SOPAC

The University of the South Pacific

INSTITUTE OF APPLIED SCIENCES (IAS)

NEEDS ASSESSMENT FOR WASTEWATER TRAINING PROGRAMME FOR THE PACIFIC REGION

AS A CONTRIBUTION TO
THE GLOBAL PROGRAMME OF ACTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES

Compiled by

Kamal Khatri, Sarah Davies, Marc Overmars
& Bill Aalbersberg

April 2007 *SOPAC Training Report 118*

ACKNOWLEDGEMENTS

Institutions and persons that have contributed to the needs assessment and for commenting on this report are gratefully acknowledged. Heartfelt appreciation also goes out to the members of the Advisory Committee (see Annex 1) who were kind enough to take time out to contribute to the development of the training course.

We acknowledge the financial support of the United Nations Environment Programme (UNEP) GPA Coordination Office – The Hague.

TABLE OF CONTENTS

LIST OF ACRONYMS

DOALOS	–	United Nations Division of Ocean Affairs and the Law of the Sea
FSchM	–	Fiji School of Medicine
GPA	–	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
IAS	–	Institute of Applied Sciences
IOI	–	International Ocean Institute
IWP	–	International Waters Programme
PACE-SD	–	Pacific Centre for Environment and Sustainable Development
PCDF	–	Partners in Community Development Fiji
PWA	–	Pacific Water Association
SIDS	–	Small Island Developing States
SOPAC	–	Pacific Islands Applied Geoscience Commission
SPAS	–	School of Pure and Applied Science
SPREP	–	Secretariat for the Pacific Regional Environment Programme
UNEP	–	United Nations Environment Programme
UNESCO – IHE	–	United Nations Educational, Scientific and Cultural Organisation – Institute for Water Education
USP	–	University of the South Pacific
WHO	–	World Health Organisation
WIOMSA	–	Western Indian Oceans Marine Science Association

INTRODUCTION

The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) is a global strategy aimed at preventing the degradation of the marine environment from land-based activities. The United Nations Environment Programme (UNEP) was chosen as the Secretariat of the GPA initiative. Wastewater discharge has been identified by UNEP as the main source of land-based pollution and reconfirmed at the 2002 Millennium Summit on Sustainable Development. In 2003, UNEP/GPA with UNESCO-IHE developed and delivered a pilot course titled “Improving Municipal Wastewater Management in Coastal Cities” in Zanzibar, Tanzania. SOPAC along with the IAS arm of USP together with GPA is now working on adapting this course for use in the Pacific region.

The first step in this regional adaptation has been to carry out a needs assessment in consultation with stakeholders to assess the training needs for the Pacific region with the idea to identify the blend of material appropriate for the region as well as the most preferred learning modes and teaching approaches.

This report provides the findings of the training needs assessment that was carried out in July-August 2005.

TRAINING NEEDS ASSESSMENT

Method

The needs assessment included reviewing the available literature on wastewater management, as well as consultations with relevant institutions such as SPREP, IOI, WHO, UNESCO and USP (which includes IAS, SPAS and PACE-SD) through advisory committee meetings in the process of training material design and implementation. A list of members of the advisory committee is attached as Annex 1.

In addition, a questionnaire was designed for distribution to people working in the field of water/wastewater to consider factors such as experience, need for training, topics of interest and training timeframe (the sample questionnaire is attached as Annex 2). The questionnaire was sent out by email to approximately fifty individuals throughout the region. These individuals were also asked to disseminate the questionnaire as appropriate. The distribution list for the questionnaire was primarily drawn from the wastewater focal group that was formed through the

Regional Meeting on Wastewater Management in Majuro, in 2001. Copies of the questionnaire were also distributed to the Advisory Committee group members for further dissemination through their contact points.

Limitations

One of the major limitations in the needs assessment was the lack of response to the questionnaires. Only seven completed questionnaires were received for analysis and four of these seven were from Fiji. A two-week time frame was given for completing the questionnaire and two reminders were sent during this time however unfortunately this did not encourage greater participation.

However, the experience of the advisory group members and the literature available within the region coupled with the questionnaire responses are felt to be sufficient to provide a reasonable background to the status of wastewater management in the Pacific region and the needs for training in this area.

WASTEWATER MANAGEMENT IN THE PACIFIC REGION

There are over 30,000 small islands in the Pacific (Falkland 1992) and they vary greatly in their physical characteristics including high volcanic islands, low-lying atoll islands and uplifted limestone islands. The high islands are large, consisting mainly of volcanic rock and are generally forested with fertile soil and usually an ample availability of freshwater (Scott *et al*. 2003). The low islands are usually small with limited freshwater resources and poor soil. Although many of the islands in the Pacific are small in area, the population densities can be very high which place a lot of stress on the naturally occurring water resources. Population density varies from as low as 8 people per km^2 in Vanuatu to 430 per km^2 on Nauru (Scott *et al*. 2003).

While there could be several definitions for the term wastewater, the Pacific Wastewater Framework for Action defines it as ‘any combination of discharge (liquor/effluent, sludge/biosolids) into the environment, with or without treatment. It is defined as: human excrement (including zero waste discharge systems), effluent, flushing water, industrial water and stormwater (run-off caused by rain). Wastewater discharges are the main contaminants to freshwater and coastal marine resources throughout Small Island Developing States (SIDS). In the Pacific urban areas, currently served by a centralised system, the treatment level is usually limited to primary and secondary stages, and the discharge method is ocean outfall. Many existing wastewater

treatment systems do not work properly and are not operated or maintained due to lack of trained personnel and adequate finance (Burke 1999; Pacific Wastewater SAP 2001).

To improve the sustainability of water resources management in small island countries it is important to get support from bilateral, regional and international donor agencies, and others including NGOs and consultants. The capacities of national water agencies require strengthening in many areas including water resources assessment and monitoring capabilities, water planning, and appropriate technology in water, sanitation and wastewater (Falkland 2002). Specifically, there is a need for improved sanitation systems on small coral islands where the current systems continue to seriously contaminate the groundwater leading to environmental and human health problems. There are several reports available on sanitation issues in the Pacific (Bower *et al*. 2005; Crennan 2001; Crennan and Berry 2003; Crennan and Burness 2005; Depledge 1997; and Dillon 1997).

There are three common wastewater disposal systems used in the Pacific. These could be categorised as individual on-site waste disposal systems, centralised and decentralised wastewater treatment systems. There are many pollution sources that degrade the surface and groundwater quality in many small islands. One of the major pollution sources is discharge of untreated or partially-treated wastewater (from sanitation and greywater systems) with associated pathogens in streams and rivers. Increasing water pollution and associated water borne diseases have been reported by many studies in the past; (Detay *et al*. 1989; Miller *et al*. 1991; UNESCO 1991) as well as recently (ADB 1999; Crennan and Berry 2002; Falkland 2002).

Of the total population in the Pacific (6.1 million people) approximately 694,200 (or 11%) are serviced by a reticulated wastewater system. If PNG was excluded from the calculation then approximately 546,000 people out of 2.4 million (or 23%) have access to reticulated wastewater systems. Note that of those people serviced by collection systems (694,200), wastewater from over 100,000 people is discharged directly into the coastal environment without treatment (Burke 1999). A number of countries have reticulated systems (Kiribati, Republic of Marshall Islands, Solomon Islands, Pohnpei and Chuuk in the Federated States of Micronesia and Nauru) but no treatment. In areas with adequate wastewater treatment and disposal systems, water quality may still be poor due to the large number of individual systems that still exist in the area. Also many of the existing treatment plants do not perform as designed. The balance (or majority) of the people dispose of their waste through septic tanks, various types of latrines and over-water latrines. In some SIDS, composting toilets have been introduced as an alternative method of disposal. The bush and beach are still used for defecation, especially by children, in many countries. Domestic wastewater or sewerage is managed in several ways ranging from non-existing physical facilities

in rural and undeveloped urban areas to advanced secondary treatment plants in some of the large municipalities (Convard *et al*. 1997).

Many Pacific Island Countries lack data on coastal water quality, which is a concern. A regional water quality survey found that countries lacked the initiatives from the governments to support water quality monitoring programmes (Naidu *et al*. 1991). In Fiji, high levels of nutrients have been found along the 'Coral Coast' of Sigatoka, which could have detrimental effects on the coral reefs ecosystem (Mosley and Aalbersberg 2003).

To address the problem of pollution, GPA, has identified amongst other things, the need for capacity building including training, as an important component of action on sewage. The need for training was endorsed by the first Intergovernmental Review Meeting of GPA held in 2001. The need for training was also one of the outcomes of the Regional Wastewater Consultation held in Majuro 2001, which was facilitated by GPA, PWA, SPREP and SOPAC. This consultation led to the Pacific Wastewater Policy Statement and the Pacific Wastewater Framework for Action.

RESULTS FROM THE QUESTIONNAIRE

The questionnaire (Annex 2) consisted of 2 main parts to glean information on both existing capacity and training needs. The results are summarised below with more detailed information provided in Annex 3.

Existing Capacity

All respondents to the questionnaire were tertiary educated. Qualifications were engineering or science-based and several respondents possessed post-graduate degrees. The respondents to