

SAMOA

1. INTRODUCTION

The Independent State of Samoa with its capital lies in the Central South Pacific Ocean. The Island state has got two main islands, Savaii and Upolu, in addition to a number of very small ones. Apia, the capital of Samoa and centre of government and commerce, as well as the international airport are located on the island of Upolu. The population figure for Samoa is currently approximated at 175,000 according to the latest census report.

The climate of Samoa is dominated by the south-easterly trade winds and the south pacific convergence zone, and is of the warm, wet and humid tropical rainforest type. Most rainfall is orographic, caused by the moisture laden winds meeting the high and large volcanic land masses which make up the two main islands. There is the drier season which occurs from April to September and a wetter season from October to March. During the former, the climate is influenced by the easterly to south easterly trade winds.

The water supply system in Samoa utilises rainfall, surface and underground water as the source of water. The treatment mode adopted for surface water is slow sand filtration followed by disinfection while bore water which is generally of good quality is pumped straight to the customers. A European Union funded project which is now nearing completion has introduced disinfection for bore water supply.

The Management of the water resource in Samoa is fragmented with various Government Departments and Agencies having some form of control or authority over the resource. The Samoa Water Authority as well as the Electric Power Corporation are the two major users of water.

High water consumption and leakage are some of the problems faced by the Samoa Water Authority, although measures are now in place to address these issues.

This paper discusses and looks at the important and critical issues regarding the water resource utilisation in Samoa, as well as measures being put in place to address these issues.

2. EXECUTIVE SUMMARY

Water resource management in Samoa is fragmented. The Ministry of Agriculture, Forestry, Fisheries and Meteorology deals with watershed management and hydrology while the Health Department monitors water quality standards. No agency is formally responsible for the regulation of water resources.

Samoa Water Authority is the national service provider of water while the Electric Power Corporation is the biggest water user for hydro electricity generation.

Samoa has access to an acceptable level of surface and groundwater. 90 to 95% of the population have access to piped water with 65% supplied by surface water and 35% by borehole and rainwater. Surface water availability is highly affected by the yearly rainfall, the land use practices and user demand.

The major institutional constraints on the effective and efficient management of water resources are fragmentation, insufficient finance and absent of proper legislation to bring together commitment of those interested parties with water interest role. However, Cabinet has just recently approved a National Water Resource Policy (NWRP) resulting from a multi-stakeholder consultation process now outlines the strategies of a more coordinated approach towards better resource management.

Samoa before the installation of water meters had an extremely high consumption daily rate (~900 litres per person), which contributed highly to low water pressures and no water problems in most areas, especially in Apia Township. This rate has significantly reduced to around 280 litres per person per day with the introduction of the user pay system for treated supply only.

The majority of the population residing in the urban area, Apia, receive water of high quality. It is serviced by three main water supply treatment plants (surface water), which are also disinfected with calcium hypochlorite. A current Joint European Union / Samoa funded project has further extended the capacity of one treatment plant (Fuluasou Treatment Plant) and hence extending the service coverage of potable water.

This same extended area will also be supplied with water from the eleven new pumping stations that has just completed.

Detailed knowledge and information on Samoa's water resources and its availability is really the starting point for better management programmes. The continuation therefore of the Stage 2 for the Master Plan that started on 1996 is strongly recommended.

Around seventy percent of Samoa's population and infrastructure are located on low-lying coastal areas. Such living patterns have become a source of major concern for Samoa because of its vulnerability to impacts of climate change and sea level rise.

Learning about the implications of critical environmental issues such as sea level rise and global warming are vital for Samoa, particularly in terms of its efforts to adapt to the climatic changes. Fortunately, our small island, having realised the effects of continued ignorance and negligence in this area, has joined the rest of the world in its commitment to reducing greenhouse gases and reversing this phenomenon.

Samoa has taken steps to become involved in the global efforts to prevent climate change. The Government of Samoa ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol in 1994 and 1997.

A National Disaster Management Council exists to coordinate early warning programmes, strategic response actions during an extreme event and relief efforts after an event.

Government's has given a great emphasis on promoting good governance in all aspects including water management.

Samoa has been classified as a Least Developed Country mainly because of its vulnerability to natural disasters and to external economic and trade developments for which it has no control. Despite these constraints, considerable progress has been achieved in the comprehensive reform programmes of the Government, which conveys opportunities, or given emphasis in the current Strategy for the Development of Samoa (SDS) which has as its theme the creation of opportunities for all.

In 1992 Samoa was the first country in the Pacific to ratify the Convention on the Elimination of all forms of discrimination against Women (CEDAW). Gender awareness training workshops are an integral part of capacity building efforts by the Ministry of Women's Affairs, Samoa Water Authority as well as other departments and civil society.

Samoa, like many of the Pacific Islands, is fortunate to be blessed with adequate annual rainfall reasonably distributed throughout the year giving rise to reliable raw water, river resources in several areas along with good sources of groundwater in many parts of the country. The catchment's condition for the major rivers is reasonably good, although changing at present. As a result – coupled with favourable hydro geologic impacts on quality the raw water quality is good (relatively) and leads itself to basic treatment technologies to achieve WHO drinking water standards.

After many studies over the years associated with various schemes the water treatment processes for surface water which are working well and 'appropriate' to the Samoan situation is the slow sand filtration process followed by disinfection (chlorination).

Samoa is currently going through the process of preparing a sanitation plan for Apia and investigating 'appropriate' technology for any wastewater treatment scheme or schemes that may be proposed for the Central Business District in Apia. It should be noted that Samoa is in the process of setting receiving water quality standards.

Demand Management is addressed in the "National Water Resources Policy" as one of the challenges that needs to be addressed in particular with regard to:

- Competing and conflicting demands for water resources nationwide
- Excessive demand on water supply

SWA aims to achieve 100% treated water supply coverage to all its customers as a long-term objective primarily through an extensive Demand Management plan.

The Samoa Water Authority commenced operations as a government-owned corporation, excised from the then Public Works Department, in 1994, following the passing of the Water Authority Act 1993 / 1994.

The SWA was forced to make a very rapid transition from public sector to statutory body but, at the same time, had to confront organisational deficiencies such as unclear objectives, staff structures in need of re-shaping, assets that were ill-defined and not systematically managed, accounting fragmented and staffing deficiencies in skills, experience and administration. This therefore motivated the need for Institutional Strengthening Project and therefore requesting financial assistance through government, which eventually was then picked by AusAID.

The SWA has approximately 16,500 customers broken down into metered household customers, metered commercial customers and un-metered (or flat rate) customers.

The existing tariff for metered consumers recognised the need to cut the very high household consumption rates, which existed at the time metering commenced. However, the experience has been that the installation of meters has resulted in a metered household cutting consumption from an estimated 4.6 cubic metres per day to around 2.0 cubic metres per day.

Water is vital for the life and health of the Samoan people and its environment and basic requirements for the development of the country as a whole. Because of human activities disturbing the ecosystem we agreed that our environment must be conserved and restored in order to ensure sustainable water resources for humanity.

3. NATIONAL CONSULTATION PROCESS

There was a broad consultation among stakeholders during the preparation of this paper as these particular stakeholders also took part during the formulation of the National Water Resource Policy that is now approved by Cabinet.

The whole focussed of this particular consultation was not only on the supply of water but the management of water resources. Water resource management is generally fragmented – the Ministry of Agriculture, Forestry, Fisheries and Meteorology deals with watershed management and hydrology while the Health Department monitors standard. No agency is formally responsible for the regulation of water resources. Samoa Water Authority is the national service provider of water while the Electric Power Corporation is the biggest water user for hydro electricity generation.

Consultations were held for all stakeholders such as Government Departments, Non Government Organisation, Private Sectors, and committees such as water advisory committees and women committees from villages.

Government Departments and Corporations that were involved include Health Department; Ministry of Agriculture, Forestry, Fisheries and Meteorology; Ministry of Internal Affairs; Treasury Department; Ministry of Women Affairs; Education Department; Samoa Water Authority; Electric Power Corporation; Samoa Visitor's Bureau; National University of Samoa; Samoa Polytechnic. Non Government Organisations involved include Le Siosiomaga Society; Chamber of Commerce and Samoa Umbrella of Non-Governmental Organisation.

4. VISION, ISSUES AND CONSTRAINTS

4.1 Water Resource Management:

Samoa has access to an acceptable level of surface and groundwater. 90% to 95% of the population have access to piped water with 65% supplied by surface water and 35% by borehole and rain water

Surface water availability is highly affected by the yearly rainfall, the land use practices and user demand (NCCCT, 1999). Samoa's vulnerability to water shortages has been evident in past years dry spells whereby most rivers experience dry periods and the fact that very few rivers run all year round despite high rainfall. There are a number of natural springs used by



Picture 1: Fuluasou River dried up on the year 2001

many villages as an alternative source of water when water supplies are very inconsistent and during very dry periods. A number of natural village springs were restored under a government project in 1990 and looked after by the village people. However the use and need for such springs are becoming less important and thus neglected with marked improvement in water supplies.

Land tenure issues regarding customary and private owned lands tends to be a limiting factor in particular for those lands with water resources. Land clearing for either agricultural practices or for settlement purposes is not managed and the increase in use of chemicals and fertilizers pose a real threat to catchment areas and water supplies. The major institutional constraints on the effective and efficient management of water resources are fragmentation, insufficient finance and absent of proper legislation to bring together commitment of those interested parties with water interest role.

However, Cabinet has just recently approved a National Water Resource Policy (NWRP) resulting from a multi-stakeholder consultation process now outlines the strategies of a more coordinated approach towards better resource management.

Samoa before the installation of water meters had an extremely high consumption daily rate (~900 litres per person) which contributed highly to low water pressures and no water problems in most areas, especially in Apia Township. This rate has significantly reduced to around 280 litres per person per day with the introduction of the user pay system for treated supply only. Thus the problem of high wastage consumption remains a problem for those areas receiving untreated (non potable) water.

The majority of the population residing in the urban area, Apia, receive water of high quality. It is serviced by three main water supply treatment plants (surface water) which are also disinfected with calcium hypochlorite. A current Joint European Union / Samoa funded project has further extended the capacity of one treatment plants (Fuluasou Treatment Plant) and hence extending the service coverage of potable water. This same extended area will also be supplied with water from the eleven new pumping stations that has just completed.



Picture 2: Chlorination Unit for Rural Water Supply

The portion of the population that are supplied by boreholes receives water of good quality. There is however a problem with saline intrusion into the water for some villages in the bigger island, Savaii, due to rock permeability and the close proximity of some bores to the sea. The remaining population however receive untreated surface water and it is this portion of the population who are at the greatest risk of being exposed to water borne diseases. The natural springs with its open nature is prone to many sources of contamination pose the same risk. Extensive tests by the Samoa Water Authority lab have indicated no risk with chemical contaminants for all sources with the exception of the bacteriological contaminants such as E. coli and Total coliforms for untreated water. Deforestation and land clearing leading to soil erosion contribute highly to poor water quality in terms of high

turbidity values and bacteriological counts.

Detailed knowledge and information on Samoa's water resources and its availability is really the starting point for better management programmes. The continuation therefore of the Stage 2 for the Master Plan that started on 1996 is strongly recommended. Knowing how much water and where it is available will help pin point priority areas to concentrate efforts towards. The protection and prevention of contamination at the source is undoubtedly the most effective and efficient way to minimise water quality related problems as treatment costs itself could be a limiting factor to the provision of good quality water. Protection of the source coupled with the user pay system will in turn improve water conservation and availability. However it is really getting the communities involved and understanding in water resource management issues that would foster better collaboration and more efficient management programmes. The revival of natural springs as alternative sources would also play an important part in conservation but also sustainability of water resources. The involvement of the health department though is critical to ensure safety of all water sources for the public to use.

4.2 Island Vulnerability

Typical of small tropical islands, characterised by their geographical remoteness from big landmasses, Samoa's climate features high temperatures, rainfall and humidity most of the year round. On the leeward (north western) sides of Savaii and Upolu (Samoa's main islands), there are notable wet and dry seasons. Southeast trade winds blow almost all year round also. However, Samoa's vulnerable months for severe tropical cyclones are during the summer time, between December and February.

Samoa is also exposed to exceptionally long dry spells that coincide with the EL Nino South Oscillation (ENSO) phenomenon. The two tropical cyclones that struck Samoa in 1990 and 1991 consecutively demonstrated her greatest vulnerability to extreme climate change and thus resulting in immense devastation around the country.

Around seventy percent of Samoa's population and infrastructure are located on low-lying coastal areas. Such living patterns have become a source of major concern for Samoa because of its vulnerability to impacts of climate change and sea level rise. Climate change is an important phenomenon because it affects the way Samoan's live and work. If the agricultural sector is affected by climate change, then a significant portion of the population whose daily sustenance is derived from the plantation and sea will also feel the pinch of its impact.

Learning about the implications of critical environmental issues such as sea level rise and global warming are vital for Samoa, particularly in terms of its efforts to adapt to the climatic changes. Fortunately, our small island, having realised the effects of continued ignorance and negligence in this area, has joined the rest of the world in its commitment to reducing greenhouse gases and reversing this phenomenon. Priority has already been attributed to addressing this area through policy initiatives and inventories.

Another major environmental concern for Samoa is the pollution of Ambient Air Quality, particularly in the Apia urban and industrial areas. While it has always been the practice of Samoans, particularly in the rural areas, to prepare food in earth ovens and incinerate their rubbish outside, the pollution created by the emission of smoke has only recently become an issue. Contaminants are being emitted into the atmosphere from all different sources around the islands of Samoa. In the Apia urban area, industrial establishments such as bakeries, food processing factories, timber treatment plants, diesel fuelled power plants, and landfill, are contributing to the presence of soot, sulphur dioxides, oxides of nitrogen, hydrocarbons, carbon monoxide and lead etc in Samoa, while manufacturing premises emit contaminants from the incomplete combustion of carbon-based fuels. These collective emissions from Samoa are contributors to the anthropogenic sources of greenhouse gases that are reportedly responsible for the 'global warming' effects, however its level of contribution to this problem is uncertain. What is clear is that with the absence of any legislative controls over these emissions, Samoa's contribution to the greenhouse gases will continue to increase. Notwithstanding that, while this situation is being reviewed, Samoa has taken steps to become involved in the global efforts to prevent climate change.

The destruction of the Ozone layer in the upper atmosphere is yet another source of great concern, however, Samoa, whose consumption of the Ozone substances is insignificant compared with large industrialised and other developing countries, is already taking actions towards the reduction of Ozone Depleting Substances (ODS). Having gained accession to the Vienna Convention and Montreal Protocol for the control of ODS in 1993, Samoa has since established a National Ozone team whose aim is to develop a national programme for the Phase out of ODS.

Spurred on by real life experiences of climate change effects on the physical social and economical environment, the Government of Samoa ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol in 1994 and 1997. Collective efforts have since been made by various Government Departments to educate the public on the impacts of changing weather and climatic conditions. Moreover, a National Disaster Management Council now exists to coordinate early warning programmes, strategic response actions during an extreme event and relief efforts after an event. This is a huge improvement from the ad hoc Disaster Management Committee in the early 1990s which apparently only became active in times of extreme events. The more permanent status of the existing National Disaster Management Council has given its role and functions more strength, however financially, the Committee is unfortunately still strongly dependent on external assistance for support of its activities and secretariat.

4.3 Awareness

4.3.1 Political Will

Government's has given a great emphasis on promoting good governance in all aspects including water management. The commitment that government has stated in the Development Strategies (SDS) has now opened the door to greater emphasis on implementation of a national water resource policy that Cabinet has just recently approved. The Department of Lands, Survey and Environment has now given mandate to coordinate this policy implementation.

4.3.2. Environmental Understanding

Water is of the most important natural resources. "Water is Life" and is at the heart of sustainable development. Yet this precious resource is widely mismanaged not only in Samoa but world wise, unless we change our ways of managing water, we will face serious crises in the future. Securing good quality water is one of the most important challenges in Samoa, not only in meeting basic human needs but also in making sustainable development possible at all levels.

About two thirds of the population had access to water drawn from surface resources, the other third relied on bore water or rainwater (Taule'alo 1993). Samoans have always regarded water as a gift from God and accordingly, they expect that it should be free. But due to human activities upsetting the eco-system very soon there will be no more water.

To insist on the harmonious co-existence of mankind and nature. Mankind should not make use of nature in an unrestrained way. In managing water resources, efforts should not only be made to protect mankind from destruction by water, but also be made to protect water from destruction by mankind. Deforestation activities, farming and reclamation of land unrestrained, diversion of river water, excessive withdrawal of underground water, wasteful usage of water and polluting of water are all examples of humanity damaging water catchment areas (SDS 2002). Humanity will invite punishment if he/she cannot establish a harmonious relationship with nature.

Water and water resources in Samoa serve both human and environmental needs; but the balance between the two has been tipped towards human wants. In Samoa we have witness the over abstraction of water resources, the degradation of natural ecosystems and the extinction of hundreds of freshwater species. The threat of increasing conflicts and rising number of environmental refugees is apparent. The great challenge we now face is the question how we can restore the balance? Where do we look for solutions that avoid the destruction of the world's life support system?

4.3.3. Education and Training

Samoa is still experiencing severe environmental pollution. However, it has been able to cope with this problem through the strengthening of environment policies. In order to preserve the quality of water, Samoa is still continuing to make every effort to reduce the environmental burdens that are generated at each stage of water utilisation. This is done through public awareness and educational programmes carried out on regular basis as well as dedicated programmes to commemorate events such as World Water Day, Environment Week, Ozone, Climate Change to name a few.

Challenges and Issues

- More awareness on the need to protect watersheds is crucial in relation to environmental issues.
- Communities need to be consulted fully given a role of active involvement in the management of water resources. To be waterwise and protection of water resources should be addressed at the village level through traditional governance mechanism (village fono/chief council).
- Water resources should be conserved in partnership with all stakeholders. Through such collaborative effort, the conservation of all fresh water bodies will be more integrated. It is envisaged that the sustainable utilisation of water resources will be achieved in this way.

There is a need to protect water resources from the adverse impacts of human activities. The 1998 EIA regulations need to be enforced, in order for water abstractions and associated developments to be sustainable in the long term.

- Prime challenge is to ensure the integrity of ecosystems through sustainable water resource management. Thus challenge the difficult task of changing human comprehension of the problem so that human behaviour becomes supportive, rather than a negative force, in its dealing with nature.

4.3.4. Gender Balance & Equity

Samoa has been classified as a Least Developed Country mainly because of its vulnerability to natural disasters and to external economic and trade developments for which it has no control. Despite these constraints, considerable progress has been achieved in the comprehensive reform programmes of the Government, which conveys opportunities, or given emphasis in the current Strategy for the Development of Samoa (SDS) which has as its theme the creation of opportunities for all.

In 1992 Samoa was the first country in the Pacific to ratify the Convention on the Elimination of all forms of discrimination against Women (CEDAW). Gender awareness training workshops are an integral part of capacity building efforts by the Ministry of Women's Affairs, Samoa Water Authority as well as other departments and civil society.

The tamaitai (female) play an essential part in the provision, management and safeguarding of water. This pivotal role of Samoan women as providers and users of water and guardians of the living environment have been reflected in institutional arrangements and community settings for the development and management of water resources. A fine example would be the capital of Apia which to this day still uses the Women's Vineula Committee for this water community service.

Water is indeed vital for all forms of life and is the key to the well being and health of human. In this environment, men and women across Samoa have equal opportunity and complete access to safe and adequate water to meet their essential and basic needs of households and business.

Over the years, considerable capacity on the inter-relationship between gender in water and environmental affairs has been built. Samoa now has women and men who, in their own right and within organizations, have applied knowledge and expertise at community level on dealing with water resources. This expertise has now been harnessed and fully applied.

In Samoa all implementing organization such as Samoa Water Authority with mandates for the development and management of water resources have deployed expertise within our organizations. Gender-aware staffs are appointed from grass roots to white-collar jobs, and have made measurable progress towards increasing gender capacity. Community base organizations including women's committee, komiti tumama etc has enabled them to interact with higher-level organizations and government.

Challenges and Issues:

- Gender equity should be more recognize that access to safe and sufficient water and sanitation are basic human needs and are essential to health and well being
- To give equal opportunities to both men and women, through a participatory in decision making and process of water management.
- Those in all establishments where behaviour and skills relating to water and environmental management should be taught from primary to engineering to decision making institutions should be an integral part of learning.
- The need to share the burdens and costs equitably and to change gender norms to achieve greater equity.
- Affirmative actions are needed so that women, like men, can acquire knowledge technical skills and organisational expertise and overcome inequities.



Picture 3: Slow Sand Filter, Treatment for Rural Water

4.4 Technology

4.4.1. Water Treatment

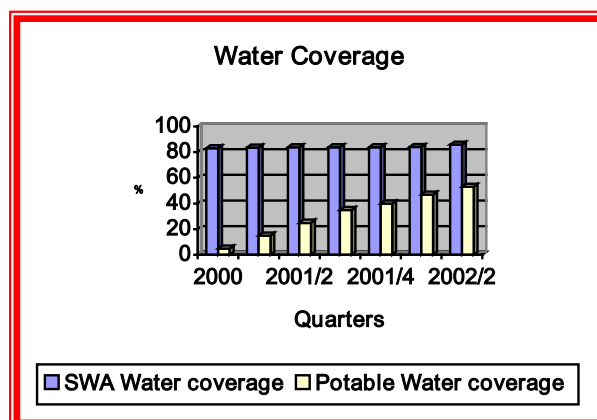
Samoa, like many of the Pacific Islands, is fortunate to be blessed with adequate annual rainfall reasonably distributed throughout the year giving rise to reliable raw water, river resources in several areas along with good sources of groundwater in many parts of the country. The catchment condition for the major rivers is reasonably good, although changing at present. As a result – coupled with favourable hydro geologic impacts on quality the raw water quality is good (relatively) and leads itself to basic treatment technologies to achieve WHO drinking water standards.

After many studies over the years associated with various schemes the water treatment processes for surface water which are working well and ‘appropriate’ to the Samoan situation are:

- Turbidity - Sedimentation (horizontal flow)
Roughing Filters (up flow)
Slow Sand Filters
- Bacteria & Parasites - Slow Sand Filters
- Bacteria & Viruses - Chlorination (Calcium Hypo chlorite)
- Taste & Odour - Slow Sand Filter
- Hardness - Not Applicable
- Organic - Not Applicable

This treatment train works well although it is labour intensive but requires only basic water treatment plant operation skills.

In the case of the Groundwater the basic water quality is generally very good and meets WHO standards. However the aquifers are generally unconfined and coliform and E Coli have been detected in some bores. Our most recently constructed scheme involving 23 bores has adopted chlorination at the well head as precautionary measure against bacteria and viruses.



4.4.2 Wastewater Treatment

Samoa is currently going through the process of preparing a sanitation plan for Apia and investigating ‘appropriate’ technology for any wastewater treatment scheme or schemes that may be proposed for the Central Business District in Apia. Currently in Samoa, septic tank or cess pits are used – in greater Apia and the rural areas. The Central Business District, Hospitals and major industries have a range of treatment systems ranging from enlarged septic tanks to state of the art package plants.

We are currently investigating options for sanitation improvements in Apia. Although several conventional reticulation, treatment and outfall disposal schemes have been put forward it is likely a more rational and ‘appropriate’ solution will be eventually adopted for Apia. This will involve:

- Upgrading septic tank standards (design construction)
- Preparation of septage disposal plans
- Sewage reticulation of the Central Business District
- Selection of an ‘appropriate’ treatment process and disposal system for the Central Business District.

It should be noted Samoa is in the process of setting receiving water quality standards.

4.4.3. Demand Management

Demand Management is addressed in the “National Water Resources Policy” as one of the challenges that needs to be addressed in particular with regard to:

- Competing and conflicting demands for water resources nationwide
- Excessive demand on water supply

The first challenge has not been addressed at present, and this will depend on the Institutional arrangements, which are also outlined in the Policy (as part of the Medium-to-long-term strategy), which is to “Establish a regulatory framework for the sustainable management of water resources”. This has been allocated as a responsibility of the Department of Lands, Survey and Environment (DLSE) and part of this strategy is to “establish pricing mechanisms for the extracting and allocating of water”.

The Samoa Water Authority however has addressed the latter challenge quite extensively in the last 5 years and some notable progress has been made.

One of the key factors, which placed emphasis on this issue of excessive demand, was the pre-requisite of the current EU/Samoa Rural Water Supply Scheme that the consumption had to be reduced before the project could commence. A study that was done as part of the design for this project had measured consumption at approximately 670l/c/d, which was considered excessive and unsustainable. This challenge has also been addressed by another project funded by KfW – the Apia Water Supply Consolidation Project (AWSCP 1999-2001) that was contracted to improve the water quality and supply in the urban Apia area. They discovered early in the project that this could only be achieved with a reduction in demand (amongst other factors).

With the momentum and progress that these projects have initiated, the SWA has continued its programs for Demand Management to continually drive it down to a target of approximately 220 l/c/d within the next 5 - 10 years. The achievements of the Demand Management initiatives also impact on the service of the SWA in many areas but especially on the quality of water supply, which further impacts on reduction of consumption through metering. The reason is that there are areas currently being supplied by raw water and in order for these areas to be shifted onto treated water supply (and therefore can be metered), consumptions in these treated water areas have to be reduced. The reduction in consumption (primarily domestic) is achieved through a combined effort of metering and public awareness, and this ‘saved’ water can be re-routed into these raw water supplied areas a portion at a time, continuously decreasing the raw water supply coverage area until it is completely supplied with treated water (and synonymously completely metered).

SWA aims to achieve 100% treated water supply coverage to all its customers as a long-term objective primarily through an extensive Demand Management plan. Target dates have not been established for this goal as yet until sufficient information becomes available (from meter readings etc) to enable this to be done meaningfully.

4.5 Institutional Arrangement:

4.5.1. Policy

Samoa has just set up a National Water Resource Policy for the conservation, sustainable use and management of Samoa’s water resource. This policy is also to ensure community equitable access to water of suitable quality and appropriate quantity to meet all reasonable health, environmental and economic development needs.

One of the main challenges that are addressed by this policy is to resolve the current problem of fragmented control, management and protection of water resource. The Department of Lands, Survey and Environment is mandated to coordinate the implementation of this policy.

However, Samoa Water Authority, as a service provider for the country water supply, has progressed to contribute to the above national policy objectives through strengthening its services in all aspects.

4.5.2. Institutional Strengthening

The Samoa Water Authority commenced operations as a government-owned corporation, excised from the then Public Works Department, in 1994, following the passing of the Water Authority Act 1993 / 1994. This conformed to the economic directions determined by the Government of Samoa. A long-term aim of cost recovery was indicated.

The SWA was forced to make a very rapid transition from public sector to statutory body but, at the same time, had to confront organisational deficiencies such as unclear objectives, staff structures in need of re-shaping, assets that were ill-defined and not systematically managed, accounting fragmented and staffing deficiencies in skills, experience and administration. This therefore motivated the need for Institutional

Strengthening Project and therefore requesting financial assistance through government which eventually was then picked by AusAID

The project design identified a broad objective as being “a contribution to the development of the SWA as an organization capable of providing its customers with a level of service appropriate to their needs at prices that would be affordable and equitable”. It recognised that such a project would need to be long-term and that the design may need to be developed as the project progressed.

The project was therefore structured into three phases:

- | | |
|---|---------|
| • Strategic Planning and Core Systems Development | 1 year |
| • Procedures and Work Practices | 2 years |
| • Consolidation and Withdrawal | 2 years |

The first two phases would have as an output, a design for the subsequent phase. The project addressed four components:

- Executive Management Strengthening
- Asset Management
- Financial Management
- Human Resource Management and Administration

Key outputs have been:

Corporate planning – SWA reviews its plan annually, setting a 3-year horizon each time. The corporate plan links corporate objectives to budgets through a corporate action plan and divisional business plans.

Policies and procedures structured into a series of manuals:

- Corporate Management
- Asset Management
- Human Resources Management
- Financial Management
- Customer Relations

An asset management strategy: To incorporate a systematic approach to creation, operation, maintenance, replacement and disposal of assets to achieve cost efficiencies in service delivery.

Financial management: To ensure integrity of the accounts and improved billing and collection performance leading to accurate public reporting and useful management reports to uncover opportunities for expenditure management generally.

Training: The development and implementation of training programs focussed on organisational needs. Much training has resulted from the activities of various donor projects. The ISP seeks to ensure the good management of training.

Staff grading: Providing a sound job grading structure, corresponding salary scales and setting in place the mechanisms for consistent grading of jobs.

In the duration of the project thus far, a series of organisational improvements have occurred, if not as a direct result of the project, at least as a result of the environment it supports. These included:

- Improved management generally
- Financial performance accurately tracked
- An integrated billing and accounting system
- Improved water supply in the Apia area
- The fair grading of staff
- Audit functions operating and accountable to an independent committee
- Development of modern asset management techniques

The organisation has the challenge of maintaining and building upon the benefits of the institutional strengthening project. It needs to retain its expanded corporate knowledge. There is now an expectation of performance by the SWA that will be difficult to resist as the country progresses its reform agenda.

4.6. Finance

4.6.1. Costs and Tariffs

The SWA has approximately 16,500 customers broken down into metered household customers, metered commercial customers and un-metered (or flat rate) customers. As would be expected, the consumption rate for these customers differs significantly with an un-metered household consuming more than double the consumption in a metered household (Figure 1).

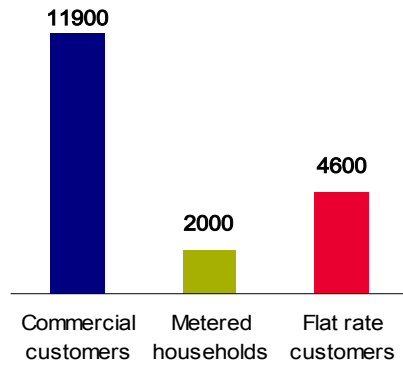


Figure 1. Estimated consumption rates (litres/customer/day).

The existing tariff for metered consumers recognised the need to cut the very high household consumption rates which existed at the time metering commenced. The tariff provides a hefty penalty if consumers maintain this consumption pattern after metering (Figure 2).

However, the experience has been that the installation of meters has resulted in a metered household cutting consumption from an estimated 4.6 cubic metres per day to around 2.0 cubic metres per day.

While this reduction is desirable from a water conservation perspective, the tariff has several disadvantages from a financial and/or economic perspective. These include:

- the flat fee tariff of 144 tala is equivalent to a tariff of about 0.08 tala per cubic metre which is well below costs of production;

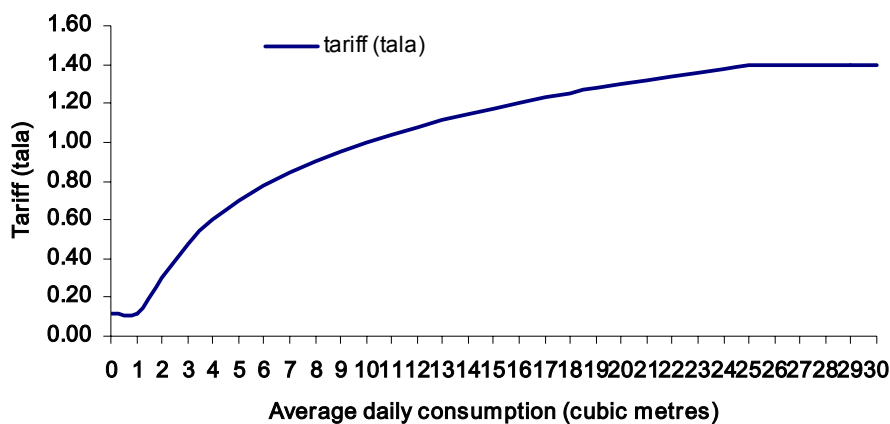


Figure 2. SWA metered tariff.

- at average consumption rates of 2 cubic metres per day for metered customers, the tariff is 0.3 tala per cubic metre. This tariff does not cover the costs of production at existing consumption levels; and
- at average consumption rates of 11.9 cubic metres a day, commercial customers are charged 1.08 tala per cubic metre. This tariff is well above costs of production and the tariff acts like a tax on commercial customers, which could reduce economic development in Samoa.

Unmetered customers make up the bulk of the SWA's customer base (Figure 3). Consequently, the very low revenue generated by flat rate customers is not offset by the tax on commercial customers. Thus the low revenue from flat rate customers is a major reason why the SWA's revenues do not cover costs of production (Figure 3).

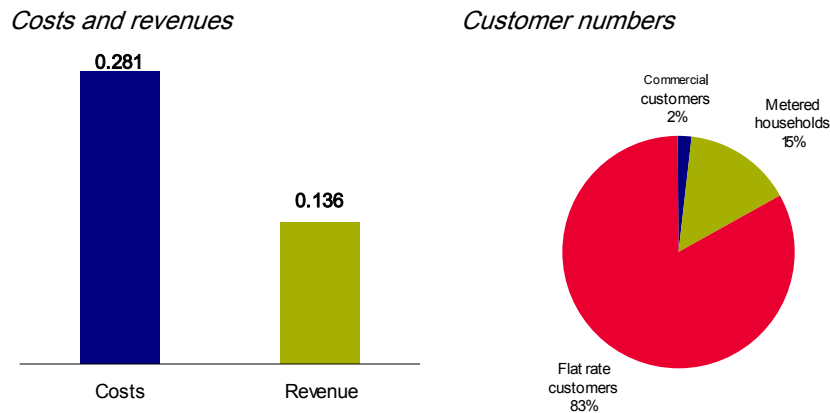


Figure 3. SWA costs and revenues (tala per m³ consumed), and customers (proportion)

The drain on SWA finances caused by the low unit revenues it generates is compounded by a revenue recovery rate which has historically been between 65 to 70 per cent of billings. Consequently, accounts receivable were equivalent to about 20 months of billing revenue in recent years. The combination of low unit revenues and low revenue recovery rates has resulted in a significant cash injection from the Samoan Government. In the year ending June 2000 this grant was equal to 68 per cent of the SWA's total costs. June 2002 has shown an improvement to 62 per cent due to excessive disconnection programme carried out by SWA.

The SWA has recognised that this situation is not sustainable. The high consumption rates are reducing the effectiveness of the water treatment plants. In addition, service delivery standards are not being met on a consistent basis. It is also difficult for the SWA to gain support for capital works when revenue recovery rates are low.

The SWA is currently addressing this situation in a very positive manner. Major initiatives include:

- development of a corporate plan which aims to achieve financial independence for the SWA;
- the development of performance measures which track the financial and physical performance of the SWA;
- the design of a new tariff which will enable operating costs to be covered;
- recognition and funding by the Samoan Government of Community Service Obligations met by the SWA;
- development and implementation of a debt reduction strategy which has proved to be highly effective; and
- Continued installation of meters.

5. PLAN OF ACTION

Objectives	Action Already Undertaken	Future Actions Needed	Means of Implementation
<p>Water Resource Management:</p> <ul style="list-style-type: none"> Secure equitable access to water for all Samoans. Protect water quality and ecosystem. 	<p>Government has approved a national policy to address these two objectives.</p> <p>Stage 1 of Master Plan Study was completed 1996</p> <p>National Drinking water standard has also been drafted and yet to be legislated</p>	<p>Water Resource management Plan is needed.</p> <p>Stage 2 for Master Plan Study is yet to start. Awaiting possible funding</p> <p>Awaiting Legislation for National Drinking Water Standard</p>	<p>Department of Lands, Survey and Environment will prepare the management plan and start implementing the policy.</p> <p>Treasury and Samoa Water Authority is currently negotiating for funding aid to complete Master Plan Study for Samoa</p> <p>Health Department is preparing this legislation to monitor the National Drinking Water Standard</p>
<p>Island Vulnerability:</p> <ul style="list-style-type: none"> Manage risks to cope with variability and climate change 	<p>Government has already established a National Disaster Committee (NDC) which directly responsible for planning and overseeing the vulnerability of the island to cyclones, floods etc.</p>	<p>All Water Institutions locally should be included and play an active role</p>	<p>NDC which is under Prime Minister Department will enforce this participatory involvement of all water institution.</p>
<p>Awareness:</p> <ul style="list-style-type: none"> Promote participatory share of benefits from large projects. Promote equity 	<p>This is an ongoing role of all bodies in an effort to develop Samoa. Consultation approach is a major part of Samoan Culture. Village Councils, women committees, youths are all consulted and participating on large projects studies.</p> <p>This is generally accepted in Samoa as an emphasis in all major water institutions, such as SWA, DLSE.</p> <p>Water Authority has set up an Equal Employment Opportunity Policy which is currently in operation.</p> <p>Ministry of Women Affairs continue to promote this emphasis not only in water but across the whole island</p>	<p>Although that this is well known approach as part of the culture. Measures should still be set in place to assure that these participatory roles are well carried out for national monitoring.</p> <p>Critical matters such as land issues related for major water project will be resolved easily by this approach</p> <p>There still is a need to continually promote this equity role in the water sector through awareness program.</p> <p>It is somehow culturally unacceptable for a female to work as a plumber, digging the pipeline trench; <i>“usually fathers don’t accept their daughters to do this sort of work”</i>.</p> <p>There is currently only one female plumber with Samoa Water Authority. However, in the management team of five (5) including the General Manager, two are females</p>	<p>Department of Lands and Environment through the implementation of the National Policy for Water should enforce this requirements and all water institutions like SWA, EPC and others should adhere to this for all future large projects.</p> <p>Samoa Water Authority, Department of Lands, Survey & Environment as well as Department of Agriculture, Forestry and Meteorology should continue to stress this equity emphasis especially on water projects.</p> <p>We should not forget that the focus is not only to recognise the equity between men and women but also to include other minority groups such as handicap people etc.</p>
<p>Technology:</p> <ul style="list-style-type: none"> Ensure that water infrastructure and quality services deliver to all Samoans. 	<p>The current National water coverage is 96%, only 53% are currently receiving good potable water from not only treatment plants but boreholes. (32% are receiving chlorinated water). 10% of the above coverage are independent water supply</p>	<p>4.4% of the country are not yet have access to any pipe water. They are currently depending on springs and rainwater.</p>	<p>This is still another challenge for SWA and Government for another five years</p>

<ul style="list-style-type: none"> Share knowledge and innovative technologies 	<p>scheme that are managed and run by respective village councils and districts</p> <p>The current Rural Water supply project that is due to complete at the end of this year 2002 will improve the above statistics to about 65% of the population will receive chlorinated water.</p> <p>Samoa is currently promoting this objective of sharing knowledge and experience with our other fellow Pacific island countries. SWA alone has maintained its commitment to support and strengthen the capabilities of a regional Pacific Water Association (PWA).</p> <p>Samoa Water Authority has started to investigate the capacity and use of fuel cell technologies and solar energy for borehole water pumps. (Taking a lot of interest on Renewable energy emphasis that is currently promoted by ADB (PREGA)).</p> <p>Has already investigating all different kind of suitable treatment of Sewerage System for Apia. An appropriate and more environmentally friendly technology will probably be selected</p>	<p>Altogether by the end of this year, 35% of the country will be left to be yet supplied by high quality treated water.</p> <p>Partnership arrangement with other individual water utilities in the Pacific through PWA.</p> <p>Closer consultation and relationship with other water related regional organisation like SOPAC, SPREP etc.</p> <p>SWA is currently working on a pilot project relating to renewable energy.</p> <p>Decision is yet to be made on Sewerage System.</p>	<p>SWA and Treasury is currently making negotiation for further funding to meet this need</p> <p>SWA will continue to support PWA</p> <p>SWA, DLSE and Meteorology of the Ministry of Agriculture will continue to work together with regional organisation</p> <p>Treasury and SWA together with other stakeholders on Renewable Energy will finalise these proposals</p> <p>DLSE, Treasury and SWA will finalise this decision as soon as possible</p>
<p>Institutional Arrangement:</p> <ul style="list-style-type: none"> Encourage more efficient service provision Improve Water management Make SWA and other water institutions more effective 	<p>SWA, as the major water service provider for the country, is currently undergoing an Institutional Strengthening Project.</p> <p>One of the very important components of this project is to amend/change the legislation from 1993/1994 Water Act to a much better operational oriented Act.</p> <p>Work on this new SWA Act is completed and now with the Attorney General's office for final submission to Cabinet and then Parliament.</p> <p>Water Resource Act was also prepared at the same time to highlight a clear separation between the regulator from a service provider but now pending for further discussion amongst the water sector.</p>	<p>SWA will work together with DLSE to implement National water policy and promote effective and efficient water services in Samoa</p>	<p>Ministry of Foreign Affairs and Treasury should support the water sectors in requesting financial assistance for projects relating to strengthening the water sectors and institutions</p>

<p>Finance:</p> <ul style="list-style-type: none"> Strengthen public funding capabilities 	<p>SWA has just submitted to Cabinet its proposal for a review on current water tariff that will assure better capabilities on public funding. This tariff is to achieve 100% simple cost recovery for just operation and maintenance on all water related assets currently under SWA.</p>	<p>100% full cost recovery tariff for SWA is also desirable to include new capital works and further extension of water asset to cover the whole country.</p>	<p>SWA is currently awaiting Cabinet decision on its recommendation /proposal for the review of water tariff.</p>
<ul style="list-style-type: none"> Improve economic efficiency to sustain operations and investment 	<p>Government, through National Water Resource Policy, will also be charging fees for extracting water from all water resource.</p> <p>Two very important aspects of this current review of water tariff with Cabinet.</p> <p>First, is the inclusion of a free entitlement of 183m³ to all domestic customers to ensure that no one cannot afford to pay for water.</p> <p>Second, is the acknowledgement of Customer Service Obligation of the Government of Samoa to be responsible in paying for that essential supply of water to all her citizens.</p> <p>Water subsidy (free entitlement) is only for domestic customers, not commercial customers.</p>	<p>DLSE will design this fee structure through participatory discussion and broad consultation with all water stakeholders.</p> <p>Implementation for the new tariff review if approved by Cabinet.</p> <p>Implementation Plan includes consultations with all major water stakeholders</p>	<p>Cabinet approval will also be needed in order for this fee structure to be approved</p> <p>Awaiting Cabinet Decision</p>
<ul style="list-style-type: none"> Make water attractive for private investment. 	<p>Current tariff review also considers this very important factor. This will reflect on the drop of the maximum rate for the new tariff from the existing \$1.40/cubic meter/day to 0.67/cubic meter/day.</p> <p>An attractive tariff to any investor to set up a water business in Samoa</p>	<p>Awaiting Cabinet decision</p>	<p>SWA is committed to implement this tariff as soon as possible and promote its quality service in the country.</p>

6.0 CONCLUSION

Water is vital for the life and health of the Samoan people and its environment and basic requirements for the development of the country as a whole. Because of human activities disturbing the ecosystem we agreed that our environment must be conserved and restored in order to ensure sustainable water resources for humanity. However, water in Samoa is not just a physical substance essential to human life, but it also its environment that supported all other living things.

The rapid growth of the population is the driver behind the many problems facing our environment and we must be fully considered in conservation strategies to lessen the ecosystem's burden. We must change our thinking to recognise that ecosystems are the source of water; it is not a question of how much water to put back to conserve nature and biodiversity but how much not to take out in the first place.

The right of both men and women's entitle then to an equitable share in the management of water for all uses, domestic, farming and entrepreneurial – and to protection of the environment. Their interests are visibly and equitably represented in decision-making organizations whether at the community, institutional or administrative level. Research – qualitative as well as quantitative, has amply demonstrated that where women and men share water and decision-making, management of water services is more effective and better sustained.

The water treatment technology as outlined above is an older technology and labour intensive but is currently 'appropriate' for Samoa and works well.

It would appear that conventional reticulation, small wastewater treatment and a major sea outfall is inappropriate for Apia. Because of the size of land holdings, topography and overall affordability issues it appears well maintained septic tank systems are 'appropriate' for the greater Apia. Improved drainage and 'appropriate' treatment and disposal technologies (environmentally friendly) are likely to be adopted for the Central Business District and the major industries.

There is a greater need to pull together the water sector in a more controlled and coordinated approach to promote efficient and effective management of water resource in Samoa. Uniting effort to assure that Samoa will continue to enjoy the good water services and supply in a future is essential. This will contribute in strengthening of all aspects of water management, such as mobilisation of finance, training, improved economic efficiency, investments and mostly to promote transparency and awareness in order to combat any possible corruption in water sector.