

# WATER SAFETY PLAN PROGRAMME

ANNEX: 4

# DRAFT NATIONAL PLAN



COOK ISLANDS  
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## **INTRODUCTION**

The importance of safe drinking water for health and development in the Pacific Island Countries has been reflected in many regional action plans and policies. Through the Regional Action Plan on Sustainable Water Management (Sigatoka, Fiji, 2002) Pacific Island Countries outlined actions that were needed to achieve sustainable water management through collaborative efforts by water sector authorities and inter-sectoral partners.

The WHO workshop on Drinking Water Quality Standards and Monitoring in Pacific Island Countries (Nadi, Fiji, 2005) developed a Framework for Action on Drinking Water Quality and Health in Pacific Island Countries, designed to support the implementation of drinking water quality actions envisioned in the RAP.

The Pacific Island Countries embraced the Water Safety Plan concept during the workshop and this was reflected in the Regional Framework. It was recommended that PICs should use Water Safety Plans to better manage their water supplies to ensure safe quality drinking water for Pacific communities.

The Government of Cook Islands, through various government and non-government agencies including Ministry of Works, Ministry of Health, National Environment Service, NGOs, Vaka Councils and Community Groups, are committed to establish Water Safety Plans for urban, rural and outer-island water supplies.

A Steering Committee for the Cook Islands Water Safety Plan Programme has been established and consists of relevant agencies, both government and non-government. The Ministry of Works is the secretariat for the Steering Committee as well as the lead implementing agency.

Other agencies such as the Ministry of Health, National Environment Service, and Office for Island Administration, Department of Environment, National Planning Office, Ministry of Marine Resources, Ministry of Agriculture, Ministry of Tourism, Ministry of Finance CIANGO and NCW have committed to support the programme.



*2.5 million L tank at Takuvaine intake*

## **BACKGROUND**

### **The Pacific Water Safety Plan Programme**

The Pacific Water Safety Plan Programme is a joint initiative of the South Pacific Applied Geo-science Commission (SOPAC) and the World Health Organization (WHO).

Funded by AUSAID, the programme is a response to the regionally endorsed Framework for Action on Drinking Water Quality and Health and will be implemented over the period 2006-2007.

The programme plans to improve the health of people in the Pacific through strengthening of national capacity to maintain safe drinking water supply systems.

Water Safety Plans (WSP), as promoted by WHO in the Guidelines for Drinking Water Quality (Third Edition), are tools that allow for proactive approaches to ensuring safety of a drinking water supply using risk assessment and management approaches to identify risks of contamination of water supply and allow for sufficient mechanisms to manage these risks.

The primary objective of a Water Safety Plan is to minimize contamination of water sources, prevent or remove contamination during treatment and prevent contamination during storage and distribution.

These objectives are equally applicable to large reticulated water supplies; smaller community managed systems as well as individual household systems.

### **WHO Guidelines for Drinking Water Quality**

Drinking-water quality control is a key issue in public health policies. From 1950 to 1970 the World Health Organization (WHO) published standards for drinking-water quality that served as a scientific basis for monitoring the quality of the water produced and delivered by water suppliers. Later on, other legislative and regulatory approaches were published by the WHO and the European Union (EU): WHO Guidelines for Drinking Water (1st edition, 1984, and 2nd edition, 1993), and EU Directives 80/778/EC, and 98/83/EC (EC, 1998). This legislation was strongly focused on standards for treated drinking water and on compliance monitoring. Water quality was guaranteed by the so-called end product testing, based on spot sampling of the water produced. With this procedure it was possible to bring the very widespread water-borne diseases under control, especially those of bacterial origin.

Over the years, several shortcomings and limitations of the end-product testing methodology has been identified. Some of them are related to the following aspects:

a) There is a multitude of water-borne pathogens that cannot be detected or they can be detected insecurely with the classical indicators *E. coli* Coliforms and *Enterococci*,

particularly viruses and protozoa. There are examples of water-borne disease outbreaks (e.g., Milwaukee - U.S.A., in 1993) that occurred through water supply systems that met the standard for absence of indicator micro-organisms.

b) Often, monitoring results are available out of time of intervention needed to maintain the safety of a supply system. End product testing only allows checking if the water delivered was good and safe (or unsafe) after distributed and consumed.

c) End-product testing hardly can be considered a sound method for representative water quality *status*. A very small fraction of the total volume of water produced and delivered is subject to microbiological and chemical analysis. Moreover, the monitoring frequency does not guarantee representative results in time and space, as well.

d) End-product testing does not provide safety in itself. Rather is a mean of verification that all the supply system components and installed control measures are working properly.

In recognition of these limitations, primary reliance on end-product testing is presently considered not to be sufficient to provide confidence in good and safe drinking-water, moving towards to process monitoring by introducing a management framework for safe water (Bartram *et al.*, 2001). The 3rd edition of the WHO Guidelines for Drinking-water Quality, (GDWQ) proposes a more effective risk assessment and risk management approach for drinking-water quality control. The GDWQ emphasize the multi-barrier principle, establishing a systematic process for hazards identification and effective management procedures for their control through the application of a preventive Water Safety Plan (WSP) that comprises all steps in water protection, from catchments to the consumer (2001; WHO, 2004).

## Water Safety Plan

A Water Safety Plan (WSP) is an improved risk assessment and management tool designed to ensure the delivery of safe drinking water to consumers. It identifies:

- hazards that the water supply is exposed to and the level of risk associated with each;
- how each hazard will and/or can be controlled;
- how the means of control will be monitored;
- how the operator can tell if control has been lost;
- what actions are required to restore control; and
- how the effectiveness of the whole system can be verified.

## Developing a Water Safety Plan

The development of a WSP involves a systematic approach for:

- preventing the contamination of source waters
- treating water to reduce or remove contaminants; and
- preventing re-contamination during storage, distribution and handling of treated water

In order to do this, the water authority or supplier needs to:

- assemble a team that understands the system;
- identify risks, hazards and hazardous events;
- identify means for controlling these risks, hazards and hazardous events;
- establish a monitoring system to ensure consistent supply of safe drinking water; and
- periodically review the Water Safety Plan.

To develop and establish a WSP, some essential prerequisites are required such as AS getting commitment from Government, Managers and Executive Officers.

Once commitment is achieved, a WSP steering committee is established (consisting of relevant stakeholders such as health and environment professionals as well as the water supplier), the water supply system is described and risks identified, control measures are identified and monitoring systems developed.



*20 micron ARKAL filters at Tupapa Intake*

## **ORGANISATIONS INVOLVED**

### Department of Water Works (Ministry of Works)

The Department of Water Works (DWW) is the agency responsible for planning, installation, operation and maintenance of public water systems in Rarotonga and selected outer islands including Atiu, Mangaia, and Aitutaki. DWW is the lead implementing agency for the Cook Islands Water Safety Plan Programme and are a key agency in the replication of WSPs in other supplies in Cook Islands. They are also the secretariat for the National Steering Committee.

### Ministry of Health

The Public Health Division of the Ministry of Health is the agency responsible for monitoring and surveillance of the biological quality of public water supply schemes.

There are existing programmes for regular water quality monitoring of public water supplies. These could be strengthened through Water Safety Plan pilots.

The MoH also have awareness programmes for communities on public health issues including water-borne diseases and could play a key role in developing awareness programmes for water quality issues.

### Ministry of Marine Resources

The Ministry of Marine Resources is responsible for the management of coastal waters around the Cook Islands. They have shown a great deal of interest in addressing lagoon pollution from surface water runoff and sewage runoff from land-based activities including agriculture and tourism.

The Ministry of Marine Resources has a well-equipped laboratory for chemical, physical analysis of coastal, surface and groundwater.

### Vaka Councils

The Vaka Councils are the local government institutions responsible for development and administration of districts within Cook Islands. They have a mandate for representing their communities and essentially provide a vehicle for taking community issues up to the Government. Their contribution towards community education and

awareness will be of great value in raising awareness on drinking water quality issues as well as awareness on Water Safety Plan related issues.

## CIANGO

The Cook Islands Association of NGOs is responsible for community development projects. It is widely recognized by International donors and has secured funding for a number of community projects. CIANGO has a key role in the Cook Islands Water Safety Plan Programme especially because of their relationship with communities, government agencies, donors, expertise in writing project proposals for funding and links with all local NGOs and community based organizations in Cook Islands.

## Ministry of Finance

The Ministry of Finance is the agency responsible for preparing the national budget and thus has an impact on capital and recurrent funding for water supply projects. Their involvement in the Cook Islands Water Safety Programme is vital, as some improvements will need small-scale capital works that could be Government funded rather than donor funded.

## The Office for Island Administration

The Office for Island Administration is the agency responsible for overall coordination and monitoring of projects in outer islands, and for coordination of development plans including those affecting the water sector.

## National Environment Service

The National Environment Service is the agency responsible for environmental issues and concerns including pollution, conservation, waste management, climate change and EIAs.

The IWP programme in Cook Islands has developed a Catchment Management Plan for the Takuvaine Catchment, which is a major milestone for the Cook Islands. There is a strong support for similar Catchment Management Plans for the other 11 catchments on Rarotonga.

The Cook Islands Water Safety Plan Programme would build on the work already done by IWP and include the National Environment Service as a key stakeholder especially for the Catchment Management aspects of the Water Safety Plans.

### Cook Islands Meteorological Centre

The Meteorological Office is responsible for issuing weather forecast and monitoring of long-term weather patterns and Climate Change issues. They have strong technical capacity for monitoring and predicting effects of Climate Change on water resources in the Cook Islands.

## ***NATIONAL WATER RESOURCE & SUPPLY STATUS***

Status of Water Resources (Urban, rural & outer island)

To be completed by the Steering Committee

Existing Legislation, Plans & Policies

To be completed by the Steering Committee

Existing water quality standards & guidelines

To be completed by the Steering Committee



*Water intake at Avana Catchment*

## ***ACTIONS FOR PREPARATION OF WATER SAFETY PLANS***

### SYSTEM DESCRIPTION & ANALYSIS

**1. Assemble a team of people who have good knowledge of the system**

Assemble a team for water supply description and analysis. The team should include people with relevant technical and operational knowledge of the system.

**2. Allocate sufficient funds to carry out a full system assessment & analysis**

**3. Research previous studies and reports on the water supply system**

Find out key information including:

- Hydrology
- Water Quality trends
- Climatic conditions and weather patterns

**4. Develop checklists for describing a water supply system**

The team should develop appropriate methodologies for describing the system including tools such as checklists and maps.

**5. Conduct Field Trips and surveys to describe a water supply system**

The team should conduct surveys in order to describe and analyze the system in the form of systematic diagrams, maps, layouts or reports.

### **RISK ASSESSMENT**

**6. Use local knowledge for risk assessment**

**7. Develop relevant tools for risk assessment of the water supply system**

The team should gather relevant resources and expertise to assist with identification of risks. These resources could include:

- Photos and maps of the water supply
- Risk assessment guidelines (e.g. NZ MoH and WHO guidelines)
- Videos on risk assessment (e.g. NZ MoH DVDs)

- Reports (of previous studies)
- Experts (e.g. mechanics, plumbers, operators, civil engineers, hydrologists, soil scientists, laboratory personnel, health officials and others as needed)
- Funding

## RISK RANKING

### **8. Assess the feasibility and practicality of addressing each risk**

Different agencies would have different areas of expertise and they should be involved when assessing risks

### **9. Strengthen stakeholder collaboration**

- Establish and strengthen the National Steering Committee by including all agencies that have a role (or responsibility) in the management of drinking water quality in Cook Islands.

### **10. Conduct public consultations and workshops to consult relevant agencies on issues and concerns relating to drinking water quality and health.**

### **11. Improve sharing of information among agencies**

- Establish a working group that would collate data and prepare annual reports on the following:
  - i. Drinking water quality of various supplies (urban, rural and outer-island) in Rarotonga
  - ii. Water-borne disease statistics
- The membership of this working group should include agencies that are directly responsible for water quality monitoring or health surveillance such as DWW, Ministry of Health and National Environment Service. The NGOs and Vaka Councils should also be represented in this working group.
- Inter & intra governmental relationships and networks should be strengthened to improve information sharing
- Establish a network between other PICs that have or are in the process of developing and implementing WSPs to share lessons learnt.

## **MONITORING & INSPECTION PROGRAMME**

- 12. Develop new or strengthen existing water quality monitoring and health surveillance programmes**
  - Identify agencies responsible for drinking water quality monitoring
  - Review current monitoring programmes to identify gaps and weaknesses
  - Collate past water quality monitoring and health surveillance data (including customer complaints records and disease statistics)
  - Conduct public consultations and organize workshops for key agencies to discuss a strategy to improve coordination between existing monitoring programmes.
- 13. Identify resources (e.g. finance, experts etc) that would be needed to strengthen existing monitoring programmes and establish means for securing those resources.**
- 14. Capacity building (training & professional development) for key staff from relevant agencies in Drinking Water Quality Monitoring.**
- 15. Identify and procure relevant tools for Drinking Water Quality Monitoring**

## **IMPROVEMENT SCHEDULE**

- 16. Complete Water Safety Plans to identify areas that need improvement.**
- 17. Assess the feasibility and practicality of each 'improvement'.**
- 18. Rank the improvements based on the resources (funding, capital works, infrastructure development, human resources) and time needed to complete them.**

## Products & Outputs

1. National Policy promoting Water Safety Plans
2. Checklists developed for system description and analysis
3. Maps, schematics, layouts etc for water supply systems within Rarotonga and other outer island water supplies
4. Checklists developed for risk assessment

5. Improved water quality monitoring programmes by DWW and MoH
6. Strategies developed for public consultation and community participation to tap into local knowledge
7. Improvement Schedule
8. Network established for sharing of information including water resource status reports, water quality monitoring data and health surveillance statistics

## **ACTIONS FOR IMPLEMENTATION OF WATER SAFETY PLANS**

### **AWARENESS & COMMUNITY PARTICIPATION**

*For safe quality drinking water, communities need to understand the linkages between water quality and health and know the contributions they can make to ensure safe drinking water.*

#### **1. Develop community education and awareness programmes**

- Strengthen collaboration between agencies to share resources and develop awareness programmes and materials;
- Establish a working group for community awareness & education that would be responsible for developing IEC materials for awareness raising on drinking water quality and health issues;
- The Awareness Working Group should engage in public consultations to identify issues and concerns of the public in relation to drinking water and health.

#### **2. Conduct workshops to empower communities to take more ownership and responsibility of their drinking water**

- Promote the linkages between drinking water quality and health issues through community workshops;
- Empower communities to maintain safe quality water by training them on simple water quality tests and sanitary surveys e.g. H<sub>2</sub>S test kits and WHO sanitary survey forms;
- Empower communities (landowners) to engage in public awareness programmes including tourist awareness especially for catchment protection and management (e.g. build on IWP work with communities at Takuvaine Catchment).

### **WATER RESOURCE MANAGEMENT**

*For safe quality drinking water we need to ensure adequate supply of good quality of source water for public water supplies.*

### **3. Strengthen Catchment Management at all twelve (12) intakes on Rarotonga.**

- Implement Catchment Management Plans developed by the IWP pilot project (National Environment Service)
- Conduct a review of existing laws for Catchment Protection and Management
- Awareness programme for tourists and members of public
- Place signage warning tourists and members of the consequences of tampering with the intakes, or accidental or deliberate contamination of water intakes
- Introduce community policing of catchments by landowner groups (as proposed in the IWP Catchment Management Plan)

### **4. Establish strategies for sustaining the quality and quantity of water resources in Cook Islands**

### **5. Strengthen monitoring of drinking water quality**

- Strengthen MoH surveillance and monitoring of drinking water supplies (including urban and rural supplies);
- Strengthen DWW monitoring of public water supplies and source waters;
- Establish strategy for sharing of data among agencies;
- Prepare annual reports on drinking water quality status and share among key stakeholders.

### **6. Explore alternatives water source including groundwater and desalination**

- Prepare a proposal for expert study of groundwater potential in Cook islands

## **INSITUTIONAL ARRANGEMENTS**

For safe quality drinking water we need effective cooperation among key stakeholders at all levels of operational policy, regulatory framework and information sharing.

## **7. Establish an independent board made up of representatives of different agencies and community groups**

- The board should include the following:
  - A representative from DWW, MoH and NES
  - Agricultural, Commercial and Tourism sectors
  - Community reps (e.g. CIANGO)
  - Local Government Reps (Vaka Councils)

## **8. Capacity Building for agencies in developing and implementing WSPs**

- An ongoing Capacity Building and Training programme needs to be established to ensure local expertise is available to assist with WSP development & implementation.
- Conduct training workshops to train staff from other agencies on development and implementation of WSPs.;
- A strategy for maintaining expertise within agencies needs to be developed (e.g. staff passing on their knowledge to successors).

## **9. Improve sharing of information among agencies**

- Establish a working group that would collate data and prepare annual reports on the following:
  - i. Drinking water quality of various supplies (urban, rural and outer-island) in Tonga
  - ii. Water-borne disease statistics
- The membership of this working group should include agencies that are directly responsible for water quality monitoring or health surveillance such as DWW, Ministry of Health and NES. The NGOs and Vaka Councils should also be represented in this working group;
- Inter & intra governmental relationships and networks should be strengthened to improve information sharing;
- Establish a network between other PICs that have or are in the process of developing and implementing WSPs to share lessons learnt.

## **10. Strengthen monitoring of drinking water quality**

- Strengthen MoH surveillance and monitoring of drinking water supplies (including urban and rural supplies);
- Strengthen DWW monitoring of source water and public water supplies;

- Establish strategy for sharing of data among agencies;
- Prepare annual reports on drinking water quality status.

**11. Establish a National WSP Working Group (*Expert group that will help other supplies prepare a WSP*)**

- Assemble a working group that would assist operators of other supplies (e.g. rural and outer island supplies) in developing and implementing WSPs.
- Organize a training of trainers' workshop on Water Safety Planning for this working group.

**12. Enforce existing legislation or draft new legislation to address national water supply concerns such as water theft, illegal connections or cross connections between reticulated and rainwater systems.**

- Conduct a legislative review of various acts and regulations that regulate water resource, water supply or water quality management.
- Make amendments to existing legislation to address key issues in water resource, water supply and water quality management.

## **FINANCING**

***For safe quality drinking water we need appropriate financial arrangements and support to invest in needed improvements in water resources management, appropriate technology, institutional arrangements and community awareness and participation.***

**13. Identify funding sources**

- Agencies need to identify sources (national budget and donor aid) for funding WSP implementation;
- Review current and projected budgets to identify funding for needed capital or institutional improvements for implementation of WSPs;
- Establish an advisory service for preparation of funding proposal.

**14. Allocate funding for needed improvements (capital works or institutional arrangements) or capacity building**

- Complete Water Safety Plans for water supplies to use as justification for funding or donor support for needed improvements.

- Prepare an Improvement Schedule to identify (prioritize) those improvements that can be made with existing funding and those that will need additional funding from Government or donor support.

## **APPROPRIATE TECHNOLOGY**

*For safe quality drinking water we need to consider appropriate technology including reliability, practicality, energy needs, easy access to consumables, easy access to technical 'know how' and repairs/maintenance.*

- 15. Identify appropriate technology, infrastructure and equipment for water supply (e.g. ARKAL filters) and to strengthen on-going monitoring of drinking water quality (e.g. purchase of appropriate equipment for measuring residual chlorine in distribution system)**

## **ISLAND VULNERABILITY**

*For safe quality drinking water we need relevant information and resources (including climatic data) on effects of climate change, natural disasters etc to enable preparations for sustainability of water supplies and quick recovery after events such as natural disasters (flooding, drought, cyclones etc).*

- 16. Improve access to relevant regional and national climatic data**
  - Encourage sharing of information on climate change and weather patterns in Cook Islands;
  - Strengthen the capacity for monitoring effects of Climate Change on water resources;
  - Establish networks with regional meteorological centers for information sharing on climate change and regional weather patterns.
- 17. Improve preparedness for natural disaster events that could have significant impact on water resources and water supply**
  - Review and implement the National Disaster Management Plan;
  - Increase local awareness of the Disaster Management Plan;

- Develop an emergency/contingency plan for water supplies during and after natural disaster events such as flood, drought, cyclones and earthquakes;
- Promote emergency storage of water (through local media) before, during and after natural disasters such as flood, drought, cyclones and earthquakes;
- Communities should be encouraged to seek funding for installing emergency storage facilities e.g. tanks;
- Ensure there are sufficient funds allocated for response to natural disasters.

## Activity & Responsibility Matrix

	Actions	DWW	MoH	NES	LG	CIANGO	Comm	Fin.	Marine	Met.	Is. Admin
1	Develop community education and awareness programmes	I	I	R	I	R	A	A	A	A	A
2	Conduct workshops to empower communities to take more ownership and responsibility of their drinking water	R	I	I	I	I	A	A	A	A	A
3	Strengthen Catchment Management at all twelve (12) intakes on Rarotonga.	I	I	R	I	I	A	A	A	A	A
4	Establish strategies for sustaining the quality and quantity of water resources in Cook Islands	R	I	I	I	I	A	A	A	A	A
5	Strengthen monitoring of drinking water quality	R	R	I	I	I	I	A	A	A	A
6	Explore alternatives water source including groundwater and desalination	R	A	I	I	A	I	A	A	A	A
7	Capacity Building for agencies in developing and implementing WSPs	R	I	I	I	I	A	A	A	A	A
8	Improve sharing of information among agencies	I	I	I	I	I	A	A	A	A	A
9	Strengthen monitoring of drinking water quality	R	R	I	I	I	I	A	A	A	A
10	Establish a National WSP Working Group ( <i>Expert group that will help other supplies prepare a WSP</i> )	R	I	I	I	I	I	A	A	A	A
11	Establish an independent board made up of representatives of different agencies and community groups	R	I	I	I	I	A	A	A	A	A
12	Enforce existing legislation or draft new legislation to address national water supply concerns such as	R	R	R	I	I	I	A	A	A	A

	water theft, illegal connections or cross connections between reticulated and rainwater systems.										
13	Identify funding sources	R	I	I	I	I	A	I	A	A	A
14	Allocate funding for needed improvements (capital works or institutional arrangements) or capacity building	I	I	I	I	I	A	R	A	A	A
15	Identify appropriate technology, infrastructure and equipment for water supply (e.g. ARKAL filters) and to strengthen on-going monitoring of drinking water quality (e.g. purchase of appropriate equipment for measuring residual chlorine in distribution system)	R	I	I	I	I	I	A	A	A	A
16	Improve access to relevant regional and national climatic data	I	I	I	I	I	I	A	A	R	A
17	Improve preparedness for natural disaster events that could have significant impact on water resources and water supply	I	I	I	I	I	I	A	A	R	A

Key:

R - Responsible

I – Involved in the action

A – Aware of action

## Products & Outputs

1. National Policy promoting Water Safety Plans
2. National Steering Committee established & mobilised
3. Drinking water quality monitoring working group established
4. Awareness programme(s) established
5. Education & Awareness materials introducing WSPs are developed and distributed
6. Strategy for information sharing developed
7. Capacity building and Training workshops completed
8. Drinking water quality surveillance and monitoring programme established by Ministry of Health
9. Source water and drinking water quality monitoring programme established by Department of Water Works
10. Annual reports on drinking water quality status of all supplies in Cook Islands
11. National WSP Expert Group established
12. Legislation review completed

13. National Plans and policies reviewed to include WSPs
14. Water Safety Plans completed for ten (10) intakes of the Rarotonga supply
15. Improvement schedule completed for Rarotonga water supply

## ***REVIEW AND EVALUATION***

### Indicators of success

1. Improved quality of public water supply in Cook Islands
2. Security of supply (sufficient water available at all times)
3. Inter-agency cooperation improved
4. Guidelines for water quality established
5. Improved community ownership (e.g. catchment protection and awareness)
6. Reduced cost of water for consumers
7. Healthy people (i.e. reduction in number of cases with water-borne diseases reported)
8. Increased tourism
9. Better catchment management
10. Increase in donor support for water supply improvement especially in Rarotonga
11. Technical capacity in developing and implementing WSPs increased
12. Reduced maintenance and operation costs
13. Increased public awareness of water supply issues
14. Updated and appropriate legislation

## Who benefits?

	<i>Indicators of success (Benefits)</i>	<i>DWW</i>	<i>NES</i>	<i>MoH</i>	<i>CIAN GO</i>	<i>LG</i>	<i>COM.</i>
1	Improved quality of public water supply in Cook Islands	P	P	P	P	P	S
2	Security of supply (sufficient water available at all times)	P	S	P	P	P	P
3	Inter-agency cooperation improved	P	P	P	P	P	P
4	Guidelines for water quality established	P	P	P	P	P	P
5	Improved community ownership (e.g. catchment protection and awareness)	S	P	S	P	P	S
6	Reduced cost of water for consumers	P	S	S	P	P	S
7	Healthy people (i.e. reduction in number of cases with water-borne diseases reported)	P	P	P	P	P	P
8	Increased tourism	S	S	S	S	P	P
9	Better catchment management	P	P	P	P	P	P
10	Increase in donor support for water supply improvement especially in Rarotonga	P	P	S	P	?	S
11	Technical capacity in developing and implementing WSPs increased	P	P	P	S	S	S
12	Reduced maintenance and operation costs	P	S	S	S	P	S
13	Increased public awareness of water supply issues	P	P	P	P	P	P
14	Updated and appropriate legislation	P	P	P	S	P	P

Key: P – Primary benefit

S – Secondary benefit

## Verification

	<i>Indicators of Success (Benefits)</i>	<i>Means of Verification</i>
1	Improved quality of public water supply in Cook Islands	Reduction in number of complaints from public (records); reduction in contaminants through monitoring; reduced risk of waterborne illness
2	Security of supply (sufficient water available at all times)	Reduction in number of complaints from public (records); Improved emergency preparedness (surveys); Improved water reserves (less demands on the system and recovery); Good public response to minimize water loss (less demand on system); Network upgrade completed; Increased sale of water storage tanks
3	Inter-agency cooperation improved	Less arguments among agencies; Workable interagency plans and improved sharing of information
4	Guidelines for water quality established	Guidelines in place are appropriate and in use; Quality management plans in place
5	Improved community ownership (e.g. catchment protection and awareness)	Increased involvement of communities (landowners) in water supplies e.g. catchment & intake protection; Increased funding to communities for water related and/or catchment protection projects.
6	Reduced cost of water for consumers	Less cost to the public (e.g. need to buy bottled water reduced, subsidized point of use treatment options)
7	Healthy people (i.e. reduction in number of cases with water-borne diseases reported)	Water-borne disease reports reduced; people happy with quality of water (survey); tourists able to drink directly from tap without getting sick.
8	Increased tourism	Increases in number of tourists; increase in tourism industry's confidence in local water supply (survey)
9	Better catchment management	Less complaints from landowners; water quality data indicates reduction in contamination e.g. Coliform; Increased biodiversity
10	Increase in donor support for water supply improvement especially in Rarotonga	Increase in donor support and aid for water supply improvements; targeted funding from Government
11	Technical capacity in developing and implementing WSPs increased	More staff trained in WSP development
12	Reduced maintenance and operation costs	
13	Increased public awareness of water supply issues	Decrease in per capita demand for water; Introduction of water/catchment issues in formal curriculum
14	Updated and appropriate legislation	Gaps within existing legislation addressed; Increased enforcement of relevant legislation and regulations; New legislation/regulations

		developed for catchment protection/ management
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*Taro cultivation upstream of Takuvaine Intake*

## ***REPLICATION***

To be completed by the Steering Committee.

**NOW**  
**FUTURE**

*How do we get there?*

1. Secondary Treatment e.g. Tupapa Arkal filters (at least 5 microns) at all Intakes;

Water Quality is variable e.g. dirty water through taps and low pressure

2. Identify systems that are low-cost (low operation and maintenance) but efficient e.g. the Arkal filters

Water Quality is consistently good/safe

3. Consumers install household treatment systems e.g. Filters and UV lamps

4. Improve/strengthen water quality monitoring (including source water, treatment and reticulated water)

Water Quantity sustainable

5. Identify other sources for agricultural water use e.g. irrigation;

Water Quantity is variable / not

6. Reduce water loss in the network and consumers' system;

Less than 20% Water Loss

7. Complete Distribution network upgrade;

Distribution network 100% upgraded

8. Rainwater Harvesting should be promoted

9. Desalination options

Water Demand is High (250L/pp/day)

10. Water Demand & Loss needs to be ascertained;

11. Increase Consumer Awareness Programmes for responsible water use, conservation and fixing problems within their own property e.g. pipe breaks

Appropriate Legislation / Policies in place for better management of drinking water supply;  
Develop Standards for building materials (e.g. pipes & fittings)

Resource Management Plan;

Inadequate  
Legislation /  
Policies

13. Control Political Influence in  
water supply management;

14. Strengthen and build on IWP  
efforts for Catchment Management

15. Encourage Hotels and  
businesses (and households) to re-  
use of wastewater e.g. for irrigation  
of farms and golf courses etc

Re-use of  
wastewater /  
sewage treatment

16. Develop and implement  
management and protection plans  
for catchments for each intake

Improved  
management of  
wastewater

17. Land ownership issues are  
resolved (e.g. addressed through  
Catchment Management Plans)

Catchment  
Management and  
Protection not adequate

18. Identify sources (National  
budget, Donor Support etc) for  
funding capital works to improve  
water quality as well as quantity

Efficient Catchment  
Management

In-sufficient Funding for  
capital works for  
improving water quality  
and quantity

19. Develop Partial Cost recovery  
(e.g. water rates) – large  
consumers e.g. Hotel, Industries etc  
pay for water use

Sufficient funding  
available to complete  
needed capital works

20. Improve capacity for writing  
proposals for funding (either  
national budget or donor support)

Insufficient human  
resource (incl. training)

21. Capacity Building Programmes  
need to be developed for on-going  
training and up-skilling of staff  
(DWW, NES, MoH, MoAgr, NGOs  
etc)

Technically competent  
staff available within  
agencies involved in  
water management

22. Promote linkages between safe  
drinking water quality to issues of  
national interest such as Public  
Health and Environmental  
Sustainability as a way to push  
government to increase support for  
drinking water supply;

Political Support not adequate

Adequate Political Understanding and Support

### 23. Political Awareness

24. Access Donor support to increase pressure on government;

25. Link Water Safety Plan to other relevant National Plans including IWP Catchment Plan and DWW

#### Comments to note:

- Implementation of the National Plan should be the responsibility of the National Steering Committee and should be protected from Political interference.