained in the Objective Oriented Planning process of the manual which targets maximizing the capacity of supervisors, managers and operators at wastewater utility companies in planning and managing projects.

Since 2005 the training has been conducted with a sub-regional and/or national focus and as such has seen the training successfully delivered in:

- Guam
- Papua New Guinea
- Tonga
- Kiribati
- Fiji Islands and the Cook Islands (with representation from Vanuatu and Samoa respectively)

Following the 2005 training, various recommendations from the initial training have been incorporated into the 2009 training which has been based on the recommendations and suggestions from trainers and participants. The training this time around in 2009 had a more national focus as compared to the one held in 2005 which was the inaugural regional training. The training for 2009 was made possible through the generous support by UNEP-GPA.



Figure 1: Fiji participants in a breakout session

## Background and Objectives of the Training

The training course on Improving Municipal Wastewater Management in Coastal Cities (*improving sanitation and wastewater management for pacific island countries*) consists of three modules, an introduction, a fieldtrip, a synthesis session with a set of mastery tests. It covers five days of intensive training for a group of relevant participants and is supported by a training manual, an instructor's manual, a video and a set of power point presentations. A CD ROM with background materials is also included in the participant package which complements the materials already in the training manual.

The objective of the course is to have the participants carry out an Objectives Oriented Planning Process, using a realistic wastewater problem, resulting in the presentation of a project proposal on the final day of the course (*Annex 4*). The participants are organized in groups. These groups will formulate their own problem. Each group, for their own case, carries out the various steps involved in an Objectives Oriented Planning Process:

- i) Problem analysis
- ii) Objectives analysis
- iii) Stakeholder analysis and finally
- iv) Options analysis which will report the outcome of the various steps.

A full day of programme is dedicated to stakeholder's analysis (*Annex 1*). Besides doing a stakeholder analysis for the selected problem within each group, a number of stakeholders (e.g. tourism/hotel association, health officials) are possibly invited to highlight the importance of involving them in the planning process.

A day was also scheduled for providing appropriate knowledge to select (innovative and environmentally sound) options that can be used to address the identified problems. The participants are expected to include such approaches in their long-list of options and in the subsequent selected project proposal. The module on presentation techniques is designed to support the participants with their oral presentations and with the structure of their proposal.



Figure 2: Fiji participants at the Wastewater training during final comments by Tasleem Hasan (SOPAC)

## Wastewater Training - Fiji Islands

### Presentations by participants

At the end of the training participants were given an opportunity to make presentations on the OOP process, individual groups were allowed 15 minutes presentations on an issue from either their own work situation or from a case study example. Presentations given were as follows:

- Group 1: Santiago Chile Case study
- Group 2: Wastewater problems; Septic tank systems
- Group 3: Mali Island presentations (Health perspectives)
- Group 4: Rewasa Bulabula - eco wastewater design and management

Additional presentations were made by various participants attending the course to further complement the theory sessions with some context into the situation as is in Fiji with regard to wastewater management and the issues involved including presentations from FSPI (NGO sector), Department of Health, Department Water and Sewerage, Department of Environment.

The presentations that were made on the final day of the training were judged with predetermined criteria by the course facilitators with the inclusion of an independent assessor, SOPAC Drinking Water Safety Planning Coordinator. Presentations were concluded with final remarks on the course offered by SOPAC Water Services Coordinator and certificate presentations and closing words from SOPAC management.

### Participants and Trainers

Participant selection was done in consultation the local country counterparts (WSD and MoH). The primary stakeholders were identified as Ministry of health (environmental health officers and inspectors), department of water supply and sewerage (plant operators, managers and laboratory personnel from the water quality division), department of environment (liquid waste division) and the NGO sector (FSPI and PCDF). A total of 26 participants were then selected from Fiji with one representative from Vanuatu (*Annex 2*). The Vanuatu participant provided objective insight into the training and the experience with wastewater issues in Vanuatu.

The trainers for the Fiji training were Dr. Bale Tamata (USP) and Mr. Rodney Lui from SOPAC co-facilitating various sessions in the program. Dr. Tamata was also a facilitator in the 2008 training for Kiribati and Tonga alongside with Mr. Kamal Khatri the former SOPAC WASH officer.

### Venue

The venue for the training workshop was at the SOPAC secretariat water conference in Fiji. The venue was an appropriate and central location easily accessible with ample space for group work and was fully furnished with all the required training tools (LCD projectors, overhead screens). The conference area was set up to a lecture style setting with room for breakout groups and grouped discussions.

## Stakeholders and Fieldtrip

The Fiji training was adapted to include the stakeholder analysis as part of the field trip session, which was important to the course because it made the field trip more interactive, and applied across the work covered in modules 1 and 2. Participants were allowed to visualize and interact with the stakeholder analysis component of OOP which is key in the stakeholder analysis sessions and provides appreciation of the context in which projects and wastewater management issues are conceptualized within.

The Fiji training field trip focused on an ongoing project (NIWA/IAS wastewater management in a coastal Fijian village - Votua, Sigatoka). The concept involves a rural community managing its wastewater issues in relation to sanitation and livelihoods. The project offered participants a practical opportunity to use their skills in the OOP process as they were able to talk to the real people behind projects as opposed to people involved in only planning, managing, and supervising (*Annex 3*). Stakeholders interests and feedback in current projects is a dynamic feature and is beneficial

## Monitoring and Evaluation - Fiji Course

The course evaluation forms were circulated to course participants to improve and streamline future delivery whilst also providing crucial feedback on the course logistics, content amongst other elements. A total of 24 out of 26 questionnaires were registered and collected from the participants and the graphs provided here are the results of this.

Course logistics covers issues such as the selection of the appropriate venue and also the use of various AV equipment, and refreshments was suitable. Participant feedback indicated 71.3% of participant response strongly agrees with the course logistics with 1.3% of participants who felt the course logistics could be improved.

In the general overview participants were asked questions directly on the overall format of the course, the relevance of the course to their work, the appropriateness of the course material, interaction with trainers and participants was positive and beneficial. This section also explores the value of the training and also the professional advantage of being a part of the course. This section of the form indicated a high number of participants (75.6%) of participants in strong agreement to this section.

This section of the questionnaire was related to the use of time and scheduling for the training by the facilitators and trainers. Timing for various elements of the course is important for such short intensive training and this was sufficiently addressed accordingly. 85.7% of questionnaire responses recorded that participants and observers felt that the time allocated per section of the course content was about right.

The key responses that were gauged here indicated that participants strongly agreed that the topics covered across all modules from 1-3 were equally important and feedback from questionnaires reflected this. An even spread of the participants indicated that modules 1 and 2 were important with a larger proportion of the participants found Module 3 (71%) important in addressing project proposals and the pre-feasibility opportunities for projects.



## Conclusion and Recommendations

The Fiji course was an important follow up course to the 2005 training for Fiji. The 2005 session was the first run and looked at the generic nature of the course, its adaptation for PIC's and also the relevance and importance to the Pacific situation. This round of trainings for 2009 was able to adapt the recommendations of the 2005 training and the gained experience from other trainings. It offered delivery to a more targeted audience whilst also adhering to the demands of the Fiji situation and contextualizing the course content to meet the needs on the ground.

The training offered an open forum for former participants to share and exchange their ideas on wastewater issues affecting Fiji in general. With the release of the Environmental Management Act of 2008, the training offered participants a chance to delve into the issues at the heart of the newly introduced regulations and enquiries on standards for the implementation of various aspects of the act. The training as a side objective allows participants and the organizations an opportunity to avoid any duplication and misinformation across various sectors for wastewater management and issues.

Issues that were discussed at length were:

- The role of DoE in the implementation of the currently released wastewater regulations under the EMA act 2008, discussions over the implementation, and integration of current operating standards in relation to the new standards and compliance issues.
- Roles of regulators and compliance to the new EMA act 2008. The integration of the old system in relation to the newer standards was a healthy point for discussion.
- Financing and funding small scale projects, the relevant donor communities, and assistance for projects both in MoH and also with the department of water and sewerage.
- The role and impact of resource owners (land owners, tenure and rights) were an important outcome of the Fiji training as most projects in Fiji require some backing, representation and approval from landowners. Recognizing the impacts of traditional leaders and community leaders was also an important learning outcome for the Fiji training.
- The training was able to successfully network the key stakeholders which between most government agencies can often be a challenge and is sometimes difficult to establish.

The training for 2009 closed on a positive note with most participants from the training discussing the use of information and skills obtained from the training across into their professional work fields.

## **Acknowledgement**

The 2009 session for Fiji would not have been possible without the financial assistance and guidance of UNEP-GPA.

The contribution and assistance from USP-IAS through Votua village and administrative assistance are duly acknowledged in this report, the case study work undertaken by our partners at the Fiji School of Medicine are hereby recognized.

## Annex 1: Course program Fiji

	Day 1	Day 2	Day 3	Day 4	Day 5
08:30-10:00	09:30 Opening	Presentations Problem analysis  Conventional approaches and alternative technologies	Group meet at SOPAC, Field trip	Field trip evaluation & trip presentation  Financial approaches to municipal wastewater management	Introduction proposal presentation  Preparation proposal
10:00-10:30	Coffee/tea break				
10:30-12:00	Introduction	Objectives analysis  Presentations Objectives analysis	Stakeholder analysis & interviews  Presentations Stakeholder interviews	Panel discussions (participants)  Financial approaches to municipal wastewater management  <Water management in the city of tomorrow <sup>1</sup> >	Preparation proposal
12:00-13:30	Lunch break				
13:30-15:00	Problem analysis	Conventional approaches and alternative technologies  The way forward: the 3-step strategic approach	Field trip site:	Options analysis: making the long-list	Presentations proposals
15:00-15:30	Coffee/tea break	Coffee/tea break	Votua & Qalito villages, Sigatoka Coral Coast Fiji	Coffee/tea break	Coffee/tea break
15:35-17:30	Problem analysis  Oral presentations	Introduction to stakeholder analysis & work on Stakeholder analysis & interviews		Options analysis  Introduction & discussion Presentations of concept note> project design. <sup>2</sup>	General discussion/ feedback from participants  Evaluation  Farewell drink

<sup>1</sup> This section was omitted from the course content in the actual sessions and taken as reading materials for participants as extra work

<sup>2</sup> The relevance to the Fiji Case study was drawn here and participants were allowed to discuss a project that was relevant to the

## Annex 2: List of Participants

Name	Designation/Affiliation (occupation – Department)	Contact details (mailing address)	Electronic mail contact	Phone/fax (+679)
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## Annex 3: Field trip notes - Votua village

### Field trip: Votua village (Sigatoka) - sustainable waste treatment system for a coastal Fijian village

Presentations were given by Viliame Jeke (water engineer) and Victor Bonito (marine biologist) at both Votua and Qalito village.

**Location:** Votua village Sigatoka

**Population:** approx 390 people and more than 120 households

#### *Stage 1:*

- The village won an award from UNDP in the 1980's for tourism development, the community started off with 6 communal taps in the 1960's and later developed private water supply.
- The project was borne out of discussions and issues in the ICZM (Integrated Coastal Zone Management project) of the early 90's and was also highlighted through the FLMMA (Fiji Locally Managed Marine Areas) network projects in the Sigatoka area. After villagers noticed significant changes in their deteriorating; community health and their surrounding ecosystems was advice sought on how this could be managed.
- A gathering issue that became evident as the population of the village increased was the improper disposal of wastewater; piggeries upstream were also identified as a high risk area as well since downstream pollution was becoming more and more evident.
- Tests and water quality monitoring data also identified that 40% of coastal pollution was from piggeries and sampling data from 2005-2008 confirmed this as well. Sampling involved village members where stakeholder involvement was highly participatory. Surface water that was tested showed risk assessments in 3 stage all confirming the same results.
- Wastewater issues were linked to: housing, piggeries, and the village. Further to information collected from the WQM data was also the use health diaries which detailed household information and also the incidence of disease outbreaks and general health concerns, at the end of which information was used by the community through collated graphed data placed at the village community notice board.

#### *Stage 2:*

- This phase in the project involved developing, testing and demonstrating sustainable wastewater solutions and also getting more information on the project and its implications on the village.
- Limited space to develop wastewater treatment options became an issue, and options were set up for 4 anaerobic and 2 aerobic systems to be trialled outside of the village. An additional function of the design options was that the only mechanically operated function in the wastewater system is that a major function be gravity fed and only transfer be 'mechanized' through a pump system.
- Using a trialled version of the wetland in tagaqe village it was noted that here greywater saw a 90% reduction on nitrogen removal and approx 1-2 orders of bacterial removal. The new drum systems that were installed for greywater discharge took at least 8-10 months before they needed to be changed.

- Stakeholder involvement for the Votua project was also highlighted as part of the training since inception and the participation of the village chief on the project committee has been a strong point for the project. The villagers collectively from youth- leaders have been involved in various trainings and workshops over the years to build capacity on managing their local land and marine environments.
- The community is also strongly involved in managing the project and also in the monitoring aspects of the project. With various contingency funding for other mini projects within the village.

### *Additional notes*

- The village with help from various public sectors has been able to trial various compost piggeries and addressed the point source pollution of piggeries by relocating piggeries inland.
- The housing authority division of the housing upstream has offered to upgrade their septic systems, and renewed dialogue between communities and the hotels have reopened with more interest from the hotels in the village projects.
- After completed upgrades to the dam system away from the village a noted reduction in the incidence of water borne diseases has been noted up to 60% and the upgrades has also led to satisfactory water pressure to the village at peak usage hours especially in the morning and afternoon.
- Drinking water supplied under this system has after extensive monitoring proven to be of sufficient drinking water quality and as such is untreated and



## **Annex 4: Course outline**

### **Module 1: Objective Oriented Planning**

The objective of this module is to guide participants through the different steps of objective oriented planning. In this module the participants will be familiarized with problem analysis, objectives analysis, options analysis and stakeholder analysis. In each of these topics the participant will first be introduced to into the methodology of undertaking the analyses. Following this introduction a case study will be used to illustrate the approach for undertaking the analyses. Application and contextualization of OOP to the participants working environment is important and the material should reflect this or be adapted as such across the range of participants present

The module consists of the following parts:

- The Problem Analysis
- Objectives Analysis
- Stakeholder Analysis
- Options Analysis

#### **Module 1 objectives:**

In this module participants should be able to describe the steps involved in creating a problem tree, identifying cause and effect relationships and be able to analyze these problem trees and create objectives from the given problems. Participants then proceed to look at their options available, rank them in order and then select viable options in achieving a selected objective, look at various stakeholders and also discern their interests and roles.

#### **Expected outputs**

Proper application of Objective Oriented Planning in the final proposal formulation and presentation, with attention to the inclusion of stakeholders

### **Module 2: Conventional and Innovative Approaches to Municipal Wastewater management**

This module is the core of the course. The participants will get an overview of conventional and innovative technological solutions as well as financing options. A general overview of possibilities and limitations of various approaches is presented that will give sufficient background to develop new approaches to wastewater management in each municipality.

This module has two focal areas, technological and financial content for the Fiji training was adapted to the situation on the ground and 3 steps strategic approach section was briefly touched while the City of tomorrow section was offered as reading material.

#### **Module 2 objectives:**

- Cognize the changing principles underlying (wastewater services (technological and financial).
- Adapt to a more consumer-based financing approach.
- Classify various alternatives to address wastewater problems.
- Describe their strengths and weaknesses in a specific situation.

#### **Expected outputs**

Application of innovative approaches and appropriate technologies for use in the final presentation

### **Module3: Presentation Techniques**

Developing proper solutions is one thing, but getting moral and financial support for the ideas is as important. Thus, a proper presentation to organizations, to stakeholders, or to potential donors for getting support for the ideas is vital. Therefore one has to pay some attention to presentation techniques: each module ends with a presentation by some of the participants. To facilitate these presentations, a short introduction into the basic skills for giving oral presentations is provided. Moreover, after a brief introduction of the distinct stages of a project (project cycle) this module will acquaint the participants with the contents of a feasibility study and explain how to structure the presentation of projects in a written document.

This module is divided into two following parts:

- Presentations Skills ( the presentation skills work was included as reading and reference material for the
- Writing the Feasibility Report

#### **Module 3 objectives:**

Compose a presentation within a set time frame.

Realize an oral presentation within a set time frame, using basic presentation skills (e.g. visual aids, time management, and delivery performance).

Prepare and present a project proposal to address the problem that requires mitigation.

#### **Expected outputs**

Good quality and well structured presentations during the course. The end product of the 3<sup>rd</sup> module should be a properly designed feasibility study.