

THEME 4 TECHNOLOGY

*TOWARDS SUSTAINABLE
URBAN WATER AND WASTEWATER UTILITIES
IN PACIFIC ISLAND COUNTRIES*

**PACIFIC REGIONAL CONSULTATION ON
WATER IN SMALL ISLAND COUNTRIES**

FROM VISION TO ACTION

*TOWARDS SUSTAINABLE
WATER MANAGEMENT IN THE PACIFIC*

**29TH JULY – 3RD AUGUST 2002
SIGATOKA, FIJI ISLANDS**

**by Michael Dworsky
Pacific Water Association**

TABLE OF CONTENTS

1. INTRODUCTION	3
2. WHAT SHOULD A SUSTAINABLE WATER AND WASTEWATER UTILITY LOOK LIKE	8
3. SUMMARY OF ISSUES, CONCERNS, AND CONSTRAINTS	16
4. MEASURES TAKEN TO MANAGE WATER AND WASTEWATER UTILITIES	23
5. FUTURE NEEDS	37
6. STRATEGIC ACTION PLAN	44
7. CONCLUSIONS.....	51
8. REFERENCES	53

THEME 4 TECHNOLOGY

1. INTRODUCTION

The Pacific Ocean covers some 18 million km² or about 36% of the earth's surface. Scattered throughout the Pacific are over 30,000 small islands and a number of larger islands (each over 2000 km² in area) that emerge from the sea floor of which about 1,000 islands are inhabited.

The natural environment throughout the Pacific Island Countries is extremely fragile and is highly vulnerable to both natural and human impacts. Natural hazards like cyclones, droughts, earthquakes and tsunamis may strike at any time and at most places within the Pacific Region. Human impacts include rapid urbanisation and waste and wastewater generation.

The availability of potable water and proper disposal of human waste are key elements to the health of any civilization. Contaminated drinking water is one of the primary causes of death and illness throughout the world. Thus it is one of the responsibilities of local governments to assure the availability of potable water and the proper treatment and disposal of human waste. In order to provide these services the local government is obligated to install sanitation facilities, and to properly manage, operate and maintain these facilities.

A successful Water and Wastewater Utility is designed, built, managed, and operated to:

- 1) Protect public health,
- 2) Protect the environment,
- 3) Meet customer needs.

Well run utilities have clearly defined and up-to-date set objectives and action plans for improving their service through monitoring their performance. Such monitoring is targeted at lowering unnecessary production and distribution costs, enhancing billing and revenue collection, improving customer relations, reducing unaccounted-for-water and generally increasing the level of service. Unfortunately many utilities in Pacific Island countries are not run as such. In fact, many of them rarely collect data systematically to assess their own performance in order to design operational improvements. As a consequence, both those responsible for service delivery, and those willing to support them, lack the information needed to design measures and investments to improve the delivery of service. There is therefore a need to address this weakness.

This requires a staff that manages, operates, and maintains these facilities to have certain skills that are not readily available within most local governments. This is especially true of the governments of the Pacific Islands. The lack of required knowledge and skills is not the fault of the local government. Rather, these shortcomings are due to the lack of funds, in some cases the lack of an understanding of the need for the knowledge and skills, and the lack of knowledge of available resources to obtain the knowledge and skills.

Human Resource Development

One case study following this overview is "The Micronesia Water and Wastewater Training Program" which was developed to address these and other issues. This program has operated since 1997 and has provided a significant amount of training and technical assistance which has resulted in observable improvements in the operation and maintenance of the targeted utilities, not without roadblocks which have been identified and are discussed in the case study.

External Bilateral Assistance

A developing Water and Wastewater Utility often needs financial assistance from outside the country. Bilateral development assistance has been an important resource to Water and Wastewater Utilities. Among the providers of bilateral assistance, the most prominent is Australia. The goal of Australian assistance to the Pacific Islands is to promote self-reliance through better governance, stronger growth, greater capacity, better service delivery, and environmental integrity. In addition, Australia will provide about \$20 million to support the network of regional organizations and institutions that assist the Pacific Islands countries.

Japan, the United States, New Zealand and United Kingdom are the other prominent providers of bilateral assistance. Japanese funding focuses on agriculture, forestry, fisheries, and basic infrastructure, including hospitals, schools, and water supply facilities. In 1998, the net disbursement of Japanese official development assistance to the Pacific Island countries was about \$130 million. The US funds are almost completely focused on the FSM and RMI, primarily through Compact Funds. Others such as New Zealand's assistance focuses on health, education, environment, human resource development, and private sector growth. Total assistance from New Zealand to the Pacific is about \$40 million per year. The United Kingdom contributes about \$6 million per year to the Pacific region. Others such as the European Union (EU) and the World Bank are significant other multilateral contributors to the Pacific. UNDP coordinates the activities of various UN agencies.

The Asian Development Bank (ADB), a major multilateral donor in the Pacific region, operates in 12 Pacific Island countries. Annually, ADB approves between \$100-\$150 million in loans and \$15 million in Technical Assistance grants for the region.

With all this multilateral funding potentially providing improvements to the Pacific Island countries, why is the development of a successful **sustainable** Water and Wastewater Utility so difficult to achieve?

The Case study of Ebeye demonstrates that the ADB has recognized some limitations in the way projects have been developed in the past, and are committed to major change. In this case, the ADB has made a strategic shift in their special approach to assistance to the Pacific. Coordination of aid programs is improving and ADB is requiring the Pacific Island governments to take a more proactive role in aid coordination. Sustainable change must be evolutionary in nature, allowing time for internalization and institutionalization of new modes of behavior and operation. The ADB is willing to commit to program reforms over the longer term. This cannot be overemphasized, for too often in the Pacific, a project upon completion and immediately after the ribbon cutting ceremony, begins to fail due to the lack of a sustainable Water and Wastewater Utility.

Water Demand Management and Conservation

The ADB recently funded a regional technical assistance for "Performance Benchmarking" for Pacific Water Utilities. The Pacific Water Association and its' members consisting of small Pacific Island countries, have adopted the establishment of appropriate operational, institutional, and financial performance evaluation criteria and benchmarks within the utility organization. The technical assistance provided by the ADB is assisting in the development of appropriate regulatory, managerial, and technical services through the consultation between the water utilities within the Pacific region.

The main role of the benchmarking and Performance Indicator project is to provide a management tool for self evaluation for the operators, benchmarking for utilities with similar operating environments, promoting experience sharing between the utilities and documenting and sharing information on emerging best practices and lessons on water supply and wastewater (sanitation). It will also promote accountability and transparency in the operation of the utilities leading to higher efficiency and effectiveness.

The Pacific Water Association was established in recognition that the key to significant progress in water and wastewater service provision rests with the improved performance of the water and wastewater providers, and in realising that well functioning water and wastewater utilities are the best models and providers of help for less experienced ones. Underlying this is the knowledge that not only does the Pacific Island countries provide a range of well functioning utilities but also, to a large degree, holds the key to best practice for application within the region.

One early indicator of the benchmarking exercise clearly identified the problem the water utilities had with managing their water resources. This is a direct result of the leakages in the system, and this large amount of unaccounted for water was included in the amount of finances uncollected. The Pacific Water Association on behalf of its members has stepped forward with this initial action item to be implemented as a direct result of the benchmarking exercise. Specific leak detection equipment and training will be provided to a group of islands

to share in the training and application of the equipment on a full-time basis. The Pacific Water Association will provide the administration and oversight to correctly administer this project along with the continuation of the "Performance Benchmarking" exercise administered formerly by the ADB and continued by the PWA.

SOPAC is the regional leader in this field. The Water Resources Unit of SOPAC previously employed a water supply engineer whose prime responsibility was to improve the capacity of member countries to reduce unaccounted for water, concentrating on technical support and training. However, with only one person, and a limited amount of equipment, there are limitations built in to this very important program.

The Pacific Water Association (PWA) has developed a case study to provide a regional on-going (sustainable) joint project on leak detection.

Leak Detection Program.

It is undeniably true that the nations in the Pacific have any number of problems that only aid programs, from loans to grants, can begin to solve. It is also true that these nations must have the will to solve as many of these problems as they can themselves and be able to reduce their dependence on aid in as many areas as possible. This itself however, requires aid. In the water sector numerous efforts have been made in some countries by aid agencies to reduce Unaccounted for Water by employing contractors who unfortunately often leave little behind other than a completed job, but without training local personnel with the expertise to follow through on what has been done. In other cases many water managers simply throw up their hands and treat UFW as too hard to solve and only ask for more aid to provide greater production capacity, which already leaking systems cannot in any case carry.

One of the biggest obstacles to self-dependence in the Pacific Region is human resources. The Pacific Island nations must have trained and skilled personnel to be able to conduct as many functions as possible in order to achieve a level of self-dependence. The problem with this however is that the island nations with small populations have in many cases very low staffing levels, and these staff are limited in the number of jobs they can do. Consequently, even many routine housekeeping duties done by larger or more affluent water companies, cannot be performed by many Pacific Island water utilities.

In the water sector this often results in high levels of leakage. Obviously, older systems will suffer from higher leakage, but with the exception of aid-funded consultants, little has been done to help utilities in the Pacific region control their own leakage problems. Anecdotal evidence indicates that many consultants involved in leakage related problems seem more interested in proving that renewal of water systems rather than rectification of leakage is necessary, requiring further aid programs. At best, locating leaks without a follow-up to prove the effectiveness of a leakage detection survey is common, as repair crews cannot work fast enough to keep up with the consultants' findings. As leakage reduction and control has to be a long term activity and should be considered as part of good distribution management, short bursts of activity are not likely to produce lasting results because of inevitable system deterioration. Niue working with the engineer from SOPAC developed an effective leak reduction and control program. The Niue Leak Detection case study will discuss the successes and limitations of the program.

This overview "thematic" paper will look at what a truly sustainable Water and Wastewater Utility should look like in the Pacific to protect the Public Health, protect the Environment, and meet the customers needs.

Through a number of consultative meetings both in preparation for the recently developed Regional Wastewater Policy and this Regional Water/Wastewater meeting, the issues, concerns, and constraints that prevent the development of sustainable Water and Wastewater Utilities have been identified.

Measures which might be taken to manage and overcome some of the constraints are developed for both the specific island needs and also at the regional level, along with the development of future actions which would be needed to address the problems of the water sector as a whole.

It is important to state that often it is not the engineering of a water and wastewater project that is lacking. We have the capability and technical expertise to put a man on the moon and bring him back safely. What is important, is the development of affordable and appropriate water and wastewater infrastructure, that can be properly operated and maintained by the local population without expensive consultants, or specialized equipment and training.

A successful sustainable Water and Wastewater Utility is contingent upon its “Capacity Building” efforts, and the appropriate “Technology Transfer” along with the effective use of human, financial, and technical resources

In conclusion, this excerpt from the report, Small States: Meeting Challenges in the Global Economy, 2000. Commonwealth Secretariat/World Bank Joint Task Force on Small States, Washington, DC: World Bank, in a nutshell portrays what makes small states different and seems appropriate to include at this point to set the base line definition.

Developing small states share characteristics that pose special development challenges. They are especially vulnerable to external events, including natural disasters, that cause high volatility in national incomes; many of them are currently facing an uncertain and difficult economic transition in a changing world trade regime; and they suffer from limited capacity in the public and private sectors. More specifically, the following characteristics define the special development challenges and vulnerabilities that many small states face.

- ?? Remoteness and isolation. Of the developing small states, three out of four are islands and in some cases widely dispersed multi-island states; others are landlocked, and some of them located far from major markets. For many small states, like those in the Pacific, high transport costs make it harder for them to turn to world markets to compensate for the drawbacks of the small size of their domestic markets. And small domestic markets combine with large distances from other markets to reduce competition and its spur to efficiency and innovation.
- ?? Openness. A high degree of openness to the rest of the world brings benefits. But it also means that small economies are heavily exposed to events in global markets, and developments in the global trade regime, over which they have little if any influence. They also tend to rely more heavily on taxing imports as a source of revenue, leading to difficulties as tariffs are reduced.
- ?? Susceptibility to natural disasters and environmental change. Most small states are in regions susceptible to natural disasters such as hurricanes, cyclones, droughts, and volcanic eruptions, which typically affect the entire population and economy. Some are threatened by global environmental developments. Since most of such adverse events affect the entire population, risk pooling at the national level is not feasible.
- ?? Limited diversification. Because of their small domestic markets, many small states are necessarily relatively undiversified in their production and exports. Where one dominant activity has declined, it has tended to be replaced with another. This adds to vulnerability to changes in the external environment.
- ?? Limited diversification. Because of their small domestic markets, many small states are necessarily relatively undiversified in their production and exports. Where one dominant activity has declined, it has tended to be replaced with another. This adds to vulnerability to changes in the external environment.
- ?? Poverty. There is some evidence that poverty levels tend to be higher and income distribution more uneven in smaller states. Where this is so, income volatility can create additional hardship as the poor are less able to weather negative shocks to their incomes.
- ?? Limited capacity. While weaknesses in both public and private sector capacity are a key problem for most developing countries, smallness of size adds a further dimension to the challenge. This is compounded in states, like the Pacific islands, where the internal distances are large and the population is scattered. In the public sector, small states face diseconomies of small size in providing public services and in carrying out the business of government, and tend to have relatively larger public sectors than other developing countries. In the context of globalization, small states also find they do not have sufficient institutional capacity to

participate fully in international finance and trade negotiations—the outcomes of which can profoundly affect their economies. In the private sector, lack of diversification and domestic competition can hold back successful development.

Many of these factors combine to make small states' economies especially vulnerable; in particular they affect incomes and access to capital.

?? Income volatility. Overall, the range of per capita income and rate of growth is not significantly different in small and large developing countries. However, the residents of small states experience higher volatility of their incomes—the standard deviation of annual real per capita growth in small states is about 25 percent higher than in large states. This reflects several of the factors listed above—their high levels of exports and imports and low diversification in production and trade, which leaves them exposed to fluctuations in world markets, as well as their susceptibility to natural disasters.

?? Access to external capital. Access to global capital markets is important for small states, and is one way to compensate for adverse shocks and income volatility. But the evidence is that private markets tend to see small states as more risky than larger states; hence spreads are higher and market access more difficult.

2. WHAT SHOULD A SUSTAINABLE WATER AND WASTEWATER UTILITY LOOK LIKE?

Successful Utilities and the Pacific Islands

This chapter is divided into two components. The first is an overview of a model of a successful utility. This is followed by a discussion of how specific Pacific island utilities compare to this model.

Sanitation facilities (water and sewer systems) are installed to protect public health, protect the environment, and satisfy customer needs. One of the keys to the effectiveness of these systems is the management of the organization responsible for the facilities. In this Thematic overview paper this organization is called the utility. The management functions of this utility can be placed into five categories:

- ✍✍ Organizational management
- ✍✍ Planning management
- ✍✍ Personnel management
- ✍✍ Operations management
- ✍✍ Financial management

Utilities may be public, non-profit, or privately owned. Public utilities may be owned by any of the common forms of local governments. In addition, there are a wide variety of organizational structures that could be set-up within the local government to manage the utility. It is the structure of the organization, rather than the ownership that determines the effectiveness of the utility.

Effective utilities share three common key traits. First, they are organized as an enterprise [An enterprise is a public service, often a utility, that is budgeted and operated as though it were a separate business. Typically most, of the costs of providing the utility's services are recovered through user charges rather than subsidies from the General Fund]. Second, there is a single manager responsible for the operation, maintenance, and management of the utility. Third, this manager has a clear vision of the purpose and function of the organization and is able to communicate that vision to staff, customers, vendors, and regulatory agencies.

These three elements are combined in a manner to assure that the utility has the managerial, technical, and financial capacity to protect public health, protect the environment, and meet customer needs.

While all five of the management functions are critical for the successful effectiveness of a utility we commonly start with the organizational management issues. We have observed that utilities that do not have these components in place will fail in their development and implementation of the other four.

Organizational Management Overview

The functions of organization's management can be divided into seven basic sections that provide information on organizational management and administration of the utility. The seven sections are:

- ✍✍ Determining the level of service
- ✍✍ Organizational structure
- ✍✍ Defining key stakeholder roles, responsibilities, authority, and accountability
- ✍✍ Utility rules and regulations (ordinance)
- ✍✍ User agreements
- ✍✍ Workspace management
- ✍✍ Records Management

Level of Service

Level of service must be designed to meet all the utility goals and the needs of the customers. Therefore level of service can be viewed as the goals for the utility. Without first defining the utility goals, it is not possible to design an effective utility organization.

The level of service provided by a utility, controls quantity and quality of service provided by the utility. Level of service includes the frequency that tasks such as utility billing and preventive maintenance are performed, responsiveness of the utility in satisfying customer needs, availability of the operations staff to respond to emergencies, and office hours.

Defining the level of service is a key to determining the cost of operating the utility. In a small utility 70 to 80 percent of the annual operating cost may be labor related. A change in the efficiency and/or frequency of performing tasks can have a significant impact on the cost of providing service.

Organizational Design

The organizational structure is reflected in the organizational chart. Having a clear and well-defined organizational structure clarifies lines of authority and lines of communication.

Developing clarity lines of authority and communication allows the utility to define the roles and responsibilities of each position identified in the organization.

Roles, Responsibilities, Authority, and Accountability

When the organizational structure is clearly defined, each employee and stakeholder has a clear understanding of their individual and collective roles and responsibilities. These roles and responsibilities are based on the position within the organizational structure rather than on the individuals' capabilities.

By clarifying the roles and responsibilities of each position (stakeholder), it is easy to clarify the authority assigned to the position.

Once responsibility and authority have been established, it is possible to clarify how each stakeholder will be held accountable for their individual area(s) of responsibility.

In order to complete all of the activities of a utility, work must be delegated. The lines of authority in the organizational structure clearly define which positions can delegate responsibilities and to whom.

Rules and Regulations (Ordinance)

The utility rules and regulations, often called the utility ordinance, is the most useful and important document in the utility. This document provides the legal authority for the utility to exist and outlines the philosophy and structure of the organization. It provides the rules and regulations that govern and guide the operation and management of the utility.

User Agreements

There are two general agreements between the utility and the customer. One is an application to connect to the utility the second is an agreement describing the responsibilities of both the customer and the utility.

The authority to provide these agreements, as well as the content of the agreements, are described in the utility ordinance.

Administration

A major part of organizing an organization is contained in administrative functions. The procedures and processes used to administer a utility must be consistent with the level of

service and utility operational philosophy as described in the utility ordinance. Administration consists of at least the following:

- ☞☞ Public relations
- ☞☞ Processing of user agreements
- ☞☞ Records management
- ☞☞ Workplace management
- ☞☞ Working with other organizations and agencies

Utilities exist to serve the needs of the customers. When customers do not understand the operation, purpose, and function of a utility, they will not support the utility. In addition, when customers do not feel properly treated, they may rebel by not paying their utility bill on time.

Quality user agreements are a part of providing good customer service. In addition, the processing of these agreements can be impacted by workplace management. This text provides guidelines for establishing and maintaining quality customer communication through the user agreements.

Poor records management practices cost utilities a significant amount of money and lost time. Typically these poor practices are the result of not knowing what records to keep, how to store them, and how they should be organized. This text provides a model record keeping system for a small utility.

Workplace management is the organization and operation of the customer service area, manager, clerk, and operator offices; equipment, tools, and parts storage; and the general day-to-day workings of the utility. This text provides guidelines for how to organize these workplaces.

Successful utilities have positive working relationships with other utilities and regulatory agencies.

Major Considerations

Key Components

What are the key components of an effective utility? Looking at effective and ineffective utilities we can see some differences. The following is a brief description of six of the key differences between successful and unsuccessful utilities.

1. While a utility can be successful when operated as a governmental function, most successful utilities are operated as a semi-independent enterprise (propriety function). Why an enterprise?

Here are five good reasons:

- a.) Enterprise-budgeting, once set up, is much easier than a governmental budget to maintain. Updating the annual budget is easier than updating governmental budgets. Enterprise accounting systems provide the manager with a clearer view of the cost of performing each function of the utility. Revenues remaining at the end of a budget year can be carried forward, thus, removing the end-of-the-year spending frenzies.
- b.) In most cases, a successful utility is managed by a single manager who has a clear view of the purpose and function of the utility and can communicate this to the staff, customers, and regulatory agencies.
- c.) Managers communicate their vision for the utility by paying attention to the details that reinforce their vision. The staff of an organization will respond to what a manager pays attention to. Thus, a manager must pay attention to the details that support his/her vision. A manager must be careful, therefore, what they pay

d.) Successful utilities are focused on meeting the customers' needs. They do this by developing good public relations and customer service systems. These systems allow them to listen clearly to the customer, providing the organization with information about customer satisfaction, wants, and needs. Based on this information, the utility makes necessary changes.

e.) Well managed utilities, are proactive with customers, staff, and regulations. They do not wait for problems to arise before taking action. The utility takes active steps to determine customer needs, staff needs, and the impact of proposed regulations, and then they respond to these needs.

2. Successful utilities are financially stable. They obtain this stability by establishing and maintaining clear financial systems. These include:

- ✂✂ Fair and easy to understand utility rates and charges
- ✂✂ Budgets that are realistic and functional
- ✂✂ Accounting procedures that allow the utility to determine the cost of providing service to each customer class
- ✂✂ Adequate reserve funds
- ✂✂ Proper planning procedures that focus the utility on meeting future customer needs
- ✂✂ Effective customer accounting and collection procedures
- ✂✂ Management and planning that deals effectively with regulatory demands and their costs

3. Successful utilities use written guidelines for the management and operation of the utility. These guidelines are based on the utility ordinance and include every major aspect of the utility from personnel to finances.

4. Well run, and successful utilities typically have a single central office where the customer can make applications for new service, obtain information about the utility, register a complaint, or pay a bill. In addition, this office provides a central dispatch for all routine and emergency maintenance crews.

5. Well run and successful utilities have a viable maintenance management system that includes: asset management, work orders, preventive maintenance scheduling, consumable and spare parts inventory control, routine data collection, data analysis, and reporting. The asset management system includes current value, replacement value, and life expectancy for all assets.

Separate crews are responsible for new construction, preventive maintenance, and repair. (In a small organization, crews may be assigned preventive maintenance on specific days, repair on specific days, and new service installation on specific days. However, those functions should be performed by separate crews if possible.) This allows each crew to develop the necessary skills and prevents repair and new construction from diluting preventive maintenance.

In these organizations preventive maintenance and routine operations account for 80% of the labor requirements while emergency repairs account for not more than 20% of the labor requirements (excluding new construction).

These crews, to be successful, must have the proper tools and required spare parts.

To protect the health and safety of the workers a viable safety program is an integral part of any successful utility.

6. In successful run utilities, training and skill needs are identified and an action plan is in place to provide all necessary skills. In these organizations training is not an additional activity it is part of the job.

The Model and the Pacific Islands

For the last eight years, we have been involved in assisting utilities in the Pacific islands in the improvement of their utilities. As a result we believe we have a perspective on how these utilities compare to the model. While we will not relate information about specific utilities the utilities referenced include those located on, American Samoa, Majuro, Kosrae, Pohnpei, Chuuk, Saipan, Yap, and Palau.

The following is a discussion of how these utilities compare to the model and our observations of the results of not following the model.

In the beginning of this project each and every manager requested assistance in one or more of the following areas; operator certification, operator skills, and implementation of a preventive maintenance program. While these are all valid request they did not in any case address the true and immediate need of the utility. This is an excellent example of the manager paying attention to the wrong area.

While most managers of the above utilities believe their staff needs technical skill training we found that most of the issues associated with dysfunctional utilities or departments within the utilities were management problems not operator technical skill problems. Here are some supporting thoughts.

Overview of Utilities. There are eight utilities involved in this review. Of these two are of significant size, that are serving populations of 40,000 or more. Two are government operation (they do not utilize the enterprise model), one of which serves a very small customer and has no operation budget (less than \$2000 US for the year). The second servers a much larger customer base and is very dysfunctional.

In only three of the eight is the water considered potable. Due to high chloride levels in one, significant sanitary deficiencies in a second, and questionable water treatment process controls in the third I recommend bottled water be used by visitors to these three as well as all of the others. In addition, two of the remaining five utilities do not provide 24/7 water.

General Considerations. In most cases these eight utilities fail to meet the model in the following area:

- ✂✂ In at least one utility there is no attempt to provide potable water. The customers do not demand potable water and in fact obtain most of their drinking water from roof catchment systems. In additional, due to the low level of income on the island, the customers have no interest in paying for service.
- ✂✂ There is little or no interest in meeting customer demands. The focus is on the needs of the utility not the needs of the customer.
- ✂✂ With minor exceptions, these utilities are not proactive in their approach to regulations, meeting staff needs, or meeting customer needs. A part of this is due to the lack of enforcement of existing regulations and in some cases the lack of regulations. Regulations or not, a prudent manager would focus attention on providing potable water.
- ✂✂ Only two of the eight utilities are financially stable. One other is in good shape and the remaining struggle on a monthly basis. In many cases, customers are allowed to get months behind in payment of their bills. Political influence and personal biases prevent adequate collection rates. In some of these utilities the collection rate is less than 50%. In one it is 104%, which of course is the exception.
- ✂✂ Written guidelines do not exist in most of the utilities for key components. Lacking in most are personnel policies, annual operations plans, utility master plans, renewal and replacement plans, capital improvement plans, accounting procedures, and budgeting. While some of the utilities have good examples of one or more of these written guidelines none of them have them all.
- ✂✂ A central office exist in six of the eight utilities.
- ✂✂ A functioning maintenance management system that includes asset management, work orders, and preventive maintenance scheduling does not exist at any of these

utilities. However, the preventive maintenance scheduling is being utilized by three of the eight utilities. A functioning work order system is being utilized by one utility. Asset management is 70 to 80% implemented at one utility.

- ✘✘ Only one division of one utility utilizes designated crews for operations & preventive maintenance, repair, and construction. It turns out this is the most effective component of all of the utilities.
- ✘✘ Only one utility has an active safety program. This program is approximately 70% complete and is actively applied to only one division of the utility.
- ✘✘ Skill training for all staff is not designed into the personnel advancement program at any of the utilities. However, one utility is in the process of implementing this concept. In addition, most managers do not expect or require staff to implement the skills and knowledge gained in training. Training is looked upon as a benefit. When the participant returns to the job they are expected to go back to doing things in the same way they were before the training. Thus there is no benefit to the utility or the staff.

Organizational Structure. While all of the utilities have some type of organizational structure, they are all lacking defined roles, responsibilities, and authority for each position. This lack of clear definition of responsibilities and authority, causes a number of problems, among them are the following:

- ✘✘ Supervisors fail to discipline employees for violation of work rules. This is due to lack of clarity of the work rules and the lack of understanding by the supervisor of their responsibility in discipline. In addition, most supervisors have had little or no training in how to properly administer discipline.
- ✘✘ Required spare parts are not on-hand because those in charge do not know who is responsible for obtaining the parts. In most cases, the utility is able to respond to an emergency by air shipment of parts at increased shipping cost.
- ✘✘ In one case a staff of 30 to 40 has three to four managers. Each gives daily direction, which often conflict. This results in staff confusion. In addition, these conflicting managers do not agree on priorities and often pull staff from a previously assigned crew to work on an entirely different project.

In one case, where the utility is operated by the government, the organizational structure is so confused as to be a major influence on the very poor effectiveness of the utility. For example, to obtain a new service connection requires the customer to find a specific person, to start the sequence of events and then travel to three different offices seeking a specific person in each. The individual in each of these offices, reports to different departments of the government.

Management Focus. Organizations develop organizational cultures. The organizational culture development is a direct result of the attention, or lack of attention the manager pays to the details of the day-to-day operation of the utility. Thus it is important that a manager be careful about what they pay attention to. They should pay attention to those items that reinforce the vision the manager has for the utility. Thus, if the manager does not have a clear vision they cannot determine which items to pay attention to.

When reviewing these eight utilities and observing the manager it is clear that the utility takes on the personality of the manager. If the manager practices a high degree of integrity then all is well. However, if the manager uses the utility for personal gain the staff responds in a similar manner. Simple actions such as not coming to work on time, using the utility equipment for personal use, excessive travel, routinely over indulging in alcoholic beverage, can be the most damaging. The staff will look upon these actions as being supported and approved by the utility.

When managers do not provide direction for the utility it, the utility, will seek its own direction. Most of the time this is not a good direction to be heading. In most of the Pacific island utilities we have worked with, the managers pay very little attention to the water and sewer division. This is partly due to the fact that most of the managers were hired because of their electrical experience and they have very little understanding or appreciation for the public health aspects of the water and sewer utilities. This is the case in all but one of the non-government run utilities. This has resulted in the hiring by the manager of a division or department

manager to run the water and sewer utility who has very limited technical knowledge. The result is an ineffective utility and considerable personnel dissatisfaction resulting in poor operations and poor maintenance of the utility assets.

Crews. All but one department of one utility functions in a crises management mode. In this mode, crew assignments are made daily, and often changed during the day. In many cases the crews are not able to complete the tasks assigned due to the lack of tools, parts, staff, or equipment.

The idea of the same crew routinely inspecting the facilities of the utility is such a foreign idea that it is very difficult to implement. Responding to problems, and building new facilities gets more management attention, funding, and positive feedback. Thus, it becomes the organizational culture. The result is a continuous deterioration of the utilities assets with more and more failures. This continues until the deteriorated facility is replaced and then the cycle starts all over. This is very evident when viewing some of the recently completed ADB projects. Keeping the poor design, selection of improper equipment and lack of involvement of the local staff out of the picture we still observe a rapid deterioration of these new assets due to the lack of routine inspection and preventive maintenance.

In some cases we have been told that the equipment has not given any trouble since it was replaced. This is true of most new equipment for the first three to five years of its life then it begins to fall apart due to the lack of routine preventive maintenance.

Tools, Parts, Communication, and Transportation. The lack of needed spare parts and tools are one of the most common and most severe departures from the model. This contributes to the lack of maintenance, failure of equipment, robbing one asset to make another one function, and the inability to apply skill training to the job.

To assist reducing the impact, the lack of tools had on training, the Micronesia Water and Wastewater program provided tools to six of the eight utilities. The other two were considered large enough to be able to furnish their own tools. After four years the tools have disappeared in three of the utilities. They can all be found in the one island, where the tools were given to a local community college. In one utility the manager purchased several sets of the tools, one for each crew. In this instance the tools issued to individuals are still available. However, the tools issued to the utility cannot be found. We concluded that when no one is responsible the tools will disappear.

While most of the utilities have parts to fix line breaks and make major system repairs, all but one lacks the repair kits needed to perform preventive maintenance on key equipment such as chlorinators, altitude valves, and fire hydrants. This lack of repair parts has been a major roadblock to the application of training and technical assistance.

In addition, many of these utilities lack sufficient vehicles for the field staff. In one case a staff of 16 is required to share two vehicles in an attempt to inspect and maintain over 45 lift stations. Add to this the lack of internal communications between the field crews and the crews and a central office. One utility utilizes cell phones as a means of communication. While this appears progressive, each crew must be called individually. With a radio system multiple crews can be summand from a single command point.

The Conclusion. After five years of activity in Micronesia and seven years in American Samoa, a number of problems have been resolved and there are measurable improvements in all of the utilities.

In order for any technical assistance and/or training program to be the catalyst for significant improvements in these utilities the utility managers must be willing to change they way the operate their utilities. If the managers and staff are happy with the current status of the utility then providing technical assistance, grants for construction, and/or training will not make a long term significant positive impact on what quality and thus on public health.

The lack of support by the public health agencies and the lack of enforcement of existing water quality regulations also sends a message to the managers of these utilities that there is no problem and thus change is not needed.

3. SUMMARY OF ISSUES, CONCERNS, AND CONSTRAINTS

Consultation

Over the last couple of decades dating from the water decade, there has been greater attention paid by International Forums, Regional organizations, NGO's, and government agencies to the issues of Water Resources, and Water Pollution. One of these efforts by the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) identified the priority for action on sewage. In the Pacific region, a consultation process was facilitated by SOPAC, SPREP, PWA and the UNEP/GPA Coordination Office on wastewater management.

A Regional Wastewater Management Meeting was held 10-15 October 2001 in Majuro, Republic of Marshall Islands and was the latest in the consultation process, which included preliminary sessions in February and March 2001 in Auckland and Apia. The Majuro meeting was sponsored by the Governments of Belgium, New Zealand and Taiwan/ROC.

The meeting brought together representatives from 15 Pacific Island countries (American Samoa, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, New Zealand, Niue, Papua New Guinea, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu), technical experts from inside and outside the region, regional and international organisations (SOPAC, SPREP, SPC, PWA, WHO, UNESCO, UNEP/GPA), potential donors and NGO's, to complete the Pacific Wastewater Policy Statement and the Pacific Wastewater Framework for Action. Both documents were submitted to governing bodies of regional organisations for their endorsement by the respective governing council national representatives.

The Pacific Wastewater Policy Statement sets out a framework of guiding principles and policies to guide future development and co-operation by the Pacific Island Countries (PICs). The Pacific Wastewater Framework for Action comprises a list of proposed actions to be undertaken at national and regional levels to achieve the goals that are laid out in the Pacific Wastewater Policy Statement and which refers to the GPA Strategic Action Plan and Guidance Document on Wastewater (UNEP/GPA, WHO, UNCHS-Habitat & WSSCC).

In the opening statement by the Hon. Tadashi Lometo, Acting Ministry of Health and Environment at the Regional Meeting for Stakeholders in Wastewater Management in Majuro, he stated that:

"Wastewater management is one of the more pressing concerns of each of our countries as we are faced with the challenge of meeting the demands of a wide variety of economic and development activities, while at the same time, taking into careful consideration the potential adverse effects of such activities on the well being of our people and environment."

"...a very important issue that the Marshall Islands constantly battles is sewage problems. It has been indicated in studies that sewage is a major source of pollution in almost every country in the Pacific, affecting the marine, coastal and freshwater environments. And this serious matter has "pooled" us together in cooperation with our regional organizations such as SOP AC and SPREP, as well as international initiatives like the Global Program of Action, to find ways to improve and enhance the situation. Our difficulties in dealing with the issue arise from problems such as economies shaped by distance and isolation, a shortage of fresh water, cultural sensitivities and financial issues..."

"In this regard, wastewater management is an essential issue that needs decisive steps for improvements. We need to develop or strengthen policies and measures that will stimulate further improvements and understanding."

"In addition, the health of our people is considerably dependent on the issue at hand. Poor wastewater disposal contributes to both water resource pollution and seafood

contamination. Therefore, new initiatives must be taken in addition to institutions already in place. Long term national and regional policy framework to move towards zero sewage problems must be created to achieve sustainable development."

"Our goal is to work together to ensure a speedy process that will produce a Regional Wastewater Action Plan that is tailored to the special needs of each of our countries, while at the same time reflecting our unique ability to come together as one "Pacific Family" in the spirit of promoting regional coordination and cooperation."

Russell Howorth, Program Manager for the South Pacific Applied Geoscience Commission (SOPAC) also at the Regional Meeting for Stakeholders in Wastewater Management shared these opening remarks with all the meeting organizations from off island. He thanked the CROP regional organisations, SOPAC, SPREP and SPC, and the utilities group PWA who provided regional technical support and advice on wastewater and waste to Pacific Island Countries. The UNEP Global Programme for Action for the Protection of the Marine Environment from Land-Based Activities, GPA for short, who had provided the framework for strategic action plans to be developed at a regional level.

Russell noted that the Majuro meeting represented the latest chapter in the regional consultation process involving the Pacific Island member countries of both SOPAC and SPREP, resource persons from Fiji, Australia, New Zealand and the USA, and the technical staff of both agencies. Preliminary consultations in New Zealand and Samoa earlier in the year had developed the groundwork upon which the Majuro meeting was based. Working groups consisting of Pacific Island delegates in conjunction with SOPAC, SPREP and a wide variety of resource persons had identified the constraints facing sustainable wastewater management and developed initial responses.

It was now the responsibility of the delegates in Majuro, to finalise and endorse a regional policy on wastewater management and develop a strategic action plan to focus regional, national and local activities. Russell acknowledged that there were many hours that many of the delegates had spent on the task of developing the draft texts, during the previous 10 months and that all of the Pacific Island Countries and Organisations represented in Majuro had given of their free time to be there. In conclusion, the local Pacific Island governments and organisations had expressed their commitment to the task before the Majuro meeting by directly contributing to the total funding of the process, along with the supporting generous direct financial support shared by Belgium, New Zealand and Taiwan ROC.

The results of that Majuro meeting were in fact the development and the endorsement of a regional approach towards the sustainable management of wastewater through an appropriate set of recommendations and actions, which are included later in this paper.

Although the Hon. Tadashi Lometo, and Russell Howorth were specifically addressing Wastewater at the Regional Meeting, the same constraints, concerns, limitations, issues, and proposed actions which will be discussed at this Regional meeting apply equally to Water.

The consultative approach was continued and used extensively in preparation for this Pacific Regional Consultation on Water in Small Island Countries. At the recent Pacific Water Association, Annual General Meeting in Port Vila, Vanuatu in April, 2002. SOPAC facilitated a day session with phenomenal feedback and participation from the utilities in attendance that identified the following constraints which limited the ability of organizations to be successful providers of Urban Water and Wastewater services to their customers. These constraints are identical to those constraints identified during the Wastewater Regional Meeting.

In January/February, 2002 also in Port Vila, Vanuatu, the ADB "Planning Meeting for Water in Small Island Countries Theme" in preparation for the 3rd World Water Forum identified similar constraints.

Constraints, Concerns, Issues

The consultative process has identified the following national constraints to achieving sustainable Water and Wastewater management. These constraints are not specific to these two sectors and are true of most sectors functioning in the Pacific. The constraints can broadly be divided into three groups: Institutional capacity of national agencies; governmental support; and public support.

- ?? Insufficient institutional capacity: lack of data & information systems; insufficient or inoperative equipment; poor maintenance of equipment, limited technical expertise; weak institutional bodies; often demoralized and unmotivated staff; insufficient training opportunities; poor staff retention; lack of finances; lack of a single manager responsible for all aspects of the utility including: planning, construction; operations, maintenance, management, and financial management. The Manager lack a Vision and is unable to articulate a clear vision to the staff; high cost of service; water quality; water conservation; poor public relations; No value given to water (meter) or the establishment of a proper tariff .
- ?? Lack of Government Support : lack of political will but often too much unwanted political interference; legislation inappropriate or absent; lack of regulation and no capacity for enforcement, often no coherent national policies on integrated water resource management; land issues; fragmented multiple government agency involvement resulting in poor regulatory or policy links between the various sectors, often inadequate share of the National annual budget and conflict between public service and sustainable utility; political instability, lack of national long term planning and commitment, No value given to water (meter) or the establishment of a proper tariff.
- ?? Insufficient public support: inadequate public awareness; insufficient community participation and involvement; and associated lack of appreciation of socio-cultural issues.

Additionally, the Pacific Island countries environment itself (outside of the national capacity) often results in further constraints due to the isolated and fragmented nature of multiple island states within a vast ocean expanse. These are common to most countries in the region.

These regional constraints include: restricted land area; competing land uses; small population base; increasing population density on "capital" islands, and de-population on outer islands; isolated communities; high transport costs; limited economic development (above factors unattractive to industry); limited tax revenue generation; poor and costly communication, electricity, and water supply systems (Due to low economies of scale); high vulnerability to natural disasters; climate variability, El Niño-Southern Oscillation (ENSO) and sea level rise issues; and lack of coordination between donors (unreasonable donor restraints), international organizations, and receiving countries.

Other National and External Constraints which Hamper Sustainable Management of Water and Wastewater Utilities!

Environmental problems are increasing. Several factors such as high population growth, poverty, urbanization, economic growth and the use of imported inappropriate technologies are creating environmental problems. Partly as a result of these pressures, traditional ways of managing the environment are now disappearing. Some pressing concerns include contamination of water resources, rapid deforestation, unsustainable and destructive exploitation of marine and mineral resources, poor waste management, inadequate sanitation, and urban pollution. In addition, the Pacific Region include many small-island countries with vast geographic, ecological, and sociocultural diversity. The smaller the islands, the more immediate and severe are the consequences of inadequate environmental management and the greater the risks of cumulative collapse or catastrophic damage from climatic events. The most crucial environmental issues are in the areas of (i) natural resource conservation, (ii) waste disposal/management and pollution prevention, and (iii) climate change and sea level rise.

Natural resource conservation must become a priority. Pacific island people rely on natural resources to meet their traditional needs and increasingly to generate cash income, e.g., tourism. Rising material expectations and, in many cases, high population growth are placing considerable pressure on the limited land and coastal marine ecosystems and the biodiversity they contain. The Pacific Island countries have high levels of species diversity that is among the most threatened in the world. Poor natural resource management, and poorly planned and implemented development projects and programs, (including improperly operated and maintained infrastructure development for water and wastewater activities) are depleting and compromising the natural resource base.

Waste management and pollution prevention are becoming increasingly important priorities. Many Pacific Island countries share the problems of waste disposal and urban pollution. High population growth, particularly in urban areas, combined with limited land area and specific programs to stimulate economic growth are exacerbating these problems. Disposal of solid waste is a particular problem in very small islands where there is no space or infrastructure for safe disposal. Even in the larger islands recycling is rare, and most disposal is done through landfill. Wastewater pollution is also increasing with negative impacts on freshwater systems, enclosed coastal waters, aquifers, and groundwater lenses. Human sewage disposal is also a major problem and poses serious risks to human health and inshore fisheries.

Climate change and sea level rise remain major potential problems. The majority of the Pacific peoples live in low-lying coastal areas that are particularly vulnerable to climate change, climate variability, and sea-level rise. The increased frequency and intensity of storms and cyclones, combined with even minor increases in sea level may cause major disruption to economic and social life, and even threaten the very existence of these countries, particularly the atoll nations. One very serious effect of a rising sea level would be its impact on freshwater lenses underlying atolls. The risk of saltwater intrusion will rise as the sea level rises, lateral leakage will increase, the groundwater lenses will become thinner, and saltwater will move within reach of pump intakes. Limited freshwater resources will be lost or at grave risk. In addition, as the sea level rises, saltwater will reach the roots of pit-grown taro, coconut palms, and other tree crops with clear negative effects on their production.

Political stability is perhaps the most significant factor currently influencing water and wastewater development projects. A variety of recent events have underscored the importance of political stability. Recent political changes in the Cook Islands and Vanuatu indicate the need for reform governments to be far more inclusive and participatory in their reform initiatives, thus ensuring that the momentum of reform continues despite changes in government. Political upheavals in the Fiji Islands and the Solomon Islands point to the need for governments to be more sensitive and responsive to growing inequities between various segments of society. In fact, in a span of 12 months, 7 of the 12 Pacific Island countries have had changes in government. The volatility of political changes in the Pacific appears endemic and must be taken account of when working with governments to plan and implement reform and development strategies.

Good governance also significantly influences the achievement of developing sustainable water and wastewater goals and objectives in the Pacific. A good example of early benefits of good governance policies is the recent case of PNG. With the adoption of a strong governance reform agenda by the new Government in late 1999, and supported by multilateral and bilateral development institutions, PNG has quickly managed to substantially reverse its fast-declining economic performance, and substantially improve its access to international finance. This is a clear signal to Pacific governments to become more transparent and disciplined in the management of their financial sectors.

The shortage of managerial and technical skills is a major development constraint. The human resources and institutional capacity in the Water and Wastewater Utilities, specifically, and in the Pacific Island countries generally, remain extremely weak, which is in large measure caused by the small labor market and limited local education opportunities. Weak human and institutional capacities are perhaps the most significant stumbling block to achieving not only sustainable water and wastewater utilities, but efficient social and economic

systems. Weaknesses range from the weak capacities of parliaments to debate policy issues and to effectively oversee government administration, to the limited professionalism of the civil service, the weak capacity of sectoral agencies to regulate and manage critical public services, and the ability of the private sector to engage the necessary business and technical skills. The shortage of skills in the smallest and remotest Pacific Island countries is to be expected, and there is no easy solution. However, while much effort has been expended in building skills in the larger Pacific Island countries such as the Fiji Islands and the Melanesian countries, durable capacity is still lacking. The important lesson from capacity building efforts in the Pacific so far is that it is a long-term task requiring sustained attention and investments. There are serious risks in being overly ambitious, given the weak base in most countries.

To some extent, providers of external assistance have contributed to the problem of low capacity. Multilateral and bilateral donors design complex projects and programs, and then field a battery of consultants to implement these because local capacity cannot cope. Capacity building programs are often resourced by long-term consultants who often are technical rather than capacity building specialists, and who end up doing the work themselves rather than transferring skills. Governments compound the problem by not adhering to a policy that allows trained incumbents to stay in place over an adequate period of time to have an impact on institutional operations. Finally, while bilateral programs have devoted much investment to overseas education and training, these programs are plagued by the consequent emigration of trainees, seeking more attractive overseas employment.

Many Pacific cultures are substantially tribal based, adhering to a value system that elevates tribal and family allegiances above all else. While this value system has served the Pacific people well over time, it also influences the water and wastewater utilities in particular ways as they modernize and adopt global trends. The tribal system influences the stability of management (particularly when managers are selected not on the basis of policy mandates or knowledge, but on tribal allegiances), the openness of governments to external investments, the ability of external investors to access land for commercial operations, the capacity of indigenous entrepreneurs to initiate and manage successful businesses while coping with extended family demands, and the ability of staff to reliably give time to employment rather than family matters.

Access to land, so critical to private investment, is substantially influenced by local custom. Most land remains under complex traditional ownership structures that do not provide formal ownership but provide access to land for family and community members. This prevents the use of land for developing water and wastewater projects without paying a high price for the use of the land. However, with rural populations growing there is not enough available land for subsistence living. Rural people need to move into the cash economy and to bring customary lands into the cash economy.

The influence of cultural traditions must be considered seriously when designing development strategies. It is not suggested here that there should be a concerted effort to change these sociocultural traditions. Many traditions are extremely valuable even from an economic point of view, particularly to protect natural resources and provide social security safety nets. Their influence in addressing the major development challenges are real and significant. This needs to be recognized in the development of strategic approaches to water and wastewater developments in the Pacific Island countries.

The rate of population growth continues to be worrisome. In most Pacific Island countries, improved health conditions have added to longevity. Populations in Melanesia and parts of Micronesia continue to grow rapidly because of high fertility. For instance, the growth rate of the RMI is 3.6 percent and that of the Solomon Islands is 3.3 percent. In most of Polynesia, (although population birth rates are high) population growth remains largely stable reflecting substantial migration to New Zealand, Australia, and the United States.

The single biggest challenge is to generate wage- and income-earning opportunities for rapidly growing labor forces. Given no expansion in public sector employment, and the inability of the private sector to absorb new labor force entrants, current population growth rates will result in ever-increasing levels of unemployment. This in turn will have adverse

impacts on poverty levels as is already happening in the RMI and the Solomon Islands, and is beginning to occur in PNG. This migration into more populated urban centers for employment opportunities, places a burden on the water and wastewater utilities need to continually develop resources to serve the growing population.

At the root of the population problem is the inability of education services to reach out to the people, particularly the women. This is particularly the case in Melanesia and Micronesia. Admittedly, providing the necessary education services, particularly to females in the rural areas, is not easy. Government budgets continue to be strained. The capacity of education agencies is weak. The topography of many Pacific Island countries makes the task doubly difficult. NGOs do play an important role, but their number and resources in the Pacific Island countries remain seriously limited. Government commitment to this problem and innovative methods and approaches are urgently needed if population growth is to be addressed.

Physical, Technological, and Financial Infrastructure

Undeveloped infrastructure severely constrains economic development. Combined with remoteness and high transportation costs, undeveloped water and wastewater utilities, and other infrastructure ranging from roads, ports, wharves, navigation aids, power generation and distribution, and telecommunications, remains a significant constraint to both external and internal investments in most Pacific Island countries. Often productivity is low, and in many cases the rich natural resources of the Pacific Island countries cannot be exploited due to the lack of efficient access. Where infrastructure has been built, often this infrastructure is not maintained because skills or public finance is lacking. Thus, future efforts to improve infrastructure must take account of skill and financial capacity to maintain the same.

There are opportunities for Pacific Island countries to harness Information Technology (IT) to overcome some of the economic constraints and vulnerability related to their isolation and smallness. An important development worldwide is the availability of new and powerful IT. While there is the threat that Pacific Island countries may be largely excluded from the economic gains enjoyed by participants in the new information-knowledge society, IT has the potential to increase the size of markets, reduce the costs of distance, enable access to sources of learning and advice, and bring jobs to skilled people even in remote locations. Of particular relevance to small states is the fact that the IT industry generally does not require much land and has low environmental impact. To enable Pacific Island countries to bridge the so-called digital divide, they will need, at a minimum, to improve and expand their infrastructure for IT, set-up appropriate regulatory regimes, and enhance computer literacy. The potential for the water and wastewater utilities to benefit from the development of IT, is the opportunity to generate information from around the globe, and access information that is currently not available.

Undeveloped financial sector infrastructure remains a major disincentive to financial investment in the Pacific Island countries. The financial sectors of the Pacific Island countries are dominated by a few foreign-owned banks that concentrate their operations in the urban areas, are extremely risk averse, and have no interest in servicing the rural areas where the bulk of the population resides. A local capital market does not exist for all practical purposes. The financial investment into the development of the water and wastewater utilities is considered too risky, so that local financial resources and investments are not a viable option.

Are the constraints in achieving sustainable services – new?

The issues that have prevented water and wastewater utilities from being sustainable are not new. They are recognized and have been around for some time.

Ten years ago when Tony Falkland published the UNESCO report entitled “Small Tropical Islands – Water Resources of Paradises Lost”, printed in May 1992, it clearly identified Major issues and problems relating to Water Resource Development and Management. He identified the following problems of water administration, and I quote:

“On many small islands, the water resources are administered either by a governmental department concerned with much broader responsibilities or by a number of departments. Inevitably, there is intense competition for the very scarce funds and manpower. (This phenomenon, however, is not unique to small island communities.) Such a fragmentation of responsibility among a number of organizations also can lead to long delays in reaching decisions which may not necessarily be based on sound technical or economic grounds.”

“There also is often insufficient expertise to properly administer the many-faceted functions of a water supply utility, regardless of how small it may be. This problem is due to insufficient training, inadequate resources – particularly funds for operation and maintenance tasks - - and inappropriate technology.”

“Often there is little or no co-ordination between a multiplicity of agencies including water and health authorities, non-government organizations, bilateral and international aid agencies and United Nations organizations.”

“Difficulties of transport and communications due to large distances from supply and information sources are common. This often results in long delays in obtaining necessary supplies. Large distances between islands of an archipelago add to this problem.”

“Reliance, in many cases, on short-term expatriate advisory and management staff often leads to lack of continuity in projects, with a consequent wastage of resources and inefficiency.”

“There is often incompatibility of materials and equipment supplied from different sources. This is especially true for the many islands in developing countries where project assistance is obtained from different aid donors. The problem is made worse if aid donors have conditions requiring the purchase of materials and equipment from the donor country.”

“The largely unskilled work-forces on many small islands can result in water development and water supply projects not being operated and maintained correctly.”

This very nicely sums up a number of issues which contribute to Pacific Island Water and Wastewater Utilities being less than successful in their ability to provide 24 hours-7 days a week of potable water to their customers, while protecting the environment and improving Public Health.

4. MEASURES TAKEN TO MANAGE WATER AND WASTEWATER UTILITIES

During the consultative process, after the constraints were identified, appropriate measures and actions that might improve the service delivery and reliability of water and wastewater utilities were suggested and perhaps if appropriate will be developed.

1. Political will and financial affordability are prerequisites for adequate water and wastewater management.
2. Environment, health and economy are important indicators for action.
3. Stepwise implementation of measures is essential to reach long-term management goals.
4. Demand driven analyses and prognoses are to be adopted to ensure effective investments.
5. Sustainable solutions for wastewater management build upon pollution prevention at the source, efficient water management built upon use and best available technologies, addressing economic aspects, social aspects and low-cost alternatives when appropriate.
6. 'Water User Pays' and 'Polluter Pays' are basic principles to consider.
7. National and local governments are to take their responsibility in creating an enabling environment for sustainable solutions.
8. Commitment and involvement of all stakeholders are to be assured from the start.
9. Public Private Partnerships and other new financial mechanisms are to be explored.
10. Linking municipal water and wastewater management systems to other sectors, for example tourism, ensures better opportunities for adequate cost-recovery. Rates are to be established solidarity wise and at social equity.
11. Innovative alternatives and integrated solutions are to be fully explored before final decisions on action are taken.
12. Water and wastewater utilities can only become truly sustainable when they have developed within the organization, the capacity building of human resources to provide the necessary skills, which are locally unavailable.

Some Key Measures on the Management of Urban Water and Wastewater:		
1	Political will and financial affordability are pre-requisites for adequate water and wastewater management	In order to safeguard human and ecosystem health, and to avoid the degradation of water quality and other coastal and marine resources, the two most important pre-requisites for adequate water and wastewater management are: i) The political will to assign a high priority to wastewater management among other pressing public investment needs, ii) Financial affordability.
2	Environment, health and economy are important indicators for action	Human health, economic functions and environmental integrity within the catchments are all essential indicators and driving forces for adequate urban water and wastewater management. The non-action alternative imposes great costs on current and future generations.
3	Stepwise implementation of measures is essential to reach long-term management goals	Long-term management objectives direct the priorities of issues and measures to be explored. However, stepwise implementation of measures may be needed to address the needs identified

		in an affordable way. Immediate small-scale, site-specific solutions, following realistic timeframes, may be preferred above holistic planning efforts to actually serve the long-term management goals.
4	Demand driven analyses and prognoses are to be adopted to ensure accurate investments	Rather than supply driven investments, demand driven approaches give 'value for money'. Demand driven approaches need proper analyses of the societal demands now and in the near future.
5	Sustainable solutions for water and wastewater management build upon pollution prevention at the source, efficient water use and best available technologies, addressing economic aspects, social aspects and low-cost alternatives when appropriate.	The high costs of water and wastewater management warrants a very careful search for low-cost and thus more sustainable technologies and approaches that target waste prevention and minimization, pre-treatment water conservation, and the efficient use of water. More cost-effective technologies comprise e.g. lagoons, natural systems, anaerobic treatment and potential for re-use instead of costly high-tech wastewater treatment plants.
6	'Water User Pays' and 'Polluter Pays' are basic principles to consider	The principles "the water user pays" and "the polluter pays" are basic to achieve sustainable water and wastewater management systems. These principles can very well be applied in a way to ensure equitable sharing of costs by the rich and the poor.
7	National and local governments are to take their responsibility in creating an enabling environment for sustainable solutions	A country's central government plays a significant role as a facilitator and initiator of appropriate water and wastewater management in developing systems to ensure good and sustainable governance.
8	Commitment and involvement of all stakeholders are to be assured from the start	Water and wastewater management is pre-eminently an effort that involves many stakeholders (governmental and non-governmental) who all must be willing to co-operate and contribute to the overall result. Thus, the investment in awareness creation, demonstration of "win-win" situations and development of commitment are essential to foster successful water and wastewater management. In many countries, however, institutional restructuring and strengthening (capacity building) at the local level is required to ensure the good performance of water and wastewater management systems.
9	Public Private Partnerships and other new financial mechanisms are to be explored	New partnerships between the public sector and the private sector are important options and useful tools to assist local governments in financing and operating the infrastructure for water and wastewater management. To improve managerial performance, to find synergy and to get access to additional investment capital, often first an adequate regulation is required to avoid negative consequences.

10	Linking municipal water and wastewater management systems to other sectors, for example, tourism, ensures better opportunities for adequate cost-recovery.	Water supply, and sustainable wastewater management systems require very high initial investments and, consequently, long term contracts to cover financial risks and sufficient recovery of costs. As profits are likely to be more prominent in other sectors, linking up to these reduces the risks involved and thus enhances the feasibility of new, prospective partnerships.
11	Innovative alternatives and integrated solutions are to be fully explored before final decisions on action are taken	Comprehensive stepwise approaches in decision-making on urban water and wastewater management are needed to explore alternatives before making final decisions on action. This should support adequate, tailor made and cost-effective measures, integrated with other sectors such as water resources and urban and rural planning in catchments, as domestic water and wastewater management are not an isolated problem.
12	Water and wastewater utilities can only become truly sustainable when they have developed within the organization, the capacity building of human resources to provide the necessary skills, which are locally unavailable.	Utilities have a critical need for suitably trained professional and technical staff. These high level professionals are required for the proper, safe and efficient operation of water, and wastewater services. National or Donor requirements also may require personnel with certified professional credentials in a number of key positions to protect public health and safety. All such positions require specialized education, a supervised internship, and some type of professional license. This type of professional certification can only be obtained through recognized academic and professional training programs.

A Pacific Island Example of Human Resource Investment in developing local staff

ASPA Professional Training and Apprenticeship Program

Brief Program Description

This is a personnel development program designed to improve ASPA's long term capacity in critical O & M areas. ASPA currently has a shortage of high level professionals in a number of technical areas. This program will provide education and professional certification for selected personnel in areas of critical need. These include engineers, water treatment plant operators, electricians, linemen, and others.

The program will enable selected employees to obtain professional license or certification in specific technical fields. They will attend appropriate education or technical training schools, as well as complete apprenticeship or internships requirements, necessary for certification.

The training institutions and courses of study are chosen based on ASPA's needs. They are selected to provide ASPA with essential expertise it currently lacks in areas critical to its operation. In addition, the program will help provide staff with the **necessary professional credentials required by Federal regulations for a number of positions.**

Program participants will be selected among current employees, whenever possible, who have demonstrated sufficient intelligence and dedication to excel at the profession. They will provide ASPA with a potential pool of engineers and technical specialist well into the future. Thus, the program is a long term investment in ASPA's future.

The Need

ASPA has a critical need for high level professional employees. These include engineers, treatment plant operators, electricians, computer network specialists, and certified linemen. The requirements of utility operations, as well as compliance with U.S. Federal regulations, demand suitably trained and certified professionals in a number of technical areas. Unfortunately, ASPA has a shortage of such personnel. These professional positions require specific technical expertise, advanced education, and professional credentials.

There are a number of factors which contribute to this shortage. Among these are:

1. High personnel costs

Individuals with high level professional credentials, and work experience, (justifiably) command salaries commensurate with their qualifications. This is particularly true in public utilities. There is a worldwide shortage of electrical engineers, water treatment personnel, and other professions essential to utility operations. Consequently, salaries are high for these positions, and competition for experienced professionals can be intense.

Unfortunately, small island utilities like ASPA find it difficult to recruit and hire qualified professionals in this climate. It simply does not have the financial resources to offer salaries competitive with those offered by large utilities in the US mainland and elsewhere. Even when it is able to attract such employees, it is seldom able to retain their services for very long. Few contract professionals stay more than a year or two, lured by better salaries and working conditions elsewhere.

Given its limited financial resources, and the economic climate of American Samoa, ASPA will never be able to offer the level of professionals salaries available in Hawaii or the mainland. This fact, more than any other single factor, accounts for ASPA's current shortage of professional staff. Despite its continual recruitment efforts, many key positions remain unfilled.

2. Number and scope of professional expertise required.

Contributing to ASPA's staffing woes is the scope of expertise it requires. The vast majority of utility organizations in the US specialize in a single utility service (i.e., power generation, power distribution, solid waste disposal, water treatment, etc.). ASPA provides power, water, wastewater, and solid waste services. Each of these utilities require unique and specialized expertise. Furthermore, each of these utilities must comply with its own set of specific Federal regulations. This requires a broad range of education, experience, and professional credentials among its staff. It requires ASPA to employ many different types of professional engineers and technicians. Far more, in fact, than most large utilities in the United States (in type if not in number).

This need to recruit various types of professionals compounds ASPA's difficulty. Fewer financial resources can be devoted to recruiting and retain any single type of engineer or technician. Furthermore, even if fully staffed, ASPA's technical expertise may be broad but is never very deep. It cannot afford to employ more than a single sanitary engineer, for example, or more than one (Level III) Treatment Plant Operator. Thus, ASPA always remains especially vulnerable to staff turn-over and attrition.

3. Lack of suitable educated and trained Samoans in many technical fields.

Low salaries and other inhibiting factors make recruiting (non-Samoan) licensed professionals very difficult. Many of these difficulties might be overcome with a talent pool of trained and experienced Samoan (and/or Pacific islander) professionals. For islanders, the selection of career and employment are influenced by many factors (e.g., culture, family, etc.) in addition

to salary. Thus professional salaries, less than those in the US, are less of a disincentive for indigenous professionals.

Furthermore, Samoan professionals are preferable for all technical positions at ASPA . Technical expertise is important, even necessary, for proper utility operations. However, a knowledge of the Samoan language, culture, and an understanding of the local (social, political, and physical) environment are essential to operate effectively in American Samoa. No outside (non-Samoan, non-islander) contract worker can be as effective, in certain situations, than a similarly trained Samoan professional.

Unfortunately, there currently are few Samoans, or other Pacific islanders, in many engineering and technical fields. Extensive searches by both the American Samoa and (Western) Samoa governments reveal few, if any, Samoans working in a number of key “high tech” fields, including those needed in the islands. Furthermore, they have found that few young Samoans are currently pursuing education or careers in these areas, despite the need and promising job prospects. Consequently, like other local organizations, ASPA has found it difficult, if not impossible, to recruit qualified Samoans with professional credentials and expertise in key technical positions.

4. Dependence on non-Samoan contract workers

The lack of licensed Samoan professionals, in several engineering and technical fields, forces ASPA (and all other island utilities) to rely on non-indigenous contract workers. As mentioned above, turn-over among these non-indigenous employees is high, and recruitment of replacements difficult. Consequently there are almost continuous vacancies and shortages in key professional positions.

5. Work in Ebeye and Micronesia

We believe ASPA is justifiably proud of the work its staff has done in Ebeye. Since assuming the operations of the power and water utilities in Ebeye, we have made great strides in improving utility services on the island. This has led to an improvement in the quality of life for all the people of Ebeye.

At the same time, there is no denying that this work has been a challenge for ASPA. It has placed additional demands on its staff and management. Some of the greatest demands have been on the engineers, technical specialists, and middle managers called upon to assist in Ebeye. They have been able to provide a level of professional expertise and experience heretofore lacking at KAJUR (Kwajalein Atoll Joint Utility Resources). With their help, KAJUR has made great strides. Unfortunately, these are the same type of engineers and technicians which ASPA itself has a shortage.

The staff used in Ebeye are typically those with more than their fair share of work and responsibilities back at ASPA. A shortage of engineers and other professionals already placed additional demands on their time and talent, even before assuming their roles in Ebeye. Their work in Ebeye has made this shortage even more acute.

Unable to fully staff its own professional positions, let alone KAJUR's as well, ASPA has had to compensate. Work on some existing projects as been delayed; new projects postponed. Some in-service training, and routine maintenance, has been deferred. While this may work in the short-term, this is not a long term solution. Unless a method is found to increase the number of these key professional staff, both the ASPA and Ebeye operations will eventually suffer.

The same is true of ASPA's regional training programs in Micronesia. Much of this work is conducted by the same middle managers and engineers needed in other parts of its operations. While ASPA remains dedicated to this regional work, shortages among these key personnel sometime results in delays and postponements of projects both at ASPA and in Micronesia. A solution to this problem, as proposed in this paper, would benefit not only ASPA but Ebeye and the rest of Micronesia as well.

6. U.S. Federal regulations

Federal regulations require utilities to employ certain numbers and types of professional employees to help ensure public health and safety. Federal law mandates specific levels of professional training and certification for many positions within public utilities. For example, water and wastewater utilities have stringent requirements as to the number, type, and level of professional certification of treatment plant operators. Failure to comply with these regulations can lead to a closure of the treatment facility, fines, and/or a loss of Federal funding.

Unfortunately, the one-size-fits-all approach of Federal regulations often leads to regulations inappropriate for small island utilities such as ASPA. They can place an unnecessary and costly burden on the utility, and exacerbate an already difficult staffing situation.

For example, ASPA is currently being required by EPA to employ the same number, type, and level of treatment plant operators as large US metropolitan area. It is required to recruit and hire a highest level (Level III) professionally certified plant operator, even though that degree of expertise is unnecessary for safe and effective operation of ASPA's small and relatively unsophisticated system. Nevertheless, ASPA is mandated to hire an expensive and high level operator, whose expertise and cost is well beyond what is truly needed.

Since ASPA operates power, water, wastewater and solid waste services it is subject to a wide range of Federal regulations. Compliance with all these rules requires experience, expertise, and technical sophistication in a number of areas. ASPA, therefore, must recruit, employ, and retain qualified professionals in a number of key positions. To do so has been extremely difficult, given its size and resources.

7. Need for education and professional certification.

Because few job applicants in American Samoa have had (or had access to) previous technical training, ASPA has had to develop a number of in-service training programs. In order to provide quality services, ASPA has devoted an extraordinary amount of time, effort, and funding to staff training. Many of these programs were made possible with Federal matching funds through Operation Maintenance Improvement Program (OMIP) grants from the U.S. Department of the Interior (DOI). Much of what ASPA has been able to accomplish has been the result of its continuous training efforts, and the support from DOI which has made this possible.

While this type of short term skills training has been effective for many jobs within ASPA, most professional positions require an academic degree and/or high level professional training. Furthermore, many require some amount of supervised work experience or apprenticeship. Some also require license or certification from a recognized professional organization or certifying board. This level of professional development is well beyond what can be accomplished with short term, in-service training.

As described above, few local applicants have the necessary education and training for the key professional positions needed at ASPA. Therefore, ASPA must find a way to develop and educate suitable individuals for these positions, much as it had done with its lower level trade and technical employees. It must expand its training programs to include professional education and development.

Impact of Staff Shortages

The impact of this shortage of professional staff is considerable. The lack of design and engineering expertise inhibits ASPA in many ways. Major construction projects are regularly delayed or postponed. Project costs are often prohibitively expensive due to the necessity of contracting outside engineering. Badly needed systems improvements, such as SCADA, stall for lack of local expertise. ASPA remains vulnerable to fines and loss of Federal funding due to non-compliance with regulations requiring certified treatment plant operators. New technologies, which could improve efficiency and profitability, cannot be adopted due to a lack of appropriate expertise.

Propose Solution

Developing local expertise is the only long term solution to the continuing dependence on expensive, short term non-Samoan consultants and contract workers. Since no pool of suitably qualified Samoa professionals is available, it becomes necessary for ASPA to “grow its own”. It must develop a long term professional development strategy to get their most promising employees trained in these key technical and professional fields. A program to train, and retain, these local professional is the only cost effective way to ensure ASPA has the critical technical expertise it needs now, and in the future.

Plan of Action

The training project proposed in this request is not new. In fact, it is a continuation of ASPA’s on-going professional development and apprenticeship training approach. Nor is it new to OMIP sponsorship. The program began in 1995 with the assistance of OMIP funding. An additional OMIP grant was received in 1999 in support of this program. Since then, however, the program has continued solely funded out of ASPA’s customer revenues. Consequently, it has become increasingly difficult for ASPA to maintain and operate. It has been necessary to reduce the number of professionals being trained, at a time when the need for such employees becomes ever more acute. For this reason, ASPA is once again requesting funding assistance from OMIP.

Past and Present Experience

In 1995, ASPA received an OMIP award to initiate the Professional Training and Apprenticeship Program. At that time, the program focused on upgrading the organization’s expertise in electric generation and distribution technology. Thirteen young Samoans were sent to the New Zealand for training in these areas. The result of this training program was dramatic.

Those trained in New Zealand provided an immediate and impressive benefit to ASPA upon their return. At the time, ASPA was installing a new switch gear at its Satala power plant. Expensive outside contractors had heretofore been necessary to install, test, and commission all new generation equipment. However, with their newly acquired expertise, the recent graduates were able to conduct this work themselves with no outside assistance. By having this new in-house expertise, ASPA saved several hundred thousand dollars on this one project alone.

In 1999, another small OMIP award enabled ASPA to send two linemen to the US mainland to begin linemen certification and apprenticeship training. Like the (New Zealand) training mentioned above, it has proven both beneficial and cost effective. Previously, ASPA was dependent on expensive outside contractors to conduct hazardous “hot line” work. Now, this work can be conducted by ASPA’s own crews, under the direction of the newly certified Journeymen linemen. This represents a significant savings, and greatly improves ASPA capacity to upgrade and maintain its power distribution system. Furthermore, these linemen are now used as instructors for the Pacific Linemen Training Program in Micronesia. Consequently, the power utilities in the other Pacific insular areas are benefiting from this program as well.

Given the obvious benefits of this program, ASPA has continued sending promising local employees to professional training programs, like those described above. However, this has proven very difficult without OMIP assistance. (ASPA has received no OMIP funding for this program since 1999). The cost of this professional training limits the number of individuals it can send each year. Thus, ASPA has not been about to keep up with the need, and the shortage of key professional staff remains.

Program Design

This program, in operation since late 1995, has proven cost effective in developing appropriately trained professional employees. Since that time, little modification has been needed in its approach or organizational design.

Briefly the program operates as follows:

ASPA has numerous technical and professional positions for which there are no suitably qualified local employees or applicants. Often, there are several ASPA employees with the potential to fill these positions, given the appropriate professional education. Usually they have worked in this field or specialty for some time (albeit at a lower professional level). They have demonstrated skill and understand of the work involved. Candidates for the advanced training are chosen from these employees. Those selected are those that demonstrate the intelligence, maturity, and work habits to perform well in these position, but lack the formal professional credentials.

When no suitable candidate can be found among existing employees, ASPA recruits applicants from outside the organization. Candidates are extensively screened for qualifications and ability to successfully complete the training. They are then placed under contract and begin their professional education.

Each potential program participant is selected to fill a specific position within the organization. The training program for each participant is chosen specifically to fit the needs of that position. The educational institutions attended are those which offer professional degree and certificate programs for the specific technical areas needed. ASPA works closely with each institution to ensure the curriculum and course of study fits the needs of the organization and the student's ability.

Most of the training programs attended include some form of professional apprenticeship or supervised work placement, in addition to classroom instruction. Participants stay to complete this work experience, necessary to receive certification or license, before returning to Samoa. Those in more traditional academic programs return to Samoa and continue to work at ASPA during holidays and school breaks (e.g., summer, Christmas).

Each employee participating in the program is required, by contract, to continue working at ASPA for a designated minimum number of years. This ensures a return on the organization's considerable investment. The contract also includes possible penalties and pay-back schemes for poor performance. Likewise, exemplary performance is rewarded with pay and position incentives.

Anticipated Benefits

ASPA believes this program has the greatest potential long term benefits of any OMIP project, to date. By providing professionally educated career employees, the program expands the capacity of the organization. It can improve the long term operation and maintenance of ASPA, as no other (short-term) training program can. It offers true institutional strengthening.

The program can provide numerous and wide spread benefits. In addition to those already mentioned above, there are: Improved operational standards and practices; better compliance with Federal regulations; better overall supervision, particularly on middle management; improved maintenance of various utility systems (generation, power and water distribution, wastewater collection, computer networks, etc.); improved water treatment quality; more economical operations with indigenous, in-house professionals; etc.

In most cases, a temporary replacement employee will need to be hired to assume their work responsibilities for the time the regular staff member is away. As most of the training is 1-2 years in length, ASPA will need to hire temporary replacements for many of the participants in the project. At this time, we estimate at least eight (8) temporary replacements will needed. Since these are higher level technical and professional positions, it may be necessary, in some cases, to recruit non-indigenous "contract employees" from the US or elsewhere. This will significantly add to the cost of operations for the time the program participants are being trained, over the next two years.

We estimate the costs replacement worker could run to more than \$180,000. This additional cost to ASPA is not reflected in the budget. However, it will represent a significant added cost of the program.

As mentioned above, regular employees will continue to receive their salary during their participation in the project.

Project participants recruited for these training positions, not previously employed by ASPA, will be paid a stipend during their training, rather than a salary like the regular employees

Summary

ASPA has a critical need for suitably trained professional and technical staff. These high level professionals are required for the proper, safe and efficient operation of power, water, wastewater and solid water services. Federal regulations also require personnel with certified professional credentials in a number of key positions to protect public health and safety. All such positions require specialized education, a supervised internship, and some type of professional license. This type of professional certification can only be obtained through recognized academic and professional training programs.

What are other actions, utilities have undertaken to improve service delivery / reliability?		
1	Developing appropriate standards regardless of whether on island/off; same tools; rules;etc.	Developing or adopting appropriate and affordable standards would allow the sharing of resources between island countries. It would reduce the amount of inventory carried by individual utilities, and perhaps allow centralized purchases. At the least, it would allow for standardization of materials, and tools, and set forth some guidance for externally financed donor assistance in the development of water and wastewater projects.
2	Metering (also conservation)	Benchmarking the water utilities has identified that accounting for the water produced is the major issue facing all utilities. Too much water produced ends up not reaching the customer. This is wasteful, and by attacking this one specific area, may result in reducing or deferring the need for future water development.

3	Limited Water - Leak Detection & Repair (FSM: Kosrae)	The lack of customer meters, makes it nearly impossible to place a value or limit the water leakage or wasted. This not only increases the cost of the water utility, but much of this wasted water ends up in the wastewater system, increasing their pumping costs. Critical need is to establish a standard sustainable leak detection program for the Pacific Island countries, which can be shared and is continuous. One week training by some off-island consultant, doesn't provide the long term benefits.
4	Human Resources – need to invest in local talent, for long term sustainability.	- ASPA: 12 young students sent off-island, 9 came back. Recognized that even if gone for a while or if costly, still saves money and saves long term action because of proper thinking (local view points that are accepted by customers); Issue after training is salary not enough; work conditions not good enough in Samoa v. New Zealand (therefore—recognize for talents and abilities and pay them for being special). Long Term Human Resources Development (ASPA) – See following small case study
5	Land Issues - (ownership access)	*** SOLOMON ISLANDS: Landowners again Threaten to Cut Water Supply The Solomon Islands landowners who own the catchment area for the capital city Honiara's water supply are threatening once again to cut the water off. The Solomon Islands Broadcasting Corporation reports that the Kongulai community in west Honiara say they're frustrated that their compensation claims for property lost during the ethnic war have not been paid. Many houses and other property in West Honiara were burnt down or severely damaged at the height of the ethnic crisis. The Solomon Islands Government has borrowed AUD 45 million (EUR 25.7 million) from the Export-Import Bank of Taiwan to pay compensation claims, but the Kongulai community says its claims, totalling about AUD 530,000 (EUR 303,000), haven't been met. ABC Radio Australia News, 24 Jun 2002,
6	Geographical Site & Isolation - also climate/rust	The Bank-Netherlands Water Partnership Water Supply en Sanitation Windows (BNWP-WSS) of the World Bank has started research on the potential of franchising as a means of providing water and sanitation services to the poor in small and medium sized towns and in marginal urban areas. The study looks at franchising as a means of (i) developing the domestic private sector in water supply and sanitation service provision and (ii) enabling new international and regional operators, both public and private, to enter the market. Preliminary findings were presented at the International Conference on Town Water Supply and Sanitation in Addis Ababa.
7	Contract Operations to Professionals i.e. Vanuatu. Improve Water Quality	*** On 1 Jul 2002, Ondeo began a US\$ 4 billion (EUR 4 billion), 10-year waterworks operations and maintenance (O&M) contract for Puerto Rico Aqueduct and Sewer Authority (PRASA). The contract, awarded to Ondeo in conjunction with its US subsidiary United Water in May 2002, is the largest O&M contract for water services ever awarded, with the venture beating the Water Company (a subsidiary of Vivendi Environnement) and Thames Water to win the deal. The terms of the contract include an extension provision and cover

7	Contract Operations to Professionals i.e. Vanuatu. Improve Water Quality	<p>the production and distribution of drinking water for all four million of Puerto Rico's inhabitants. It also includes the collection and treatment of wastewater for the entire island. Ondeo is responsible for operation, maintenance, and renovation of the infrastructure, client service, and human resources management.</p> <p>(Frost & Sullivan, 3 Jul 2002,</p>
8	Lack of Legislation - Corporate Library of Good Water Legislation, and Visits with Legislation and constant communications	<p>*** ARMENIA: New Water Code Introduced</p> <p>The Armenian Parliament has approved the new Draft Water Code, which is to replace the outdated code of 1992. The new code and related laws outline reforms to be implemented within the next 15-20 years. It also calls for the creation of a National Water Council under direct supervision of the Prime Minister. The Water Code defines water resources as national property and regulates the rules for water use. The code stipulates that both water resources and the water catchment area cannot be privatized. It does permit the right of exploitation of water resources under concession agreements. Armenia could face serious water shortages within the next 20 years if there a no significant investment in water systems.</p> <p>Related Web Site: Water Legislation Reform Working Group, http://www.magistros.am/ecocenter/workgroup/index_eng.htm (Golos Armenii Daily, 17 May 2002)</p>
9	Lack of Education - Training for existing staff (to pass to customers, too)	<p>*** HANDWASHING: Soap and Water Could Save a Million Lives a Year</p> <p>Diarrhoea is the second-biggest killer of children in the world. Scientists at the 2nd conference of the International Scientific Forum on Home Hygiene (IFH), declared that old-fashioned handwashing with soap and water could save a million lives a year. In India alone, handwashing can contribute to saving 250,000 lives. Appropriate handwashing can cut diarrhoeal diseases by 43% according to a review by the London School of Hygiene & Tropical Medicine. While most households in developing countries have soap of some sort, only 15- 20% routinely use it to wash their hands after going to the toilet, cleaning a baby etc. A World Bank-supported handwashing programme* involving governments and soap companies is being carried out in Ghana and Kerala (India). Soap companies think sales could grow by 40% in each market. The programme has discovered people's preferences for types of soap products, when best to influence mothers' hygiene behaviour (directly after a baby is born), and when and how often to advertise to achieve the maximum impact. There are plans to extend the programme to China, Nepal, Peru, parts of Central Asia and Senegal.</p> <p>*Global Initiative for Public-Private Partnerships (PPP) in Handwashing,</p>
10	Unreasonable Donor Restraints	<p>*** SUMMIT: USA-led Countries Block Commitments on Water and Sanitation, Say NGOs</p> <p>The USA, Australia, Canada and Japan are blocking a target on sanitation and the programme of action on halving the number of people without access to safe drinking water by</p>

10	Unreasonable Donor Restraints	<p>2015, according to WaterAid and Tearfund. The two UK NGOs were reacting to the disappointing outcome a preparatory meeting (Prep Com IV), held from 27 May - 7 Jun 2002 in Bali, Indonesia, for the World Summit for Sustainable Development. Some delegates have said success - or failure – on water programmes could be a roadmarker for the Summit as a whole. The Summit's proposed water and sanitation targets are being supported by a recent European Union (EU) initiative endorsed by EU Environment Ministers. The initiative calls for coordinated action through partnerships with governments, non-governmental organizations and the private sector to tackle water problems. The EU already spends about EUR 1.5 billion a year on water projects, mostly in Africa. There is still some hope that the USA will support action for safe water if US Treasury Secretary Paul H. O'Neill succeeds in lobbying for more aid, especially for drinking water. In a highly publicized visit to Africa with rock star Bono, O'Neill repeatedly stated that it would be possible to provide the poor with clean water in "a short period of time" with a "reasonable amount of money". Several development agencies were critical of his "back-of-the-envelope calculations" that only looked at costs for construction, without taking into account allocations for maintenance and training.</p>
12	No value given to water (meter) - correct tariff established	<p>ARMENIA, YEREVAN: Consumers Should Pay for Water</p> <p>Despite the fact that the city's water company, Ervodocanal CJSC, supplies twice the required volume of water (250 litres per capita per day), the Armenian capital Yerevan stills suffers from water shortages. The de facto free distribution of water has led to widespread wastage. Ervodocanal does charge a symbolic amount of AMD 1 (0.18 Euro cents) per cubic metre of water, but virtually no revenue has been collected from consumers for decades. There are no water meters and water consumption is not properly monitored. Nevertheless, the government has decided to ensure uninterrupted water supply by 2004. According to Ervodocanal's press secretary, M. Sargsyan, this goal can be achieved with an investment of US\$ 400 million (EUR 399 million) to modernize the water supply network, together with the implementation of economic incentives to conserve water.</p> <p>(Business Express Weekly, 8 Jun 2002)</p>
13	Lack of Appropriate Technology and Public – Private Partnerships.	<p>** PRIVATE SECTOR (1): Can it Help Provide Water to the Poor?</p> <p>Research* by the International Institute for Environment and Development (IIED) suggests that inappropriate forms of private sector participation (PSP) that are inadequately regulated are unlikely to be of much value to poorer households or the environment. Findings include: At the regional level, there are concerns that PSP will not benefit the poorest as they are less attractive to investors. Within countries, PSP in water and sanitation services is</p>

13	Lack of Appropriate Technology and Public – Private Partnerships.	<p>concentrated in urban areas where economies of scale can be realized and potential returns likely to be higher. Even within urban areas, there are concerns that poorer households may not benefit from any gains in efficiency, either because they live in areas where costs of provision are relatively high or because their demand is relatively low. Households in expansion areas will often be unwilling to pay connection fees when existing users, usually richer, did not do so when they were first connected to the network. Policy implications include the need for: the social and environmental benefits of water supply and sanitation to be incorporated into strategies for service provision; community participation in formal decision-making on forms of provision, and in the management and operation of provision; governments to serve as regulator and guarantor of a certain level and quality of provision; bidding procedures and contract design to allow sufficient flexibility for innovative solutions, without undermining the accountability of the firm; service contracts to stipulate the use of high quality, low cost, intermediate technologies to expand service coverage to reach low-income areas. * Thompson, J. (2001). Private sector participation in the water sector: can it meet social and environmental needs? URL: http://www.iied.org/pdf/wssd_16_water.pdf Contact: John Thompson, IIED, UK, fax: +44-20-73882826, mailto:john.thompson@iied.org (ID21, 11 Mar 2002, http://www.id21.org/urban/s3bjt1g2.html)</p>
14	Lack of Consumer Support	<p>LOCAL WATER MANAGEMENT: Lessons from the Developing World Experience, especially in developing countries, shows that local water management, properly supported by senior levels of government and integrated across the watersheds, is commonly more effective and more equitable than top-down alternatives. Centralized approaches as well as decentralization without proper capacity building often fail. A tragic example of the latter was the E-coli outbreak in Walkerton, Canada in 2000*. Hard evidence, gathered both in poor countries and in rich countries, shows that local approaches that genuinely engage local people in management decisions can be more effective than top-down policy commands. In fact, local people truly in charge of their own resources commonly prove to be reliable stewards of their own environment - and they can be prudent guardians of public health.</p> <p>** Canada, Walkerton: Ministry Blamed for E. Coli Tragedy, Source, 28 Jan 2002,</p>
15		<p>*** CHINA: Water Infrastructure Development Facility</p> <p>The Asian Development Bank (ADB) has approved a US\$ 35 million (EUR 34.9 million) loan to the China Water Utilities Group (CWUG), an investment holding company to be established in Shanghai by the China Water Company (CWC), to serve as the vehicle for a water infrastructure development facility in the People's Republic of China (PRC). CWC is a water infrastructure development and investment company that operates out of Hong Kong, China. The facility - with a total size of around US\$ 150 million (EUR 149.5 million) - will fund relatively small water projects that ADB would have difficulty to assist directly. CWUG will use the facility to partner with different municipalities to develop water resources, water</p>

		supply, wastewater treatment, and other water-related infrastructure. The facility will give municipalities access to financing to expand potable water supply as well as improve wastewater treatment to arrest the growing pollution of water resources. CWC will contribute US\$ 75 million (EUR 74.7 million) in equity to the facility. ADB, together with two bilateral financial institutions, will provide loans totalling US\$ 75 million (EUR 74.7 million). Contact: Pamposh Dhar, mailto:pdhar@adb.org (Press Inquiries Only) (ADB, 3 Jul 2002, http://www.adb.org/Documents/News/2002/nr2002111.asp)
--	--	--

Water Supply and Sanitation Collaborative Council (WSSCC), the IRC International Water and Sanitation Centre and the Source web site: <http://www.wsscc.org/source>.

5. FUTURE NEEDS

Part of the consultation brainstorming session at the Pacific Water Association, annual general meeting, led to the development of the following table which are actions that might be further developed to address some of the constraints faced by utility managers and employees. However, this is not the end but only the beginning of actions and future needs that need to be developed in this regional meeting to assist in the way forward for developing a sustainable water sector as it relates to the Urban water and wastewater utilities.

What are some future actions needed to address the problems of the water sector as a whole?	
Improved & Consistent Customer Education	Water Education Materials (Kids; Hydrology; Political Leaders; Community Groups; Civic Groups; highest educational levels)
Community Consultation	Improved participation within utility by community
Utility Donor Aids Programs:	<ul style="list-style-type: none"> i) Design w/ local interest in mind; sustainable; protects investment of local islands ii) Learn from previous mistakes to make sustainable, looking from a donor side, look at the long term interest—customer receiving end of how it will be maintained in order for the donor to be paid in long run, even if donor has to do the program differently than it is accustomed. Lifecycle costs: can't walk away. iii) "Increased stakeholders consultants ensuring sustainability." (ADB TO UTILITY; or other donors that deal ONLY W/COUNTRY, whereas OMIP, as an example, talks directly with utility)
Increased Transfer of Training & Training (within education levels; utility levels; from consultants or contract workers to indigenous)	Utilities need to invest in their own people, take advantage of training opportunities, utilize the training in the way work is accomplished, and the Manager needs to pay attention.
Donor aid utilized for study after study:	<ul style="list-style-type: none"> i) Too much studies; not fast enough to the end product. ii) No examples of "parts in the ground." Stop studies; do the projects.
Utilities agreed; but, They asked, "How?"	i) Get engineers and utilities together, fewer accountants / political people, even <u>consultants that simply want to continue to have a job</u> ; write another report. Keep Foreign affairs / high-level people out of the contractual process.
Legislative Interference:	<ul style="list-style-type: none"> i) Can legislate action if there is interference ii) Have donor agencies provide grants/funding only if legislators/politics stay out of the process; stay out of rates or disconnections, etc.
Sustainable Leakage Management:	<ul style="list-style-type: none"> i) Allied member asked why utilities complain about leaks, yet, never do anything or never follow through later? ii) Answers are: money / costs / employees (or

	<p>iii) write entire package) Answer is that YOUR UTILITIES and YOUR POLITICIANS never get your agendas pushed when the outside agencies and organizations come to your countries. Therefore; this points to WHY the utility must speak early and often with Each and Every Legislature (it's small island, and basically, you're related to all politicians anyway, says Mr. Neil, PWA).</p>
High Level Advocacy / access:	<p>i) Fisheries, Agriculture; Tourism ; Health; Education ii) 3 of 4 hospitalizations due to water-born disease, then money comes to you, more regularly.</p>
National Task Force for Water	Develops a Plan for Advocacy
Strong Legislation that is enforceable:	Developed between Legislatures and the utility with any fees generated going to sustain the utility
Greater Forcibility of Loan Packages:	Bank Policies: Why loan money for Studies; if no money is given for the follow up / implementation, sustainable.

Additional Commentary

Governance - Political commitment to and ownership of the reform program are essential. However, reform is a destabilizing process and no government undertakes such a process without some risk of becoming so unpopular that it loses its mandate to rule. Thus, much courage, patience, and commitment on the part of government are needed. The importance of political stability and firm commitment to reform from top political leaders have been underlined by events in Vanuatu and the Solomon Islands in 1999 and 2000.

Involve Key Stakeholders. It is critical for water and wastewater utilities to involve key stakeholders in the design of programs and projects, and to maintain their commitment by keeping them continually informed of the process and envisaged impacts. This serves the dual purpose of involving the customer, and by doing so, more deeply committing the utility to the path of sustainability. Presenting convincing arguments and evidence on the merits of appropriate tariffs and reform remains a challenge in the Pacific Island countries, especially because of the relative importance of the public sector as an employer and uncertainties in some cases about the opportunities for private sector development.

Account for Local Culture. Utility programs and projects must take careful account of the local culture. Some cultural factors may be used to advance the process; others may need to be managed so that they do not hinder the process; and some may display features that both help and hinder the process. One example of a social institution that may constrain the anticipated project is the Polynesian family system, which can make demands of politicians and public officials that conflict with the requirements of their formal, national roles. On the other hand, that same system may be a source of useful social support for those entrenched in the old way of doing business. Another example is the varied customary land tenure systems, which are often seen as a constraint to optimal land use and a deterrent to foreign investment, but which are valued in their own right by Pacific islanders. Utilities need to recognize and understand such cultural factors, address them overtly in a participatory manner, and manage them sensitively. Participatory approaches to the introduction of new improved programs or projects, particularly those that are culturally sensitive, are essential to ensure sustainable solutions.

Focus on Outcomes and Impacts. It is essential to maintain a continuous focus on outcomes and impacts. Utility projects and reform programs often, and necessarily, includes various levels of actions, influencing and building on each other. However, in the final analysis, the water and wastewater utilities must be able to demonstrate to their customers that the impacts of these actions (some of which may initially be painful) are actually beneficial through better service provision, or lower prices, or improved employment and other income-earning opportunities. Thus, the utilities must establish and manage an information system that tracks reform implementation, and permits the analysis and publication of the resulting impacts as and when they occur. Analysis of impacts needs to extend to an assessment of who benefits and who loses, so that the utilities may address any inequities. This area has received inadequate attention. Information is one of the most critical inputs in the reform process, and the one most commonly inadequate in the Pacific.

Design Within Local Capacity. Simple scope ensures that the infrastructure project and program content is clear, realistic, and within local capacity. Some programs have been too complex and too ambitious in terms of time targets. Project design must pay careful attention to pace and sequencing of actions and activities, with the objective of resolving conflicts that arise. For example, in terms of realistic sequencing, it is of little value to attempt introducing performance based budgeting into a utility if basic costing and accounting systems do not provide timely feedback, or for that matter, if basic accounting skills are not available to the utility.

Keep it Simple. Some key design principles learned through experience over the last few years are (i) keep it simple, (ii) tackle a few though significant and relevant improvements at a time, (iii) think through the sequencing with the implementers, and (iv) allow for testing and adjustments. It is important to lay out a sequence of actions that leads to tangible and specified outcomes and impacts. Follow-up and repetitive implementation may be required to implement change. For example, one week training in a particular skill is not the best method to implement change. However, repetitive actions, slowly reinforced over the long term, will become the standard if the Manager pays attention to the need for change, and keeps it simple.

Use Consultants Carefully. The use of consultants and external advisers must be more carefully designed. First, given the constrained human resource capacity in the Pacific, the need for consultants is often inevitable. However, there are options for how they can be used: as long-term advisers in line positions; or as providing short-term, periodic inputs. These options must be carefully evaluated, keeping in mind that the utility program must remain locally owned and managed. A key indicator of consultant effectiveness should be the extent of local ownership he or she is able to engender. Second, it is important to clarify whether the consultant is fulfilling a line function or whether the mandate is to build capacity. If it is the latter, technical expertise is not a sufficient qualification for the job. Proven success in transferring skills and supporting participative capacity building are essential requirements. For example, the ADB must assure the government and the utility that the consultants it offers have the right breadth of experience and demonstrated exposure to a variety of approaches. Otherwise, there is the substantial risk that project implementation and approaches adopted by the country are dictated not by disciplined analysis of needs and assessment of options, but by the narrow experience of the long-term adviser, and the foreign affairs or finance ministry, with little or no input from the water and wastewater utilities. The larger issue is the need for donors of external assistance to strengthen its policies and systems for the engagement and management of consultants. Consulting contracts should be drafted not only in terms of expected inputs and tasks, but also in terms of precise and tangible outputs and expected outcomes. Consultants' performance must be more closely monitored by government and providers of bilateral assistance, on the basis of the outputs delivered. And sanctions for inadequate performance should be specified in contracts, and enforced. Staff must have adequate time to supervise consultants and should be held accountable for technical assistance (TA) outputs and outcomes.

Maintain Continuing External Bilateral Assistance Support. ADB and others must maintain effective engagement in the program or project process beyond the two to three-year program loan time frame. First, communication channels between Bilateral Assistance

Support staff with the highest levels in government must be cultivated and nurtured, and through them, a relationship of trust and partnership developed. Second, and consequent to the first lesson, Bilateral Donors must seek to ensure high quality staff inputs and greater staff continuity in operational assignments. Third, the package of assistance must combine a mix of loan and TA, as well as follow-up project loans and TAs, that help the government and in particular the water and wastewater utilities address spillover and sequential needs. Fourth, coordinated inputs from external agencies in a long-term framework that supports continuity of the process is invaluable for ensuring continuing commitment to reform. Fifth, the water and wastewater recipient of support must have a closer relationship with the External Bilateral Aid agency, to have positive input into the programs or projects. 5 to 10% of the project cost must be set aside to protect the initial investment, and assist in the longer term operation and maintenance. Too often, it is the National Finance Ministry or Foreign Affairs Office who is the contact and too often they have unrealistic goals or perceived needs that are not in parallel with the water and wastewater utility.

Amongst the leaders in external bilateral assistance, the ADB has recognized that a new Pacific strategy is required to take into account the experience and lessons acquired over the previous years of operation. This overview paper calls for other providers of bilateral assistance to evaluate their programs and operations, and to make changes as necessary to address the following in light of their previous experiences:

The ADB is on record within their new Pacific strategy to support deepening of government and public commitment to the reform process. Assistance will focus on building public awareness and support for improvements through continued dialogue with water and wastewater utilities, and promoting stronger linkages with the private sector, NGOs, and community organizations that have vested interests in these improvements. ADB will give priority to awareness raising, coalition building, and public information activities, where local support for governance reforms is weak. Thus, local ownership of the reform process is a key aspect of the strategy.

The need is for the external bilateral donors or aid agency's to emphasize enhancing efficiency and effectiveness of the public service. While major achievements have been made in downsizing the public service, the same cannot be said of the quality of public services. These remain poor, inadequate, and well below acceptable standards in most Pacific Island countries. Of particular concern is the ability of governments to pay for their appropriate portion of the utilities they consume. Governments need to be financially able to pay just as the individual customer is expected to pay for services rendered. Since the strategy will also emphasize poverty reduction and improvement of quality of life for the people of the Pacific, the improvement of efficiency and effectiveness of the public sector will be a key focus.

The private sector should replace the public sector as the engine of growth. The water and wastewater utilities will be financially strengthened by a diverse private sector rather than depending on only the public sector to be the engine of growth. The ADB has noted that the reduction in size and scope of the public sector over the last five years of reforms was not associated with a corresponding growth of the private sector; this left a gap in output and employment. Furthermore, the expected efficiency advantages through private operations also did not accrue to the Pacific Island countries. The limited growth of the private sector is explained by both the immutable constraints on economies, as well as the inadequacy of various factors required for growth of a dynamic and healthy private sector.

Technical advice and investment support needs to be provided to the water and wastewater utilities. Given the small size of potential investments and high cost of project development, external bilateral aid needs to be collaborative to support technical projects and provide feasibility advice services throughout the Pacific Island countries.

Gender issues need to be brought into the mainstream. Gender equity and the role of women is unimportant in the sense that most Pacific islanders don't treat women as chattel as some of these other countries do, where they and children are assigned the arduous task of

hauling water while men sit on their haunches. But, gender issues remain significant and important on the social front, such as in relation to health, hygiene, education, and population control, a breakthrough is necessary in recognizing the potential role of women in politics and the economy. Barriers to women's participation as equals in the political and economic sphere need to be gradually eliminated. Education is perhaps the most powerful tools in this regard.

Water and wastewater utilities will ultimately be the beneficiaries from promoting the role of women in the control of population growth, broadening the reach of education, and improving health indicators. These remain critical issues in the Pacific, and the most effective strategy to address them remains through women, and strengthening women's social and economic role in society. Ways of directly influencing population growth rates through population policy, family planning, and improved access of women to health and education opportunities need to be explored and supported with governments and other providers of external assistance.

Fragile environments will be actively protected through policy support and investments. Given the narrow resource base of the Pacific islands, and the limited economic opportunities for investment, the pristine environment of many of the Pacific Island countries remains our most important comparative advantage. External bilateral aid organization need to underscore this issue while providing assistance for improving infrastructure, regulatory and management frameworks to ensure the protection and sustainable management of these environments, and support community awareness and education projects where broad-based action and public support are required. The Pacific Islands countries hold some of the world's richest sites in terms of biodiversity, and there are opportunities for attracting cofinancing, e.g., from the Global Environmental Facility, for conservation and protection projects, while providing infrastructure assistance to improve the water and wastewater utilities and the services they provide. However, it is critical that local national agencies share the same desire to preserve and protect the environment, when contemplating economic development projects. Any Pacific island project for development should consider not only the economic benefits, but the environmental, and culturally sustainable benefits.

Water and wastewater utilities must support the reduction of Poverty amongst their customers. At the country level, the three pillars of poverty reduction strategy (pro-poor sustainable economic growth, social development, and good governance) should underpin the design of infrastructure development projects and capacity building measures. In particular, enhancing the quality of governance is critical to poverty reduction, which explains the continuing focus on public sector and governance reforms. Customers cannot pay for their utility services if they don't have the social and institutional programs in place with which poverty reduction can occur.

External bilateral aid project investments should emphasize poverty reduction. At the island level, aid should be given priority in (i) investments in the social sector, i.e., education, health, population, social protection, and water supply and sanitation; and (ii) development of physical infrastructure with an emphasis on enhancing accessibility of the poor to essential services. In addition, measures to protect and conserve the fragile environment will be supported to protect the resource base of the poor.

Strategic Objectives Supported by Water and Wastewater Utilities

Gradual but systematic and long-term capacity building will be emphasized. In terms of capacity building, there is a need for the water and wastewater utilities to work within the region (SOPAC, PWA) and other Pacific Island countries to formulate long-term plans for building the required skills by combining training, exposure to other systems, consultancy, learning-by-doing, and institutional twinning arrangements. Such plans should identify the milestones for each stage of skill development, emphasizing small but successful steps at the start and moving progressively to larger ones. Such plans can guide the activities of various external funding agencies over time, and ensure better aid coordination and planning. At the project level, consultants' terms of reference should routinely include skill transfer as part of the expected output, with clear indicators for accomplishment of this result. Accordingly,

consultants will need to be selected not only for their technical qualifications, but also for their ability to guide, coach, and mentor local counterparts. Domestic consultants should be used more often, for example, as long-term understudies of international consultants.

Infrastructure development and efficient operation and maintenance will remain a basic priority for the water and wastewater utilities. Better infrastructure improves access of the poor to private markets and public services, weakens monopolistic exploitation, and facilitates the flow of information and awareness. Infrastructure development is critically linked to private sector development and economic growth as it helps reduce market imperfections and stimulates the free play of the market. Based on lessons learned from past experience, special attention will be paid to maintenance of infrastructure, as it brings significantly higher returns on investments compared with investments in new infrastructure. Given the small size of markets and geographic difficulties, the public sector will have a continuing role in infrastructure development and operations. However, to obtain higher operational efficiencies, Public-private partnerships in infrastructure development will be supported where feasible. Private sector participation in infrastructure development will be promoted by unbundling infrastructure operations, wherever possible, improving availability of required long-term financing, and developing appropriate policy and regulatory environments. In terms of reform of public sector agencies involved in infrastructure, emphasis will be on increasing managerial and financial autonomy, accountability, and long term operation and maintenance including renewal and/or replacement.

Water and wastewater utilities need to support infrastructure development which focuses on telecommunications, and IT. In view of the dispersion and remoteness of the Pacific Island utilities, the development of telecommunications and IT will help improve access and business communication, and reduce costs. The Pacific Island countries should also be harnessing the power of telecommunications and IT for health and extension of services, distance education, and monitoring of technical activities that might be supportive of utility infrastructure development and management.

Strengthen the interface and collaboration between Pacific Island utilities and NGOs and civil society groups. Infrastructure development must be participatory and inclusive. This is particularly so if the benefits of water and wastewater development are to be shared more equitably than in the past in the Pacific. NGOs have demonstrated the critical role they can play in facilitating grassroots feedback and advice, improving transparency, generating community awareness, and harnessing people's power effectively. NGOs and civil society groups have widely established their capability to mobilize communities, generate community participation and develop community movements, particularly for addressing poverty. It is therefore essential that utilities come to view NGOs and civil society groups as partners in development, and make strenuous effort to improve information sharing, education, communication, and participation in utility-led development activities and programs. Water and wastewater utilities, on their part, should seek to consult more widely with NGOs and civil society groups in the development programs and projects it supports in each Pacific Island country. They should also assist governments (where possible) to work more actively with NGOs in the delivery of essential water and wastewater services particularly to rural communities, where NGOs generally have a better comparative advantage than governments in service delivery. Water and wastewater utilities may often have expertise in urban sectors which are directly transferable to rural applications.

The success of any programs must be judged over the longer term. Sustainable change must be evolutionary in nature, allowing time for internalization and institutionalization of new modes of behavior and operation. The programs must also be a continuous learning process, adjusting to and coping with local, regional, and global changes. Major changes are indeed taking place in many of the Pacific Island countries, and utilities, and this is partly evidenced by greater fiscal discipline, more openness to external investment, greater professionalism in public service, and governments withdrawing from areas that are better left to the private sector.

Water and wastewater utilities must be prepared to address these six common variables. (i) vulnerability of the Pacific island economies, because of our remote locations,

narrow resource base, susceptibility to natural disasters, and the influence of the global markets; (ii) political instability and good governance; (iii) limited availability of skilled human resources; (iv) the wide range of socio-cultural factors influencing politics and productivity; (v) rising population growth rates; and (vi) inadequacy of physical, technological and financial local infrastructure necessary to have sustainable growth.

Implementation of any Water-Wastewater development strategy must incorporate the following lessons. The most significant are the need (i) for the Pacific Island utilities to have stronger ownership of policy reform and investment programs, (ii) to design development projects, and programs taking into account the local culture and local capacities, (iii) to pace and sequence technical, managerial, and economic reforms to ensure effective institutionalization, and (iv) to use external consultants judiciously without creating dependencies.

6. STRATEGIC ACTION PLAN

GUIDING PRINCIPLE 1:

NATIONAL WATER AND WASTEWATER MANAGEMENT POLICIES AND REGULATIONS WILL BE APPROPRIATE AND ACCEPTABLE TO THE PEOPLE AND CULTURES OF THE PACIFIC ISLANDS.

Policy 1.1: Governments will consider the water and wastewater sector as a priority for improvement and investment.

Policy 1.2: Governments will develop national water and wastewater policies and regulations that are consistent with international and national laws, regulations, technical standards, and obligations.

Policy 1.3: Governments will develop and implement appropriate water and wastewater - and associated - regulatory frameworks, compliance and enforcement requirements that benefit the specific cultures, customs, economies and environment of the people of the Pacific.

Policy 1.4: Government regulations will require regular system performance reporting.

Policy 1.5: Governments and regional organisations will co-operate to develop and sustain regional and national capacities in compliance monitoring, including technical and financial resources and data acquisition.

Policy 1.6: Government and service provider decisions on water and wastewater management will be transparent to improve accountability, donor and investor acceptance.

Policy 1.7: Governments and regional organisations, the private sector and NGOs will actively co-operate to ensure that water and wastewater management policies and plans are integrated into the national development policies and plans and other cross-sectoral initiatives.

OVERALL OUTCOME:

Appropriate and acceptable integrated national water and wastewater management policies and regulations in place.

Proposed Actions	Responsibility
1. Prepare policy or issues paper on the need for prioritizing water, and wastewater sector for improvements, cross -sectoral actions and integration into national development plans.	Government departments Service providers
2. Education and awareness on policies and regulations across all sectors with special focus on decision makers.	Governments
3. Identify and review policies and regulations on regional and national level and involve stakeholders and regional organizations	Regional organizations Governments
4. Review regulations from other countries and identify those suitable as models for Pacific Island Countries.	Regional organizations
5. Organize a review meeting involving all sectors, to agree on the need or otherwise, for national regulations and to recommend appropriate actions.	Governments
6. Implement recommendations.	Governments
7. Establish appropriate guidelines and systems for reporting on service delivery, and enforcement of regulations.	Governments

GUIDING PRINCIPLE 2:

APPROPRIATE NATIONAL INSTITUTIONS, INFRASTRUCTURE AND INFORMATION WILL SUPPORT SUSTAINABLE WATER AND WASTEWATER MANAGEMENT.

Policy 2.1: Governments will review and specify roles of, and facilitate coordination between existing agencies, and where appropriate, create specific responsible agencies for water and wastewater management.

Policy 2.2: Governments will ensure that water and wastewater technologies and related infrastructure are appropriate to meet national and local priorities and needs, within the constraints of available finance and other resources, while recognizing the need for protection of human health and the environment.

Policy 2.3: Governments, service providers, institutions and regional organizations will collaborate throughout the region to improve timely access to and sharing of available data and research on appropriate water and wastewater technologies and the dissemination and implementation of wise practice guidelines.

Policy 2.4: Water and wastewater reduction (water demand management and conservation, zero discharge toilets) and reuse strategies will be developed and adopted by governments without compromising public health.

Policy 2.5: Governments and regional organizations will co-operate to develop and sustain regional and national water and wastewater quality monitoring programs and the use of this information (e.g. benchmarking) to improve water and wastewater management and environmental protection.

Policy 2.6: Governments, regional organizations and other stakeholders will cooperate to develop integrated water and wastewater management plans to effectively address the impacts of contingencies, emergencies and disasters.

OVERALL OUTCOME:

Sustainable water and wastewater management through the use of appropriate institutions, infrastructure and information.

Proposed Actions	Responsibility
1. Identify: – the key agencies /stakeholders involved with the management of water and wastewater, and environmental health – their roles and responsibilities – activities they undertake in water, wastewater, and environmental health – lead agencies for specific national activities.	Governments
2. Establish mechanism for maintenance of data collection, on water and wastewater management (standards, regulations, and monitoring) and environmental health impacts.	Governments Regional organizations UN and donor agencies NGO's
3. Develop national guidelines on wise practice approaches to assessing and managing water and wastewater system requirements, that incorporate sound environmental health principles.	Governments Regional organizations
4. Review existing water and wastewater technologies and infrastructure and recommend strategies for improvement.	Governments Service providers NGOs Regional organizations

Proposed Actions	Responsibility
5. Develop a national monitoring capacity, building on existing and new resources, to provide initial baseline data, and long-term quality assurance.	Governments NGOs Regional organizations
6. Promote awareness of links between and means of integration of, water and wastewater management plans to effectively address contingencies, emergencies, and disasters.	Governments NGOs Regional organizations

GUIDING PRINCIPLE 3:

BETTER ACCESS TO FUNDING WILL IMPROVE SERVICE DELIVERY, AND DEVELOP THE PRIVATE SECTOR.

Policy 3.1: Governments, regional organizations, donors, the private sector and NGOs will co-operate to develop innovative approaches to existing funding structures and establish mechanisms to improve cost-recovery.

Policy 3.2: Where appropriate, governments, regional organizations and NGOs will cooperate to attract the private sector to invest in water and wastewater management through private public partnership and other mechanisms.

Policy 3.3: Governments, donors and regional organizations will co-operate to develop appropriate service delivery and funding mechanisms to equitably address the water and wastewater management needs of both the urban and rural community.

OVERALL OUTCOME:

Improved service delivery through increased access to funding and involvement of the private sector.

Proposed Actions	Responsibility
1. Carry out a review of systems currently used throughout the region and internationally, for funding water and wastewater services. Report findings in a form suitable for use by government decision makers.	Governments Regional organizations
2. Develop and implement awareness raising programs across all levels, on the need for funding mechanisms.	Governments
3. Choose and adopt the most appropriate mechanisms (from above review).	Governments
4. Identify stakeholders, and especially possible private sector partners and establish a national working party (or similar) for discussions/decision making over privatization of water and wastewater systems.	Governments

Proposed Actions	Responsibility
5. Review current water and wastewater systems and identify areas/aspects that could be improved through the involvement of the private sector.	Governments
6. Invite proposals from the private sector, review and implement.	Governments
7. Establish appropriate guidelines and reporting systems for monitoring service delivery, including financial efficiency, service quality, and service distribution across different sectors of the community (e.g. urban vs. rural).	Governments Regional organizations

GUIDING PRINCIPLE 4:

COMMUNITY PARTICIPATION IN WATER AND WASTEWATER MANAGEMENT AND SANITATION, WILL ENSURE EQUITABLE BENEFIT WITH RECOGNITION OF SOCIO-CULTURAL SENSITIVITIES.

Policy 4.1: Governments, regional organizations and NGO's will co-operate to promote and develop education and awareness of water and wastewater and sanitation issues within national and local government, while incorporating existing social and cultural values.

Policy 4.2: Governments, regional organizations and NGO's will co-operate to promote and develop community education and awareness of public health and environmental issues as related to water and wastewater while incorporating existing social and cultural values.

Policy 4.3: Governments, service providers and NGO's will in partnership with community agencies determine their respective roles and responsibilities, and will develop and implement culturally appropriate strategies and activities to ensure the implementation of water and wastewater programs.

Policy 4.4: Governments, service providers and NGO's will ensure rural and urban communities will be given opportunities for active participation in the choice, development and implementation of water, wastewater and sanitation projects and on-going operation and maintenance of its facilities.

Policy 4.5: Planning of water and wastewater facilities will ensure acceptable access for all, with special regard to women, the disadvantaged, the disabled and those in rural and remote communities.

Policy 4.6: Service providers will take into account traditional knowledge and practices complemented by new approaches to water and wastewater management.

OVERALL OUTCOME:

Equitable benefit to the entire community that incorporates social and cultural values through active community participation.

Proposed Actions	Responsibility
1. Conduct survey and collect information / data on the social and cultural aspects / characteristics of the community population.	Regional organizations National government Local government Community
2. Develop and implement national and local public awareness and education campaigns.	Regional organizations National government Local government Community
3. Use local theater groups and media in raising awareness programs.	Regional organizations National government Local government Community
4. Identify key stakeholders to determine their roles and responsibilities within the community.	Governments Service providers NGOs Community / Women
5. Create a task force that has representation of all stakeholders that will facilitate the development and implementation of cultural appropriate strategies and activities of water and wastewater management programs. The task force will have a fair representation that will include women, disabled and disadvantaged.	All key stakeholders
6. Enhance or improve participation of community in the development and implementation of community-based strategies and activities through / by: – holding regular meetings/seminars/workshops – identifying and reviewing existing systems – developing where appropriate wise alternatives – establishing community capacity building programmes – identifying and securing assistance and funding for community involvement.	Community Governments NGOs Regional organizations
7. Include public information components in costing for all development programs.	Governments
8. Promote the use of community consultative committees in development programs.	Community

Proposed Actions	Responsibility
9. Perform gender assessment studies in water and wastewater management and where appropriate stress the need for gender issues to be included into project planning.	Governments Regional organizations
10. Conduct research into the traditional practices and determine whether or not these can be adapted to suit the present situation and new development programs.	Governments Regional organizations NGOs

GUIDING PRINCIPLE 5:

VIABLE AND SUSTAINABLE LEVELS OF SKILLED AND KNOWLEDGEABLE PEOPLE WITHIN THE WATER AND WASTEWATER SECTOR AND COMMUNITIES WILL IMPROVE WATER AND WASTEWATER MANAGEMENT

Policy 5.1: Governments, regional and international organisations will cooperate to develop and implement effective human resource development programmes for water and wastewater management and related personnel (including planners, management and enforcement professional) with particular attention to up-skilling the local workforce.

Policy 5.2: Governments, local institutions, regional and international organisations will work together in the development of regional and national training courses in support of human resource development programs.

Policy 5.3: Governments, regional organisations and NGOs will promote and facilitate the development and training of communities and individuals to strengthen and assist their participation in water and wastewater management.

Policy 5.4: Governments, regional organisations, donors, the private sector and NGOs will work together to secure funding in support of human resource development policies and training programs.

OVERALL OUTCOME:

Water and wastewater management has improved, as a result of a viable and sustained level of skilled and knowledgeable people within the water and wastewater sector and communities.

Proposed Actions	Responsibility
1. Review the need for increased capacity and management training in human resources development and planning.	Governments Service providers Regional organizations Co-operating agencies International counterparts
2. Carry out training needs analysis (TNA) for workforce and community groups to identify gaps in existing training, including communities and individuals. This should include reviews of current programs, who needs training, the type of training required, and resources needed.	Governments Service providers Regional organizations Co-operating agencies International counterparts

Proposed Actions	Responsibility
3. Identify funding sources for training program development.	Governments Service providers Regional organizations Co-operating agencies
4. Develop island specific training programs and pilot projects, identify resources for delivery (e.g. staffing, equipment etc.), secure funding and implement them.	Governments Service providers Regional organizations Co-operating agencies NGOs
5. Evaluate performance of human resource development planning based on improved water and wastewater management.	Governments Service providers Regional organizations Co-operating agencies International counterparts
6. Periodically go back to Actions 1 and 2 to assure sustainability.	Governments Service providers Regional organizations Co-operating agencies International counterparts

7. CONCLUSIONS

VISION

Protect the health of the people and safeguard our fragile environment through improved, effective and efficient management of water and wastewater.

OVERVIEW OF THE GUIDING WATER AND WASTEWATER PRINCIPLES

GUIDING PRINCIPLE 1:

NATIONAL WATER AND WASTEWATER MANAGEMENT POLICIES AND REGULATIONS WILL BE APPROPRIATE AND ACCEPTABLE TO THE PEOPLE AND CULTURES OF THE PACIFIC ISLANDS.

National Pacific Island country governments are required to place high priority on water, wastewater and sanitation issues in order to direct sufficient attention and resources to these areas in national development plans. Regional and national policies should define responsibilities leading to better co-operation between agencies and increased recognition of the linkages between good sanitation, improved public health, economic development, and a cleaner environment. An updated and consistent regulatory framework, combined with effective enforcement, will result in compliance with good practices, reduced pollution, equitable allocation of resources, and increased investment.

GUIDING PRINCIPLE 2:

APPROPRIATE NATIONAL INSTITUTIONS, INFRASTRUCTURE AND INFORMATION WILL SUPPORT SUSTAINABLE WATER AND WASTEWATER MANAGEMENT.

Clearly defined responsibilities for all stakeholder organisations in water and wastewater management can prevent fragmented and uncoordinated plans and actions and improve linkages to other sectors. A specific national agency responsible for water and wastewater management can be considered to enhance performance. Strengthened institutional capacities and the collection and dissemination of data and information will support appropriate technology selection, increase system performance, increase the understanding of subsequent environmental and public health impacts, and demonstrate the need for water conservation and natural disaster preparedness.

GUIDING PRINCIPLE 3:

BETTER ACCESS TO FUNDING WILL IMPROVE SERVICE DELIVERY, AND DEVELOP THE PRIVATE SECTOR.

Adequate government financial support, alternative financing mechanisms and improved internal cost-recovery are prerequisites to sustain maintenance and attract external investment.

GUIDING PRINCIPLE 4:

COMMUNITY PARTICIPATION IN WATER RESOURCE DEVELOPMENT, WATER SUPPLY MANAGEMENT, WASTEWATER MANAGEMENT AND SANITATION, WILL ENSURE EQUITABLE BENEFIT WITH RECOGNITION OF SOCIO-CULTURAL SENSITIVITIES.

Water and Wastewater management and sanitation issues should receive a higher public profile. Public awareness by the community of socio-cultural, economic, environmental and public health impacts on wastewater management will ensure ownership.

GUIDING PRINCIPLE 5:

VIABLE AND SUSTAINABLE LEVELS OF SKILLED AND KNOWLEDGEABLE PEOPLE WITHIN THE WATER AND WASTEWATER SECTOR AND COMMUNITIES WILL IMPROVE WATER AND WASTEWATER MANAGEMENT.

Appropriately trained and experienced urban and rural water and wastewater professionals are needed to develop projects and operate facilities, at both the technical, managerial and community participation levels. Increased training enables communities and individuals to take responsibility for operating and maintaining their systems.

8. REFERENCES

- ADB (2001): Water for All: The Water Policy of the Asian Development Bank
- ADB (1996): Overview of the Pacific Region, Regional Consultations on Water Policy 1996
- ADB (1996): edited by Arriens, Wouter L., Bird, J., Berkoff, J., Mosley, P., Towards Effective Water Policy in the Asian and Pacific Region...Proceedings of the Regional Consultation Workshop, Manila, Phillipines, May 1996
- Arasmith, S., (1997): Introduction to Utility Management, ACR Publications, Albany, Oregon 1997
- Arasmith, S., (2002); www.omip.org , Micronesia Water and Wastewater Operator Training Program Website, OMIP, US Dept. of Interior. 2002
- Arthur, T., (2001); OMIP Grant Request for Apprenticeship Training of Utility Operators, OMIP, U.S. Dept. of Interior 2001
- Convard N., (2000): Regional Programme of Action for the Protection of the Marine Environment of the Pacific Islands Region from the Effects of Land-based Activities: Regional Seas, SPREP, UNEP, 2000
- Falkland A., , Custodio, E., (1991): Hydrology and Water Resources of Small Islands: A Practical Guide UNESCO 1991
- Falkland A. (1992) . Small Tropical Islands. UNESCO, IHP Humid Tropics Programme Series, May 1992
- Global Programme of Action for the Protection of the Marine Environment from Land Based Activities UNEP, Washington, 1995
- Meeting report of the Consultation Meeting on Sewage Management, SPREP, SOPAC, PWA, Apia, Samoa, March 2001
- OPUS International Consultants Ltd, A Directory of Environmentally Sound Technologies for the Integrated Management of Solid Kiquid, and Hazardous Waste for Small Island Developing States in the Pacific Region, Marlborough House, London, UNEP. November 1999
- SOPAC (1977). Sanitation for small islands; Guidelines for Selection and Development. Derrick Depledge (compiler) SOPAC Miscellaneous Report 250
- SOPAC 2001: Water, Sanitation and Hygiene Strategies for SOPAC 2001-2004, SOPAC Miscellaneous Report 444, December 2001.
- SOPAC (2001). Pacific Wastewater "Framework for Action", Majuro, Marshall Islands , October 2001
- SPREP (1993): Land-based Pollutants Inventory of the South Pacific. Nancy Convard
- UNEP/GPA Coorination Office, Guidance on Municipal Wastewater, Developed in coloboration with the World Health Organization (Who), the United Nations Centre for Human Settlements (UNCHS-Habitat), and the Water Supply and Sanitation Collaborative Council (WSSCC). August 2001
- UNDP/World Bank, 2000. Resource Guide in Urban Environmental Sanitation – A discussion of Issues and A Guide to Sources of Information to Help Resolve Them, Prepared by Kalbermatten Associates Inc. Unpublished Draft version of July 2000
- Water Supply and Sanitation Collaborative Council (WSSCC), the IRC International Water and Sanitation Centre and the Source web site: <http://www.wsscc.org/source>.