

WATER SAFETY PLANS PROGRAMME

NATIONAL PLAN

REPUBLIC OF PALAU

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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, including Palau 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 Palau, through various government and non-government agencies including Bureau of Public Works, Ministry of Health, Environmental Quality Protection Board and NGOs are committed to establish Water Safety Plans for urban, rural and outer-island water supplies.

A Steering Committee for the Palau Water Safety Plan Programme has been established and consists of relevant agencies, both government and non-government. The Bureau of Public Works is the lead implementing agency while EQPB is the secretariat for the Steering Committee.

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 microorganisms.

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 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.

ORGANISATIONS INVOLVED

(A brief summary of each agency's role and responsibilities towards water resources, water supply and/or quality monitoring/ health surveillance - to be completed by agencies)

Bureau of Public Works (BPW)

Ministry of Health (DEH)

Environmental Quality Protection Board (EQPB)

PALARIS

Palau Conservation Society (PCS)

Bureau of Marine Resources

Natural Resources Conservation Service (US Department of Agriculture)

Palau Meteorological Service

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

ACTIONS FOR PREPARATION OF WATER SAFETY PLANS

SYSTEM DESCRIPTION & ANALYSIS

1. **Assemble a team of people who have good knowledge of the system**
2. **Appropriate resources/tools including:**
 - **Maps, schematics of the system etc**
 - **Operations and maintenance manuals**
 - **GIS**
3. **Use local knowledge from people/communities within the catchment area**
4. **Talk to the Operator(s)**
5. **Engage Experts (BPW, EQPB, PALARIS, USEPA, SOPAC, WHO etc)**
6. **Research previous studies and reports on the water supply system**

Find out key information including:

- Hydrology
 - Water Quality trends
 - Climatic conditions and weather patterns
7. **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.

8. 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

9. Use local knowledge (e.g. past complaints from public about problems with water supply) for risk assessment

10. Consult the Operator(s) to assess the history of risks within the system

11. Training for individuals to conduct risk assessment

12. 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

13. 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

14. 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 Palau.

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

16. 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 Palau
 - 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 EQPB, Ministry of Health.
- 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.

IMPROVEMENT SCHEDULE

- 17. Complete Water Safety Plans to identify areas that need improvement**
- 18. Consult Operator(s) and experts to identify feasible solutions or improvements**
- 19. Assess the feasibility and practicality of each 'improvement'**
- 20. 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 Palau including outer island state water supplies
4. Checklists developed for risk assessment
5. Improved water quality monitoring programmes by Bureau of Public Works and EQPB

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 to highlight the critical linkages between drinking water quality and health of people of Palau**
- 2. Engage communities in land use planning and zoning of catchment areas**
- 3. Conduct workshops to empower communities to take more ownership and responsibility of their drinking water**
- 4. Include water quality and health issues in local school curriculum**

WATER RESOURCE MANAGEMENT

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

- 5. Strengthen water quality monitoring programmes for all water supplies in Palau**
 - EQPB have established a stringent water quality monitoring programme
 - Some samples should be sent off-shore for full-range tests to identify types of contamination that is not possible at EQPB lab e.g. agro-chemicals
 - Need to review the range of parameters tested and frequency of sampling
- 6. Involve landowners and local communities in catchment management and protection activities**
- 7. Establish strategies for sustaining the quality and quantity of water resources in Palau**

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.

- 8. Engage communities and land owners**
- 9. Improve cooperation between and among agencies and other stakeholders in operation, management, policy making, regulatory framework, information sharing etc**
- 10. Capacity Building for agencies in developing and implementing WSPs**
- 11. 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.**

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.

- 12. Prepare Water Safety Plans to identify needed improvements and use the plan as justification of your needs for more funding and/or resources**
- 13. Identify funding sources** (water supply operators should be trained on funding proposal writing and/or be invited to make contributions towards a proposal written by government for improvement of water supplies in Palau)
- 14. Ministry of Resource and Development should allocate funding for needed improvements (capital works or institutional arrangements) or capacity building or assist operators in seeking external funding**

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. Conduct assessment of water supplies (especially rural supplies) to identify appropriate technology, infrastructure and equipment for water supply (e.g. filters)
16. Gather more information on appropriate and feasible technologies available for small water supplies
17. Strengthen training of operators on existing and new technologies
18. Establish GIS mapping for all water supplies in Palau for effective operation, management and maintenance etc

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).

19. Improve access to relevant regional and national climatic data
20. Improve preparedness for natural disaster events that could have significant impact on water resources and water supply
21. Use traditional knowledge for weather prediction and preparedness esp. during typhoons and drought

Activity & Responsibility Matrix

(Place an R, I or A in the appropriate box depending on whether an agency should be Responsible (R), Involved (I) or just Aware (A) of the activities (1-21)...to be filled in by Steering Committee)

	Actions	BPW	MoH	EQPB	NGOs	PALARIS	Rural water Operators Ass.	Min. of Finance	Marine	NEMO	Presidents Office
1	Develop community education and awareness programmes to highlight the critical linkages between drinking water quality and health of people of Palau										
2	Engage communities in land use planning and zoning of catchment areas										

17	Strengthen training of operators on existing and new technologies										
18	Establish GIS mapping for all water supplies in Palau for effective operation, management and maintenance etc										
19	Improve access to relevant regional and national climatic data										
20	Improve preparedness for natural disaster events that could have significant impact on water resources and water supply										
21	Use traditional knowledge for weather prediction and preparedness esp during typhoons and drought										

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 & mobilized
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 the two urban and rural supply
15. Improvement schedule completed for Palau water supply

REVIEW AND EVALUATION

Indicators of success

1. Improved quality of public water supply in Palau
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 Palau
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 formulate appropriate legislation

Who benefits?

<i>Benefit</i>	<i>EQPB</i>	<i>Bureau of Public Works</i>	<i>Div. of Env Health</i>	<i>NEMO</i>	<i>Rural Water Operators Association</i>	<i>Koror State</i>	<i>How would you judge?</i>
Improved Water Quality	1	1	1		1	1	Reduced sales of bottle water Testing the Water Fewer public complaints Water Safety Plan
Improving Public Health			1		2	1	Water quality results Changes in reported illness Water safety Plan
Less Expenses for Medical Treatment	1		1		2		Records from medical centres
Tourism Improved			1		1	1	Visitor numbers from Palau visitors centres
Operational Costs Increase		1			1	1	Stabilised capital improvements
Environmental Benefits	1		1		1	1	Source water quality Water shed management plans available Water Safety Plan
Community Awareness	1		1	2	1	1	Number of media releases Good programme in schools Town meetings
Improved Technical Capacity	1		2		1	.5	New infrastructure in place FAC records for EQPB Number of training courses staff go on Water Safety Plan
Roll on benefits for other industries			1		2		Supply of safe water to hospitals, schools, food premises

<i>Benefit</i>	<i>EQPB</i>	<i>Bureau of Public Works</i>	<i>Div. of Env Health</i>	<i>NEMO</i>	<i>Rural Water Operators Association</i>	<i>Koror State</i>	<i>How would you judge?</i>
Living Conditions			1		1	1	Number of connections to water supplies Continuity of supply
Clear responsibilities	1			2	1	2	Number of MOUs Clear flow chart written
Clear response practice	1			1	2		Number of emergency plans written Water Safety Plans

Key: 1 – Primary benefit 2 – Secondary benefit 3 – Tertiary benefit

REPLICATION

To be completed by the Steering Committee.