PACIFIC WATER AND WASTES ASSOCIATION

Pacific Water and Wastewater Utilities Benchmarking Report

2013

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PRIF, a multi-development partner coordination and technical facility, supports infrastructure development in the Pacific. PRIF members include the Asian Development Bank (ADB), the Australian Department of Foreign Affairs and Trade, the European Commission and European Investment Bank (EC/EIB), Japan International Cooperation Agency (JICA), New Zealand Ministry of Foreign Affairs and Trade (NZMFAT), and the World Bank Group.

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Preface

I am proud to present this 2013 *Water and Wastewater Utilities Benchmarking Report*. Like previous years the Board Members of the Pacific Water and Wastes Association (PWWA) hold this regional achievement in high regard.

We sincerely thank the Pacific Region Infrastructure Facility (PRIF) and its partners for funding the two competent consultants who worked with us to successfully finish this year's benchmarking project.

The process of developing a set of appropriate benchmarks for utilities in the region has been a challenging one, with an early lack of proactive involvement of many members. However, the completion now of three comprehensive reports and the establishment of agreed performance indicators and benchmarks, has enhanced the PWWA's and its members' appreciation and consequent commitment to develop and participate in benchmarking as an ongoing exercise.

With the current level of motivation to continue benchmarking activity at the regional level, it is suggested that PWWA provides continued and ongoing coordination, communications and support to each utility through overall data collection and analysis – something that the Secretariat is committed to actively implement for the upcoming years; however we do still need sufficient funds and support from all the PWWA partners and members.

Taking these recommendations into consideration, the PWWA Board in February reaffirmed the association's commitment to the Benchmarking Strategy incorporated in this report and intends to continue and institutionalise the benchmarking of water utilities in the Pacific Region in close collaboration, and with support from, its members and the development partners active in the region.

PWWA also now agreed to enter into partnership with World Bank/IBNet which will assist to establish a sustainable benchmarking system for water and wastewater utilities in the Pacific Region and to help improving performance and enhancing service delivery in the sector. The establishment of this agreement will also improve the availability and quality of information and transparency in the water sector. The other very important objective is to support PWWA in the management and coordination of a sustainable benchmarking system as a service to its members.

We wish to thank everyone that contributed to this project and the production of this very important document: the PWWA, the consultants, the PRIF and the Pacific Coordination Office and also members of the PWWA Benchmarking steering committee and all the Pacific Utility Members (PUMs) management and staff.

Faafetai tele lava.

Latu Kupa
Executive Director
Pacific Water and Wastes Association

ACRONYMS

ASPA	American Samoa Power Authority
CEO	Chief executive officer
CED	Common efficient drainage
CPUC	Chuuk Public Utilities Corporation
CUC	Commonwealth Utilities Corporation (Saipan)
DERM	Department of Environment and Resource Management
DWSP	Drinking Water Safety Plan
EPA	Environmental Protection Agency
FSM	Federated States of Micronesia
FTE	Full-time equivalent
FTP	File transfer protocol
GNI PPP	Gross national income based on purchasing power parity (PPP)
IWA	International Water Association
IWSA	Independent Water Schemes Association
kL	Kilo-litre (1,000 litres)
km	Kilometre
KAJUR	Kwajalein Atoll Utility Resources Inc.
KPI	Key performance indicator
KRA	Key result area
KWh	Kilo-watt hours
MDG	Millennium development goals
ML	Mega-litre (1,000,000 litres, or 1,000 m^3)
MoU	Memorandum of understanding
MWSC	Majuro Water and Sewer Company
NUC	Nauru Utilities Corporation
NZ	New Zealand
NZWA	Water New Zealand
NRW	Non-revenue water
O&M	Operation and maintenance
OEI	Overall efficiency indicator
OPEX	Operational expenditure
OPI	Overall performance indicator
PCO	PRIF Coordination Office
PICTs	Pacific Island Countries and Territories
PNG	Papua New Guinea
PRIF	Pacific Region Infrastructure Facility
PUB	Public Utilities Board of Kiribati
PUC	Public Utilities Corporation of Pohnpei
PWWA	Pacific Water and Wastes Association
RMI	Republic of the Marshall Islands
SEA	South East Asia
SEAWUN	South East Asian Water Utilities Network
SW	Solomon Water
SOE	State-owned enterprise
SPC - AGTD	Secretariat of the Pacific Community – Applied Geosciences and Technology Division of SPC
STP	Sewage treatment plant
SWA	Samoa Water Authority
TA	Technical assistance
TNA	Training needs assessment
TOR	Terms of reference
TWB	Tonga Water Board
UNELCO	Electrique du Vanuatu Ltd
US$	US dollar
WAF	Water Authority of Fiji
WOP	Water operators partnership
WSAA	Water Services Association of Australia
WSP	Water service provider
WTP	Water treatment plant

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Executive Summary

This report presents benchmarking results from 24 water utilities, 20 of which completed the 2013 benchmarking questionnaire. Collectively these utilities supply water and wastewater services in 14 countries and 2 US protectorates in the Pacific region. The report has been prepared under the direction of the Pacific Water and Wastes Association (PWWA) with support from the Pacific Region Infrastructure Facility (PRIF).

The results of this year's benchmarking were presented at a benchmarking workshop during the PWWA Annual Conference in Rarotonga, Cook Islands on 11-12 November 2013. The financial and technical data individual utilities reported are based on financial years ending in 2012. The methodology and approach applied in previous years was continued, in which PWWA oversaw data collection and consultants were contracted for quality control and to analyse data and prepare the final benchmarking report. The consultants also supported utilities in preparing performance improvement action plans.

Key observations

The utilities were benchmarked across six key result areas (KRAs) and PWWA set targets called "Pacific Benchmarks" for key performance indicators. Although the quality of data improved, data accuracy requires continued attention. The key statistics generated from data collected show the following key observations:

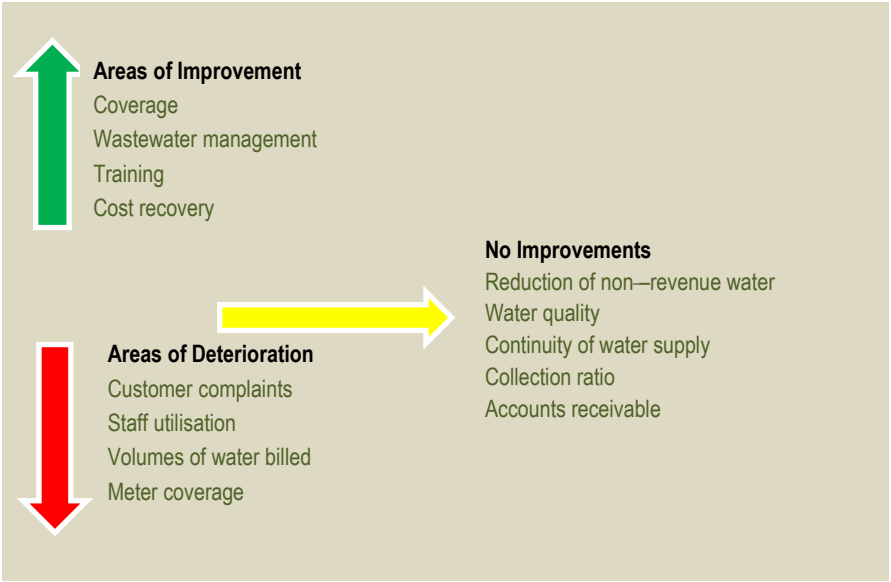
General Characteristics	
• Collectively the participating utilities serve about 329,000 water connections and 64,000 sewerage connections for 1.9 million and 0.4 million people respectively.	
• One third of all utilities lack fresh water resources, with no improvements as compared to previous years.	
• Most of the small utilities and half of the medium-sized utilities are unprepared for climate change and natural disasters. Overall some 55% of utilities have adapted their planning and operations to incorporate climate change risks and natural disasters.	
• **Key Result Area 1: Production**	
• Water production per connection increased from 1.95 kl/connection/day to 2.13 kl/connection/day and is about two times higher than the Pacific benchmark and much higher than in other regions.	
• **Key Result Area 2: Technical performance**	
• Average coverage within the service areas is 85% for water supply and 65% for sewerage. Both indicators improved as compared with previous years.	
• About 45% of utilities are unable to provide 24/7 water supply, due to a shortage of water or lack of distribution network capacity.	
• Non-revenue water (NRW) increased slightly from 51% in the 2012 report to 52% this year, and is still very high compared to the 25% Pacific benchmark. About 50% of the NRW is unbilled consumption. NRW for all utilities corresponds to a value of about US$100 million per annum using production costs and revenue foregone.	
• **Key Result Area 3: Health and Environment**	
• As in the 2012 report 38% of utilities maintain no residual chlorine concentration in their networks.	
• About 71% of sewage produced is treated to primary standard compared to 67% in the 2012 report. Few utilities treat wastewater to secondary standards.	

Key Result Area 4: Human Resources	
The average staff utilisation ratio increased from 9.8 staff to 10.8 per 1000 connections, which is above the Pacific benchmark of eight.	
Staff training increased significantly from 1.34 to 2.08 days per FTE annually, but is still below the Pacific benchmark of five staff training days per FTE.	
Key Result Area 5: Customer Service	
Customer complaints increased from 161 to 185 complaints per 1000 connections, which demonstrates that most utilities don't meet customer service expectations. Yet, the increase is expected as more utilities started monitoring these data.	
New connections in the Pacific are more affordable than elsewhere in the world.	
Water tariffs in the Pacific are relatively low and the cost of basic water consumption (at 6kL per connection monthly) is most affordable. However, the average water bill is relatively high due to high water consumption.	
Key Result Area 6: Financial Sustainability	
The average operating cost recovery ratio (excluding depreciation) has slightly improved from 85% to 86%, but still two thirds of Pacific water utilities are unable to recover their operating costs without subsidies.	
The average collection ratio of water bills remained almost the same at 86%.	
Legend: = progressed = stand still = alert!	

Compared to 2012's benchmarking exercise, utilities improved on coverage, wastewater management, staff training, and revenues collected.

No improvements have been made in reducing non-revenue water (still very high), water quality, continuity of supply, operating cost recovery, collection of bills, and accounts receivable.

Performance on the following indicators has deteriorated: number of customer complaints, staff utilisation, volumes of water billed, and meter coverage.



Overall performance observations

Using the average score from a range of indicators, an overall performance indicator (OPI) was calculated for comparing water utilities overall. Chapter 2 presents the basis for the OPI. It also presents an overall efficiency indicator (OEI), which is essentially the percentage of water that generates revenues ((1-NRW)*Collection Ratio).

Key observations relating to overall performance include:

- Utilities with a high OEI also score better on overall performance (OPI).
- Those organisations with private sector participation (private companies or private/government joint companies) show better performance using OPI and OEI.
- Government departments and statutory organisations were in the lower performance range, yet, by financial performance, the worst performers were the state-owned enterprises (SOEs).
- Utility performance, both OPI and OEI, relates to size with the large and medium utilities performing best.
- The top three performing utilities are UNELCO (Vanuatu), Eda Ranu (PNG), and TWB (Tonga).

During the Rarotonga workshop, CEOs were asked to prepare performance improvement action plans. The following summarises the priorities for utilities' action plans:

- Reduce non-revenue water by improving billing and leak detection.
- Improve the quality of drinking water and laboratory standards.
- Introduce and improve asset management systems/databases.
- Increase staff training.
- Improve customer service levels.
- Improve sanitation services.

Those utilities that prepared performance improvement action plans will also receive individual "utility profiles", which compare the specific utility's results with its peer group's overall results.

Training needs assessment

As part of the 2013 benchmarking survey for the Pacific Water and Wastewater Utilities all utilities were asked to identify their training needs on the training needs assessment survey.

The survey was divided into primary categories:

- Information on the utility's existing training needs assessment program and its effectiveness;
- Specific identification of the training needs for the following sections in the utility:
    a) Technical management and operations
    b) Financial management/accounting and customer care management
    c) Human resources
- Identification of cross cutting topics/issues beneficial for wider professional development;
- Identification of valuable training courses during the past 12-18 months; and
- Identification of training providers that water utilities use.

A separate report presents the assessment results.

PWWA benchmarking results on IB-Net

Part of the 2012-2013 PWWA benchmarking indicators have been entered into the IB-NET, the World Bank's benchmarking database. IB-NET is the World Bank's International Benchmarking Network for Water and Sanitation Utilities with direct access to the world largest database for water and sanitation utilities performance data. Using the IB-NET website enables PWWA and its members to upload data directly into the IB-NET database where they will be presented in the form of performance indicators, graphs, and performance reports.

The PWWA benchmarking indicators on IB-NET can be accessed through internet on pwwa.ib-net.org

Future PWWA benchmarking

The PWWA Benchmarking Strategy 2013-2017 aims at providing a quality sustainable benchmarking system for its members. Key elements include i) PWWA as the lead agency; ii) annual collection and reporting of data; iii) focus on improving benchmarking data quality; iv) web-based data collection and presentation; and v) cost sharing for benchmarking between utilities and other data users.

The introduction of web-based benchmarking through IB-Net justifies reviewing the strategy, as it opens up new possibilities and challenges for PWWA and utilities.

The main areas in the benchmarking strategy to review include:

- Collection and processing of benchmarking data – what are the consequences of using IB-NET for this process and how will this be achieved in the future?
- Frequency and timing of reporting – is there still a need for annual benchmarking reports?
- Benchmarking workshops – stay with the current model of regional workshops or hold utility-specific or sub-regional workshops?
- Willingness to pay for benchmarking – utilities to start paying for benchmarking reports or contribute toward benchmarking costs?
- Improvements to the questionnaire – some utilities have suggested a ‘lighter’ version as more applicable to smaller utilities.

1. Introduction

1.1 Background

PWWA and its member utilities rely on benchmarking for continually improving water utility performance in the Pacific region.

In 2009, PWWA commenced baseline data collection and benchmarking for its members and adopted a core set of indicators aligned with its strategic plan. PWWA also began collecting data regularly.

In 2011, PWWA expanded and aligned the range and number of indicators with the World Bank's international IB-Net Benchmarking Framework to allow for future inclusion in IB-Net. Based on the 2011 benchmarking results, PWWA set "Pacific benchmarks" for most indicators, reflecting target values for the indicators.

Performance indicators calculated under this benchmarking initiative have also been compared with other international studies. A comparison of the performance among Pacific water utilities is complemented with comparison of benchmarking results from previous years and with water utility performance in different regions.

The 2013 PWWA benchmarking initiative for water utilities builds on the lessons from the 2011-2012 exercise.

"The PWWA benchmarking initiative for water utilities builds on the lessons learned from benchmarking exercises in 2011 and 2012."

PRIF members support the water and sanitation sector in the Pacific with technical and financial assistance. The current water and sanitation project pipeline in the region exceeds US$400 million in investments. Improved data availability and better water operator performance are therefore key PRIF objectives. One way to achieve this is by supporting and stimulating benchmarking as an instrument for water utilities to compare performance and learn from each other. So PWWA, on behalf of its members, has approached PRIF to support continued benchmarking in 2013.

This report presents 2013's benchmarking results for 24 water utilities in 14 countries and 2 US protectorates in the Pacific region and shows developments in performance as against the 2011-2012 findings. The 2013 benchmarking provides data insight for all stakeholders with the overall goal of helping water utilities improve their performance and contribute to improved service delivery in the water and sewerage sector.

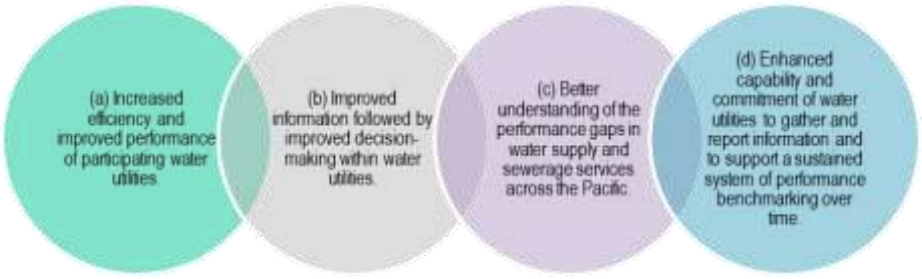
1.2 Objectives

Benchmarking enables water utilities to improve their performance and so contribute to improved service delivery in the water and sewerage sector. In addition benchmarking provides current information that allows national stakeholders (water utility boards and shareholders) and development partners to monitor performance in individual utilities and the whole sector.

It is expected that continued benchmarking will allow:

a) increased efficiency and improved performance of participating water utilities;
b) improved information followed by improved decision-making in water utilities for better direction and oversight for utility boards and shareholders;
c) greater performance transparency in the mostly publicly-owned water utilities;
d) better understanding of performance gaps in water supply and sewerage services across the Pacific for development partners; and
e) improved PWWA capability and commitment to reporting information and to supporting sustained performance benchmarking over time.

In summary it is expected that continued benchmarking will result in:



1.3 Participating utilities

Twenty water utilities completed the 2013 benchmarking questionnaire, with American Samoa and RMI Kwajalein new participants. The utilities of Kosrae, Yap South, Yap Central, and Niue participated in previous benchmarking but did not complete this year's questionnaire. Where applicable, data from previous years has been used for these utilities.

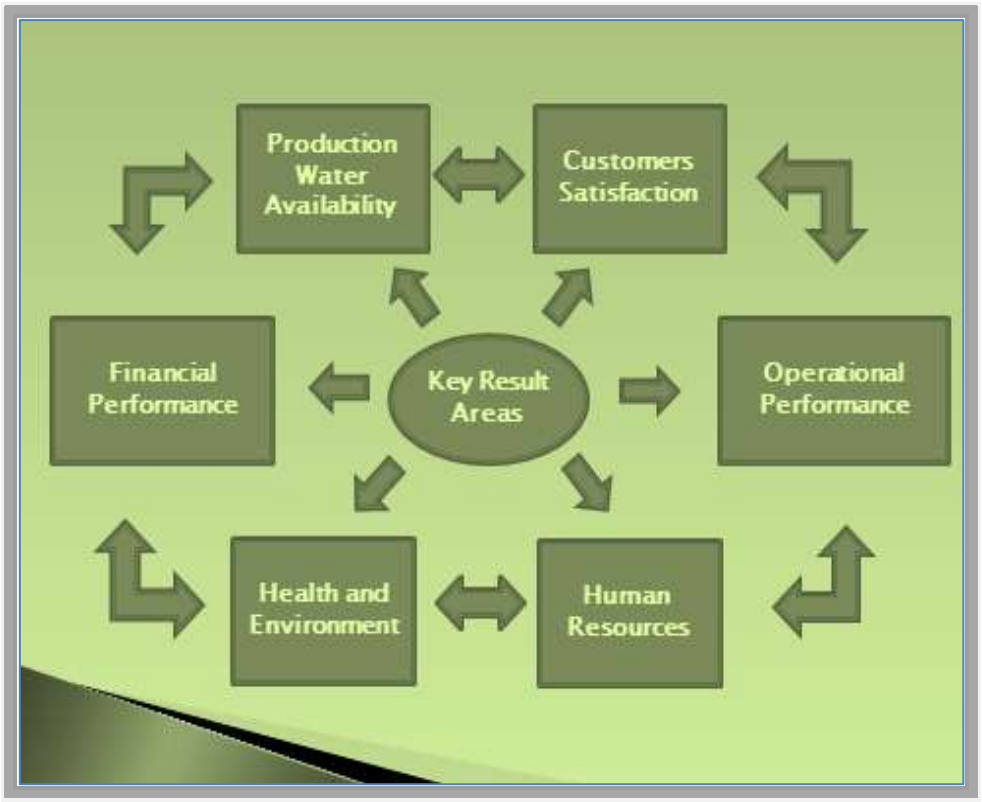
Table 1.1: Participating Countries and Water Service Providers

Country	Water Utility Name	A	B	C	D	E	F	G	H
		Size category	Response 2011	Response 2012	Response 2013	Water supply	Wastewater	PWWA Member	PCO/ PRIF Focus
American Samoa	American Samoa Power Authority	M	N	N	Y	Y	Y	Y	-
Cook Islands	Cook Islands Ministry of Infrastructure and Planning	M	Y	Y	Y	Y	-	Y	Y
Fiji	Water Authority of Fiji (WAF)	L	Y	Y	Y	Y	Y	Y	-
Federated States of Micronesia	Yap North - Gagil Tomil Water Authority	S	Y	Y	Y	Y	-	Y	Y
	Yap Central - Yap State Public Service Corporation	S	Y	Y	-	Y	Y		Y
	Yap South - Southern Yap Water Authority	S	Y	-	-	Y	-		Y
	Kosrae - Dept. of Transportation and Infrastructure	S	Y	-	Y	Y	Y		Y
	Pohnpei Public Utilities Corporation	M	Y	Y	Y	Y	Y		Y
	Chuuk Public Utilities Corporation (CPUC)	S	Y	Y	Y	Y	Y	Y	Y
Kiribati	Public Utilities Board (PUB)	M	Y	Y	Y	Y	Y	Y	Y
Marshall Islands	Majuro Water and Sewer Company (MWSC)	S	-	Y	Y	Y	Y	Y	Y
	Kwajalein Atoll Joint Utility Resources (KAJUR)	S	-	-	Y	Y	Y	Y	-
Nauru	Nauru Utilities Corporation (NUC)	M	-	Y	Y	Y	-	Y	Y
Niue	Niue Public Works	S	Y	-	-	Y	-	Y	Y
Palau	Palau Public Utilities Corporation	M	Y	Y	Y	Y	Y	Y	Y
Papua New Guinea	Eda Ranu	L	Y	Y	Y	Y	Y	Y	-
	PNG Waterboard (WaterPNG)	L	Y	Y	Y	Y	Y	Y	-
Saipan	Commonwealth Utilities Corporation (CUC)	M	Y	-	Y	Y	Y	Y	
Samoa	Samoa Water Authority (SWA)	L	Y	Y	Y	Y	Y	Y	Y
	Independent Water Schemes Association (IWSA)	M	Y	Y	Y	Y	-	Y	Y
Solomon Islands	Solomon Water	M	Y	Y	Y	Y	Y	Y	Y
Tonga	Tonga Water Board (TWB)	L	Y	Y	Y	Y	-	Y	Y
Tuvalu	Tuvalu Public Works	S	Y	Y	Y	Y	-	Y	Y
Vanuatu	UNELCO	M	Y	Y	Y	Y	-	Y	Y

1.4 Approach and methodology

Following the 2011 approach, the utilities were benchmarked across 6 key result areas (KRAs), using 28 performance indicators, critical to the utilities' performance (see Figure 1.1). A questionnaire (see Appendix C) was distributed to all utilities in July 2013. Appendix D presents definitions and guidance notes for all indicators.

Figure 1.1 Key Result Areas



The financial and technical data individual utilities reported are based on financial years ending in 2012. Though the utilities have improved data collection, inconsistencies still remain. The benchmarking questionnaire includes a data reliability check. Moreover, the benchmarking data were verified with the utility representatives during the Rarotonga workshop. Great differences were double-checked and data adjusted. Ten utilities provided audited financial statements to support financial data.

All selected indicators align with the World Bank IB-Net benchmarking definitions to allow future use of the IB-Net website and database. Table 1.2 presents the indicators per key result area.

Table 1.2 Key Result Areas and Indicators

Key Result Area	Indicators	Unit
KRA 1 Production (Availability)	Volumes of water produced Volumes of water sold Volumes of sewage collected	kL/connection per day litres/capita/day in Million kL per year litres/capita/day in Million kL per year litres/capita/day

Key Result Area	Indicators	Unit
KRA 2 Technical Performance (Operational)	Water supply coverage Sewerage coverage Continuity of water supply service Non-revenue water	% population served % population served hours available % of water distributed Volume NRW /connection/day Volume NRW /km/day
KRA 3 Health and Environment	Water quality - residual chlorine Water quality - microbiological Percentage of drinking water treated Percentage of wastewater treated	% of samples compliant % of samples compliant % of treated % of treated to primary standard
KRA 4 Human Resources	Water and sewerage business staff Training days Salary level compared to gross national income	FTE/1000 connections No. days per FTE per year USD/GNI/capita
KRA 5 Customers Management	Meter coverage rate Customer complaints Affordability new connection Affordability average bill Affordability basic need (6m3/con/month)	% metered No. complaints/1000 connections % of GNI/cap % of GNI/cap % of GNI/cap
KRA 6 Financial Sustainability	Operating cost recovery ratio Collection ratio - cash income versus billed revenue Debtors	% % % Number of days
Overall Efficiency	Collection ratio x (1-NRW)	%

The utilities have been divided by size (connection numbers) into three peer groups. This enables similar-sized utilities to compare meaningfully. Table 1.3 lists the utilities in each peer group.

Table 1.3 Peer Groups

Group 1 - Large	Group 2 - Medium	Group 3 - Small
>10,000 connections	**2,000> connection < 10,000**	**connections < 2,000**
Fiji - WAF	American Samoa - ASPA	FSM Chuuk - CPUC
Papua New Guinea - Eda Ranu	Cook Islands - Ministry of Infrastructure and Planning- MoIP	FSM Kosrae - Department of Transportation and Infrastructure
Papua New Guinea - Water PNG	FSM Pohnpei - PUC	FSM Yap North - Gagil Tomil Water Authority
Saipan - CUC	Kiribati - PUB	FSM Yap Central - Yap State Public Service Corporation
Samoa - SWA	Nauru - NUC	FSM Yap South - Southern Yap Water Authority
Tonga - TWB	Palau Public Utility Corporation - PUC	Niue - Public Works
	Samoa - IWSA	RMI Majuro – MWSC
	Solomon Islands - SIWA	RMI – Kwajalein (KAJUR)
	Vanuatu - UNELCO	Tuvalu - Public Works

1.5 Benchmarking workshop

The benchmarking workshop on 11-12 November 2013 in Rarotonga (see Appendix G) presented the benchmarking results and engaged Pacific water utilities in analyzing their benchmarking scores, training needs analysis, and action planning. Participants from 14 Pacific water utilities attended along with representatives from the Pacific Region Infrastructure Facility (PRIF), Pacific Water and Wastes Association (PWWA), Secretariat of the Pacific Community – Applied Geosciences and Technology Division of SPC (SPC – AGTD), European Union (EU), Secretariat Pacific Regional Environment Program (SPREP), Asian Development Bank (ADB), and the benchmarking consultants. The international benchmarking specialist, supported by the regional financial expert led the workshop.

The workshop studied the overall results of the benchmarking indicators and discussed the key result areas and utility profiles. It considered the training needs analysis survey, with PRIF Coordination Office (PCO) stressing the need to identify any gaps in the utilities and their training needs. Participants discussed action plans for 2013 and watched a short video demonstrating IB-Net.

Four main questions were discussed about the data on the key result areas that were presented to each utility. Table 1.4 presents the four questions and some responses:

Table 1.4 Feedback from Utilities on Benchmarking Benefits

Question	Responses
1. *What actions have you taken to improve your benchmarking results since last year?*	• Improved data capture or data recording systems • Better meter coverage • Improved non-revenue water and human resource capabilities/capacities
2. *Describe how you use benchmarking as a management tool to monitor and evaluate your utility's performance.*	• Useful for utility comparisons especially with utilities which are similar or large • Useful for performance improvement initiatives
3. *What opportunities do you see for cooperating with utilities in the region? Since last year have you mutually cooperated with other utilities in the region?*	• Smaller utilities would like to see key performance indicators specific to the relative size of their utility. • Twinning arrangements have already occurred with water utilities from developed countries.
4. *What support do you require from PWWA for improving benchmarking/performance?*	• Continued benchmarking sessions • PWWA collective report/newsletter every few months/quarterly

1.6 Lessons from previous benchmarking

Key lessons learned from the 2011 and 2012 benchmarking exercises offer the following insights:

(a) Data quality (both reliability and accuracy) improved, but requires the utilities' ongoing attention. A data checking system needs to be built into the questionnaire and used for auditing future data quality This includes comparing with the previous year's data, calculated indicators, and realistic ranges to allow for checking units' needs (e.g., kL vs. ML).

(b) Not all utilities provided financial statements to support the financial data. There is no way to check their financial data and ensure that the utility interpreted the question correctly.

(c) Some participating utilities still need support to ensure that they understand indicator definitions (i.e., ensure that inclusions and exclusions are consistently applied). They must understand the means available to collect, store, and check the data critical to the benchmarking study and to their own business management.

(d) This year uutilities were given little time for collecting data, leaving little time to verify and improve the data quality.

(e) The 2012 benchmarking report revealed that most utilities neglect training and staff development.

These lessons have been adopted in the 2013 benchmarking approach by:

- allowing more time for utilities for data collection and completing the questionnaires;
- comparing questionnaires with last year's, and questioning discrepancies or inconsistencies in data from the utilities;
- sending the benchmarking results to the utilities for their CEOs' approval; and
- including a training needs assessment (TNA) as part of the project.

1.7 Report structure

The following chapters present results from the 2013 benchmarking exercise:

- Chapter 2 summarizes the overall results grouped in three categories: large, medium, and small utilities.
- Chapters 3, 4, and 5 present country oversights, the main utility characteristics, and the benchmarking results for each category with analysis and comparisons of the performance indicators over the last 3 years.
- Chapter 6 concludes the report with performance improvement action planning, training needs assessment, and the strategy for future benchmarking.

The appendices include questionnaires and guidance notes, definition of benchmarking indicators, workshop results, and summaries of water utility action plans.

2. Overall benchmarking results

Chapter 2 outlines the overall results from the 2013 benchmarking exercise. The results are illustrated across six key result areas. It compares benchmarking indicators with previous results and with benchmarking results from elsewhere.

2.1 Key characteristics countries and utilities

Each utility's unique characteristics depend on its size, legal operations, supply area, availability of water resources, and country characteristics such as the economy, demography, geography, and topography. The benchmarking analysis therefore requires understanding of the environment in which the utility operates. Table 2.1 shows general country information and compares millennium development goals (MDG) with PWWA benchmarking indicators.

Table 2.1: General Country Information

	Country	population latest census info	GNI/capita	Land area	MDG- Popul.coverage		PWWA utilities		Population covered by PWWA utilities			
					National	National	number connections		water		sewerage	
		'000	USD	km2	Water Supply	Improved Sanitation	water	sewerage	water	% of pop.	sewerage	% of pop.
1	Cook Islands	15.0	13,478.00	237	95%	100%	2,100	250	8,400	56%	1,000	7%
2	Fiji	858.0	4,293.19	18273	98%	83%	141,025	28,204	609,938	71%	132,559	15%
3	Kiribati	106.5	2,563.20	811	63%	34%	4,995	2,282	33,896	32%	15,974	15%
4	Marshall Islands	56.1	4,170.87	181	94%	75%	2,189	2,620	16,036	29%	22,608	40%
5	Micronesia (FSM)	101.4	3,320.66	701	94%	25%	6,601	2,376	36,939	36%	12,405	12%
6	Nauru	9.9	6,746.00	21	88%	65%	2,700	0	10,800	109%	0	0%
7	Niue	1.6	5,800.00	259	100%	100%	579		1,805	113%	0	0%
8	Palau	20.9	11,080.00	444	85%	100%	4,835	2,240	18,875	90%	11,200	54%
9	Saipan	53.8	10,000.00	123	98%	25%	9,413	2,582	53,867	100%	21,000	39%
10	Samoa	187.8	3,426.22	2785	96%	98%	22,784	75	161,032	86%	120	0%
11	Solomon Islands	561.0	1,272.73	30407	70%	32%	8,082	916	56,511	10%	6,412	1%
12	Tonga	103.0	4,624.96	650	100%	96%	11,315		62,338	61%	0	0%
13	Tuvalu	11.3	5,878.64	26	98%	85%	780	NA	4,680	41%	0	0%
14	Vanuatu	264.7	4,606.00	12281	90%	57%	7,308	NA	30,869	12%	0	0%
15	American Samoa	55.5	NA	199	99%	100%	9,315	5,000	50,460	91%	23,000	41%
	Sub total Pacific Islands (excl PNG)	2406.5					234,021	46,545	1,156,446	48%	246,278	10%
16	PNG	7059.7	2,898.00	462840	40%	45%	94,715	17,618	739,571	10%	154,177	2%
	Total PWWA countries	9466.2					328,736	64,163	1,896,017	20%	400,455	4%

Sources: World Bank World Development Indicators online database, UNdata online database.
Pacic Island Forum Secretariat (Pacific Regional MDG tracking report)

Collectively, the connections in participating utilities add to approximately 315,000 water connections supplying a population of 1.9 million, and almost 64,000 sewer connections for about 380,000 persons. Figures 2.1 and 2.2 show details per utility. The Water Authority of Fiji (WAF) is by far the largest utility, followed by Eda Ranu and WaterPNG. Only 16 out of 24 utilities also have sewerage connections.

Figure 2.1: Number of Water Connections (total = 328,776)

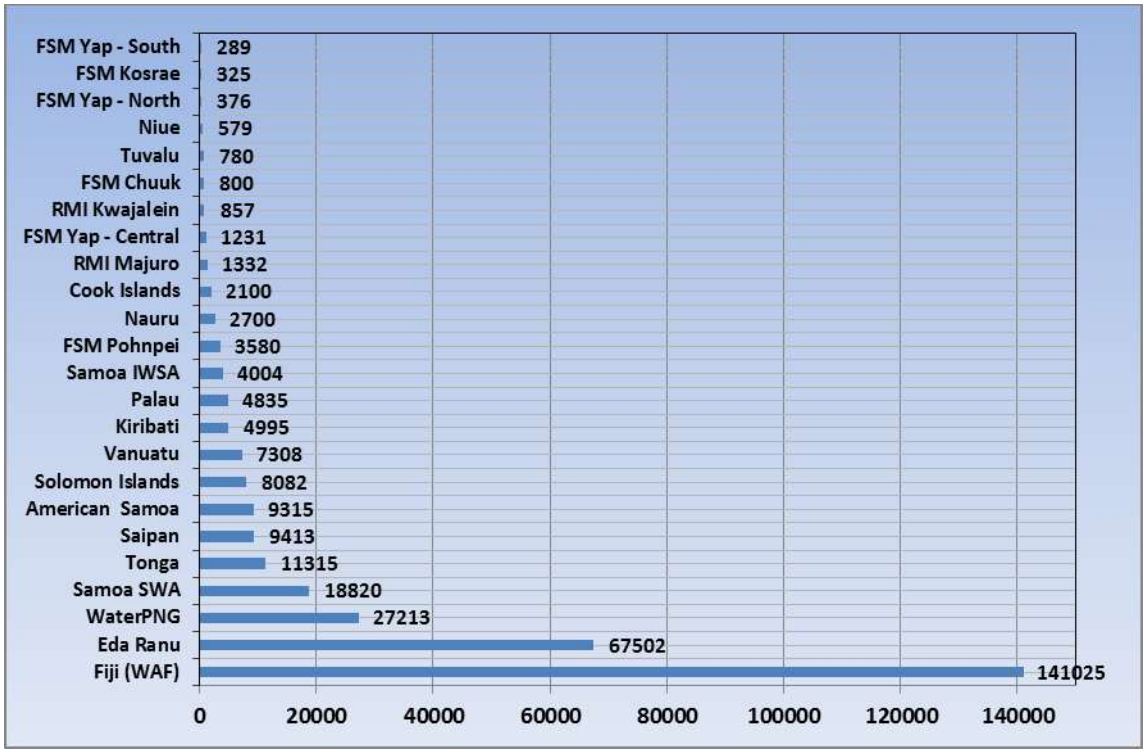
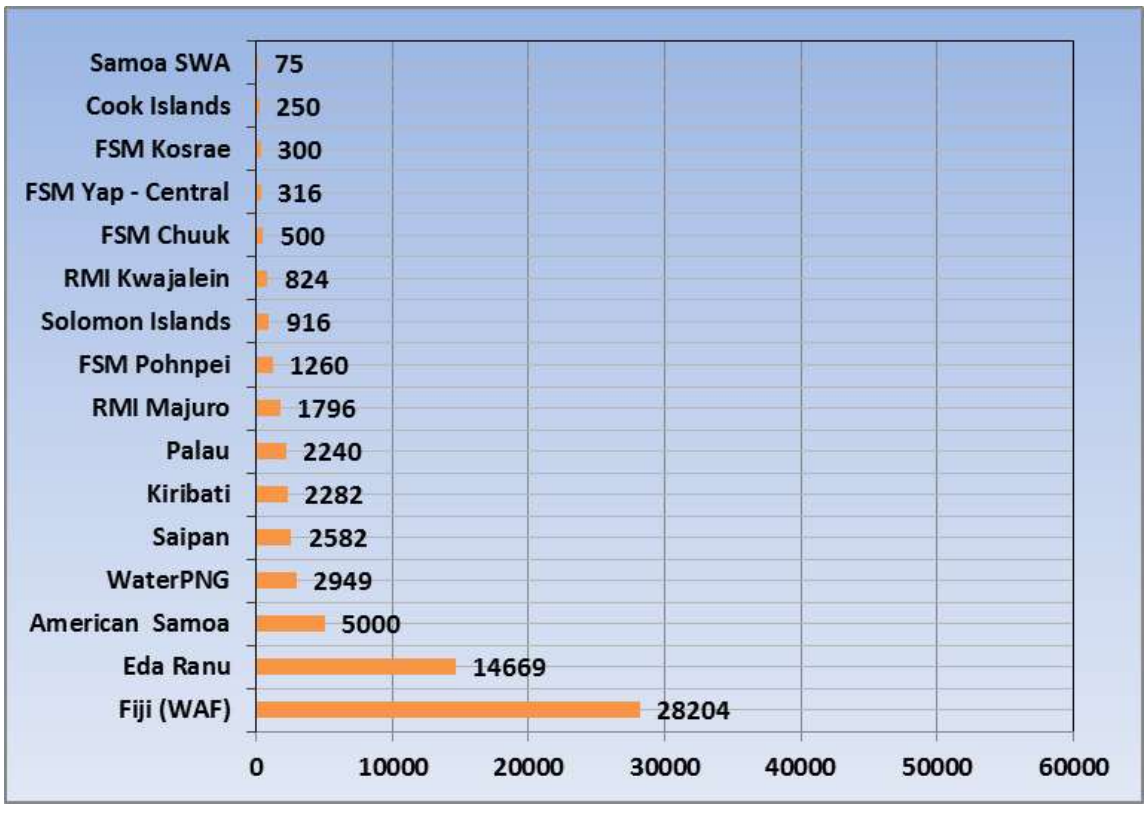


Figure 2.2: Number of Sewer Connections (total = 64,163)

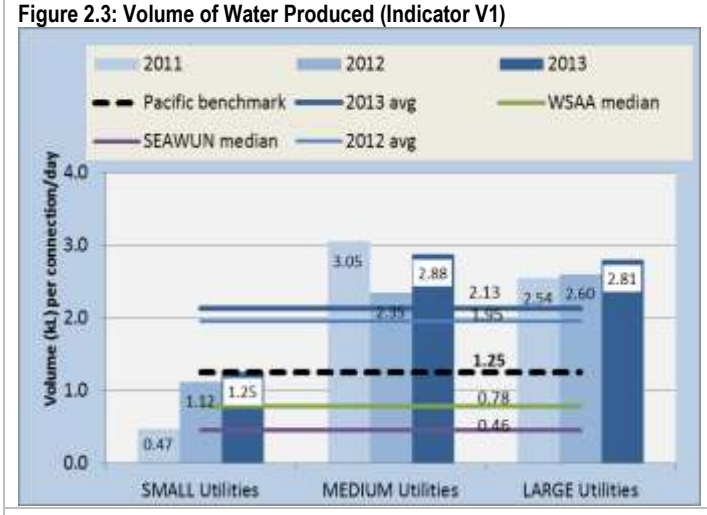


2.2 Key observations

The following tables compare overall benchmarking results with previous years. Although data of 3 years has been collected, it is still difficult to observe trends at an aggregated level as the number of participating utilities has varied over the years. The results at utility level are described in Chapter 3 (large utilities), Chapter 4 (medium utilities), and Chapter 5 (small utilities).

2.3 Production (KRA 1)

Figure 2.3: Volume of Water Produced (Indicator V1)

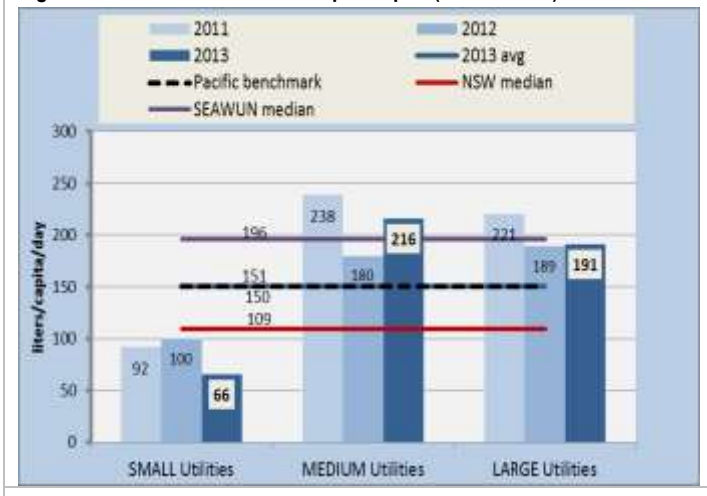


Volume of Water Produced

The average water production per connection increased from 1.95 kl per connection in 2012 to 2.13 kl per connection in 2013. Production is quite high as compared to the Pacific benchmark and much higher than water production in other regions. This reflects waste and high levels of leakage and consumption, and little attention to demand management.

Observation: *Including Saipan (see Figure 3.5) and American Samoa (see Figure 4.5) caused the increase. Both did not participate in 2012.*

Figure 2.4: Volume of Water Sold per Capita (Indicator V2)



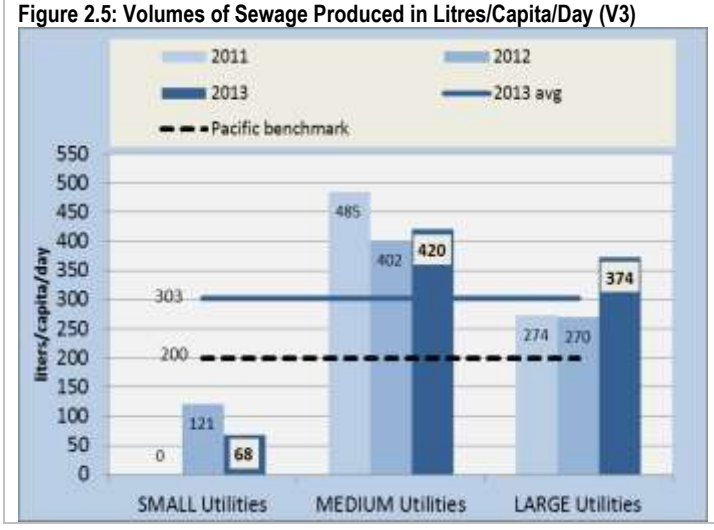
Volume of Water Sold

The average volume of water sold or consumed remained at 150 litre per capita per day (L/c/d), which equals the Pacific benchmark.

Observations: *Though the average results equal the Pacific benchmark, the differences among utilities are very large with consumption of less than 5 L/c/d in some smaller utilities to more than 400 L/c/d in others.*

The large increase at PUB FSM Pohnpei and including ASPA, American Samoa as a newcomer caused such figures.

Figure 2.5: Volumes of Sewage Produced in Litres/Capita/Day (V3)



Volume of Sewage Produced

The average volume of sewage produced is 303 litres per capita per day, with an increase for the large utilities and a decrease for the small.

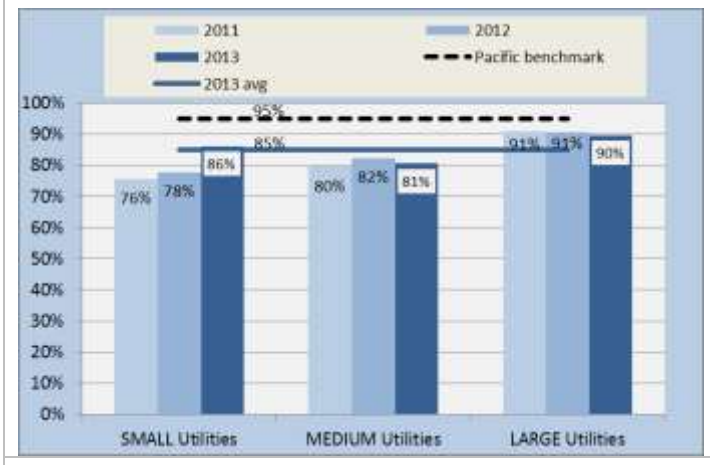
Observations: *The figures are on average higher than the volume of water sold, which is likely due to infiltration of rain and ground water in surface drains.*

The significant increase for large utilities is mainly due to data corrections for WAF Fiji and Edu Ranu.

The decrease in small utilities reflects that FSM Kosrae data were not provided in 2012.

2.4 Technical performance (KRA 2)

Figure 2.6: Water Supply Coverage (Indicator O1)

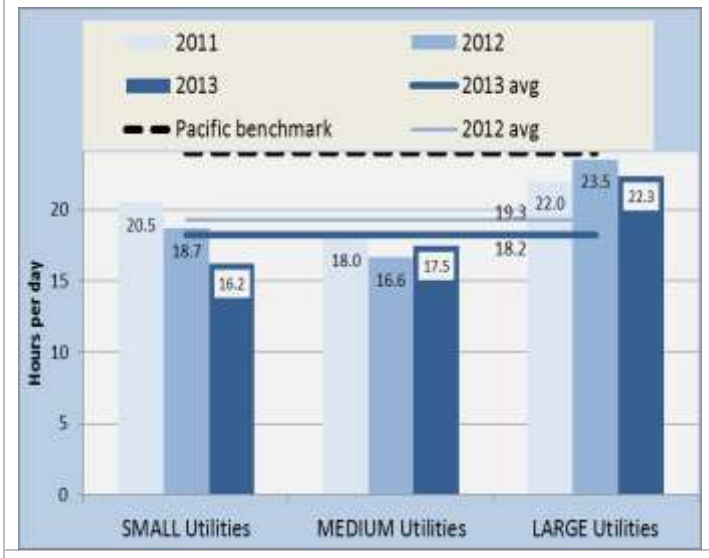


Coverage of Water Supply

The average water supply coverage within the utilities' service area increased from 83% in 2012 to 90% in 2013. This reflects small utilities' data corrections and including newcomer RMI Kwajalein.

Observations: *The coverage relates to the utility's service area jurisdiction. So the indicator does not reflect the country's national population with access to water and sanitation facilities.*

Figure 2.7: Water Supply Continuity (Indicator O2)



Water Supply Continuity

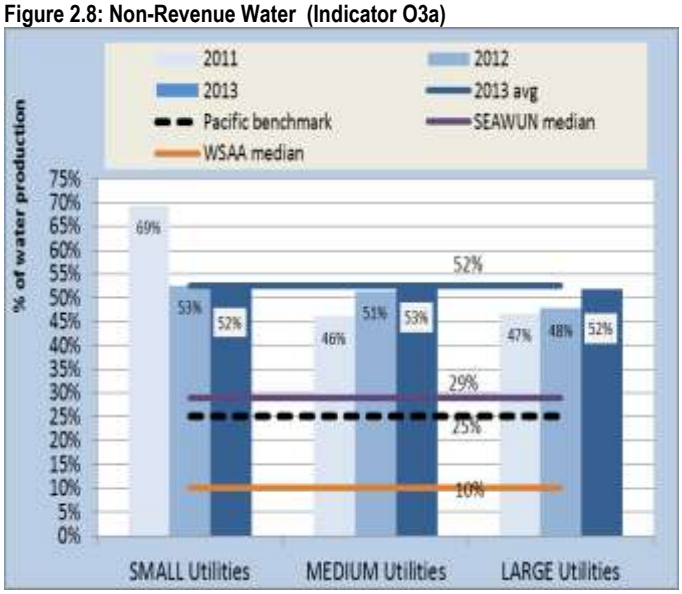
Average water supply declined from 19.3 hours/day in 2012 to 18.2 hours/day in 2013, mainly due to the newcomer RMI Kwajalein which operates for only a few hours weekly.

Observation: *Due to insufficient fresh water resources, some utilities must ration water distribution, e.g., in RMI's and Tuvalu's small utilities and in Kiribati's and Nauru's medium-sized utilities.*

Only 13 of the 24 utilities reported that they operate 24 hours daily.

The drop in the large utilities relates to WAF Fiji adjusting their data from last year's.

Figure 2.8: Non-Revenue Water (Indicator O3a)



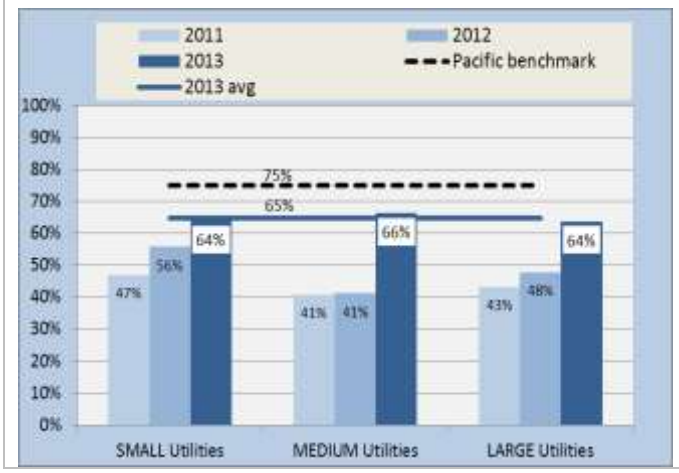
Non-Revenue Water (NRW)

Average NRW increased slightly from 51% in 2012 to 52% in 2013, which is still very high compared to the Pacific benchmark and international averages from the South Asian utilities (SEAWUN) and Australian utilities (WSSA).

Observation: *Assuming that 50% of NRW is unbilled consumption, the total NRW volume for all utilities corresponds to about US$100 million annually for production costs and revenue foregone.*

The NRW increase in large utilities is mainly due to including Saipan. For medium utilities the increase is mostly caused by PUB Kiribati's and Solomon Islands' increased NRW and by including newcomer American Samoa.

Figure 2.9: Sewerage Coverage (Indicator O4)



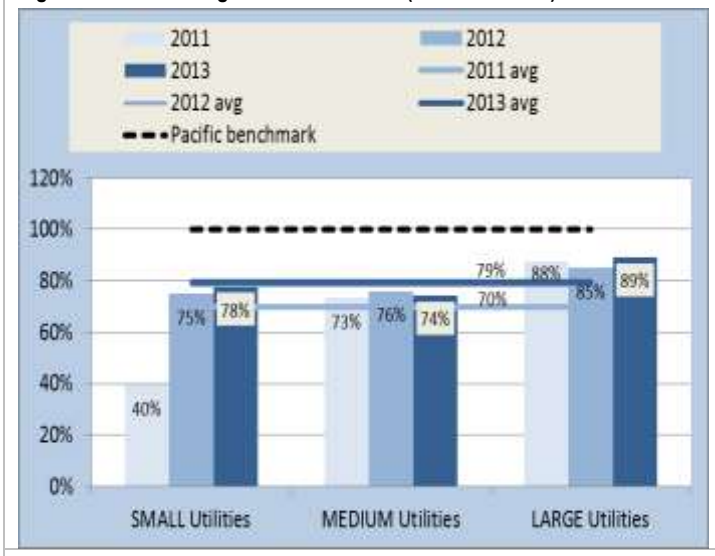
Sewerage Coverage

Sewerage coverage in the service areas has increased considerably in all utility categories.

Observation
The significant increase in coverage mainly reflects the utilities' data corrections.

2.5 Health and environment (KRA 3)

Figure 2.10: Percentage of Treated Water (indicator HE1a)



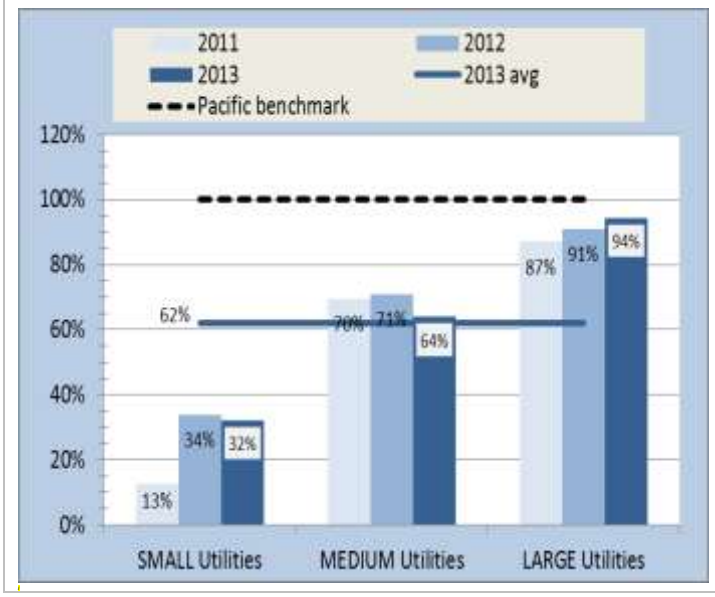
Treated Water

The average percentage of water produced and treated in 2013 was 79% compared to 78% in 2012.

Small utilities improved from 40% in 2011 to 75% in 2012 and 78% in 2013.

Observation: *Improvements are mainly due to introducing chemical disinfection and upgrading existing treatment facilities.*

Figure 2.11: Residual Chlorine (Indicator HE1)



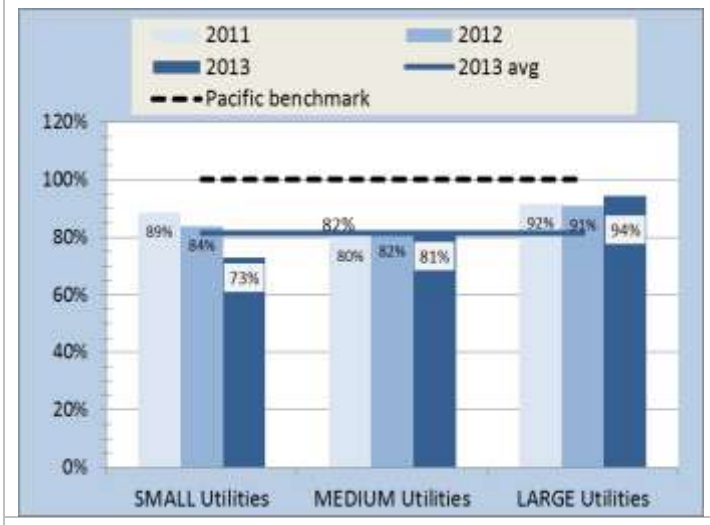
Residual Chlorine

The average percentage of tested samples compliant for residual chlorine stayed at 62% in 2013.

Observation:
Large utilities show the best results. The small utilities remain far behind target.

The results are based on 28,000 samples tested.

Figure 2.12: Microbiological Water Quality (Indicator HE2)



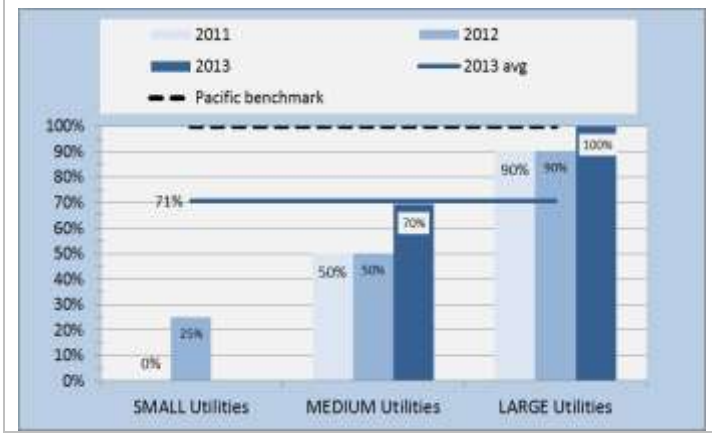
Microbiological Water Quality

A large percentage of tested samples are still non-compliant for microbiological water quality standards. In 2013, only 82% of tested samples are compliant, which is more or less the same as for 2012 results.

***Observation**: Utilities are still underperforming in water quality control. Many utilities do not test the samples themselves. They rely on the government environmental departments, which often do not monitor systematically.*

The results are based on 12,000 samples tested.
A remarkable drop is noted for small utilities. Not all utilities keep proper records. So the data remain inaccurate.

Figure 2.13: Wastewater Treated to Primary Standard (Indicator HE3)



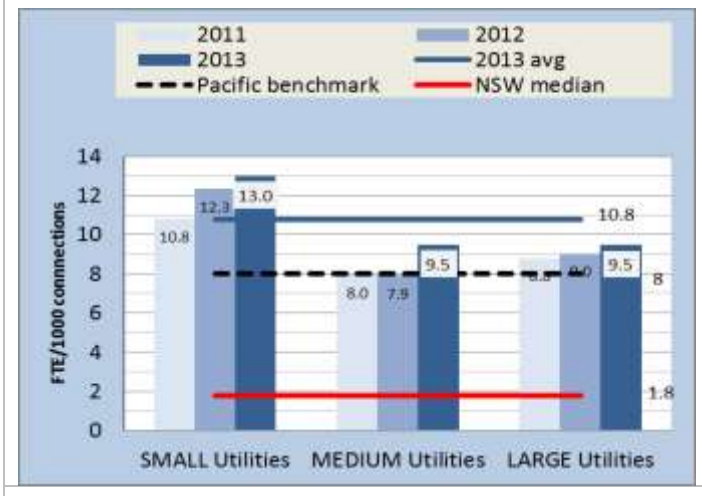
Wastewater Treatment

The percentage of wastewater treated to primary standard increased from 64% in 2012 to 71% in 2013. The large utilities are performing much better than the medium- and small-size utilities. Two small utilities have a wastewater treatment (Chuuk and Kosrae). Chuuk reported that the plant is inoperative, while Kosrae gave no data.

***Observation:** The development of wastewater facilities has gained high priority, particularly in large utilities. Medium and small utilities still require large investments to comply with environmental standards.*

2.6 Human resources (KRA 4)

Figure 2.14: Staff Utilisation per 1000 Connections (Indicator HR1)

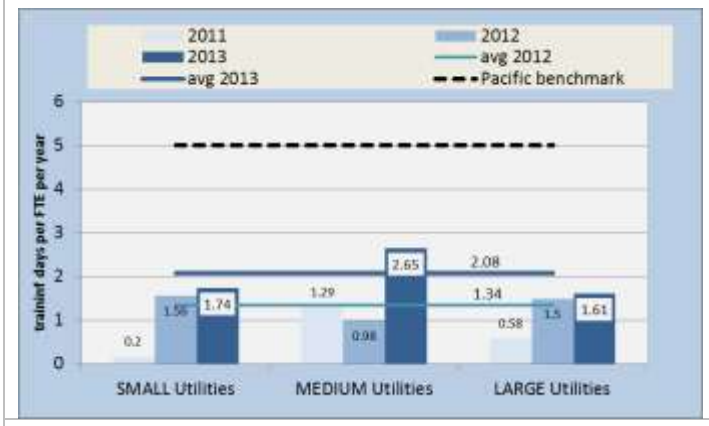


Staff Utilisation

The average number of staff compared to connections increased in all categories from an average 9.8 FTE per 1000 connections in 2012 to 10.8 FTE per 1000 connections in 2013. The median for the Australian NSW utilities is 1.8 staff per 1000 connections. The Pacific benchmark is set at eight.

***Observation**: Efficiency of staff utilisation is constrained by lack of economies of scale, labour intensive processes, and a lack of qualified personnel. So small-size utilities particularly show higher staff utilisation ratios. It is remarkable that medium-size utilities have performed better than large utilities!*

Figure 2.15 Training Days (HR2)

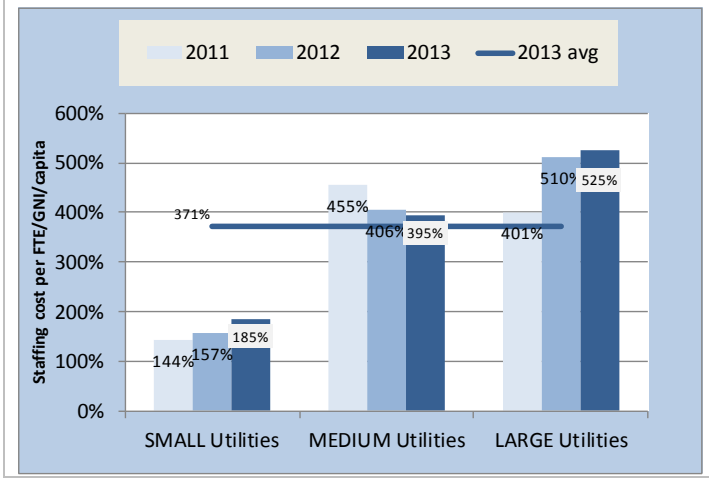


Training

Training for utility staff has trended positively in all categories. Still, the overall average of 2.08 training days per staff annually is still below the Pacific benchmark of 5 days per FTE annually.

Observation:
The relative high increase for the medium utilities is mainly due to IWSA Samoa's training efforts.

Figure 2.16 Staff Salaries/GNI Ratio (Indicator HR3)



Staff Salaries

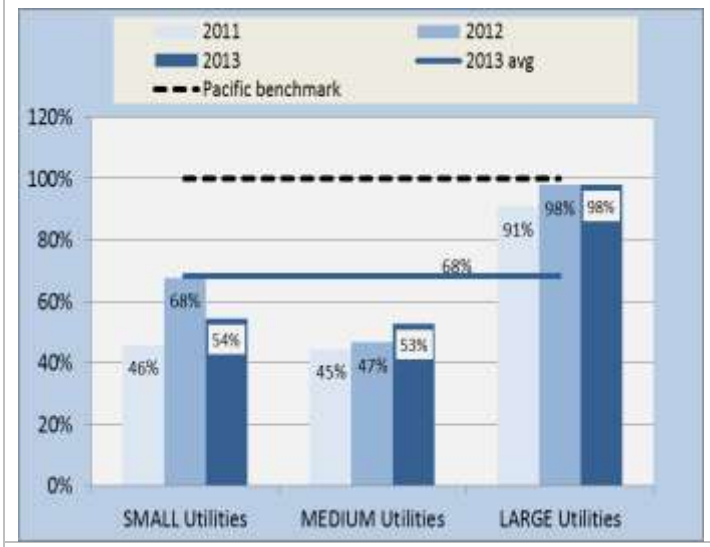
To compare staffing costs between countries the staffing costs are compared with gross national income (GNI) per capita.

Staff salaries compared to GNI per capita is lowest for the small utilities. Changes in 2013 compared with 2012 mainly reflect data corrections/improvements.

Observation: *The results show that the salaries/GNI ratio for large utilities is more than three times that of small utilities.*

2.7 Customer services (KRA 5)

Figure 2.17: Coverage Metering (Indicator CM1)



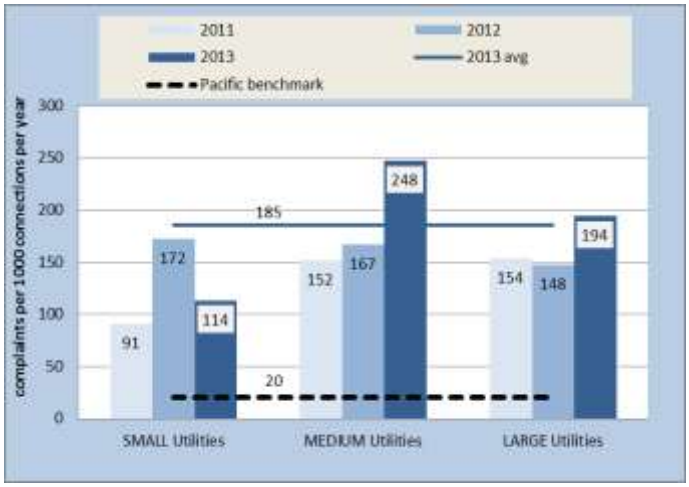
Coverage Metering

The average percentage of metered connections reduced from 74% in 2012 to 68% in 2013. The medium utilities' increased metering boosted the volume of water billed (ref. Figure 2.4).

Observation*: The drop in small utilities metering is mainly caused by the new utility RMI (Kwajalein) operating without meters.*

The increase in medium utilities' metering is due to newcomer American Samoa (see Figure 4.19).

Figure 2.18: Customer Complaints (Indicator CM2)



Customer Complaints

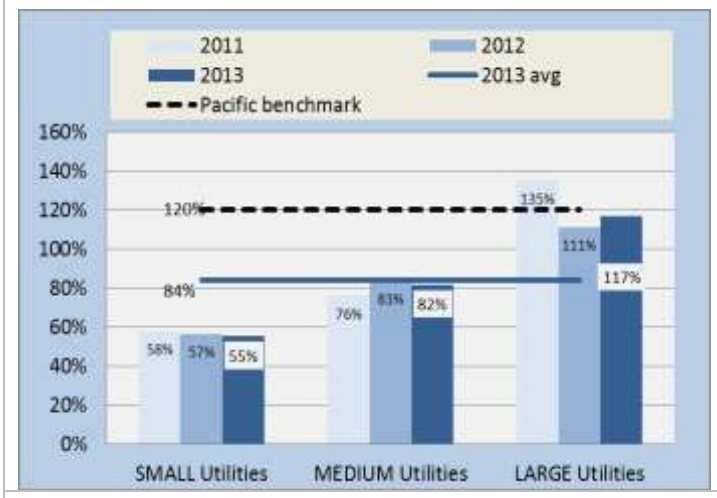
The average number of customer complaints increased from 161 per 1000 customers in 2012 to 185 complaints per 1000 customers in 2013, which is much higher than the Pacific benchmark.

***Observation**: Except for small utilities the increase appears to be partly because more utilities now report complaints.*

The most common complaints relate to water supply continuity, water quality, and billing.

2.8 Financial sustainability (KRA 6)

Figure 2.19: Operating Cost Recovery (Indicator F1)



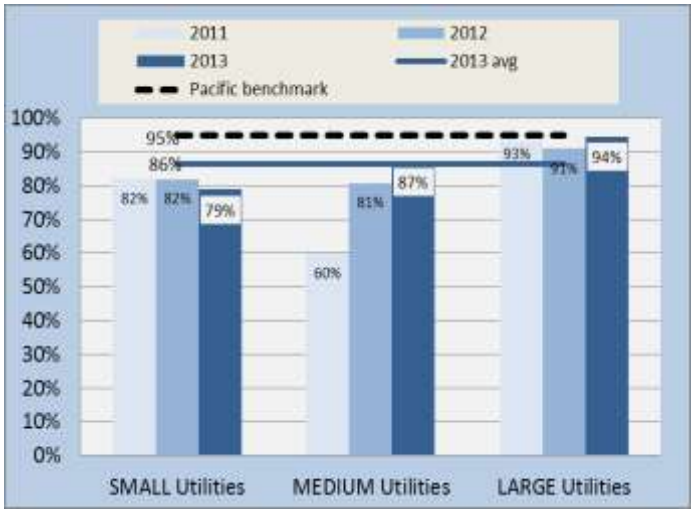
Operating Cost Recovery

The average operating cost recovery ratio (excluding depreciation and operating subsidies) slightly decreased from 85% in 2012 to 84% in 2013.

***Observation:** Generally, small utilities show very low ratios and rely on subsidies. Large utilities score better yet some still depend on operating subsidies. Only 8 of 24 utilities recover their operating costs.*

A similar trend can be observed in the collection ratios (next figure). Most common reasons for the low financial performances are: high NRW, poor financial management, low tariffs, and sometimes no billing at all (e.g., Cook Islands).

Figure 2.20: Collection Ratio (F2)



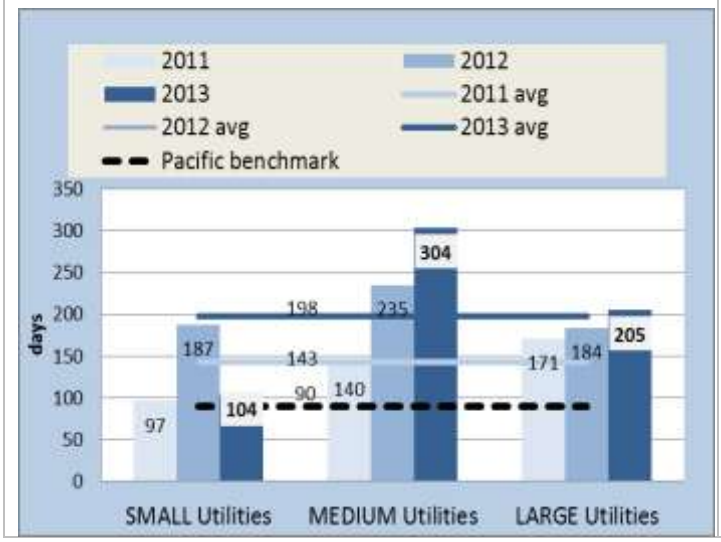
Collection Ratio

The average collection ratio was 86% in 2013, a small increase compared to 85% in 2012.

Observation:
Over the 3 years medium-size utilities trended positively.

In particular, medium and large utilities improved collection. The average for small utilities slightly declined due to newcomer RMI Kwajalein.

Figure 2.21: Debtor Days (Indicator F3)



Debtor Days

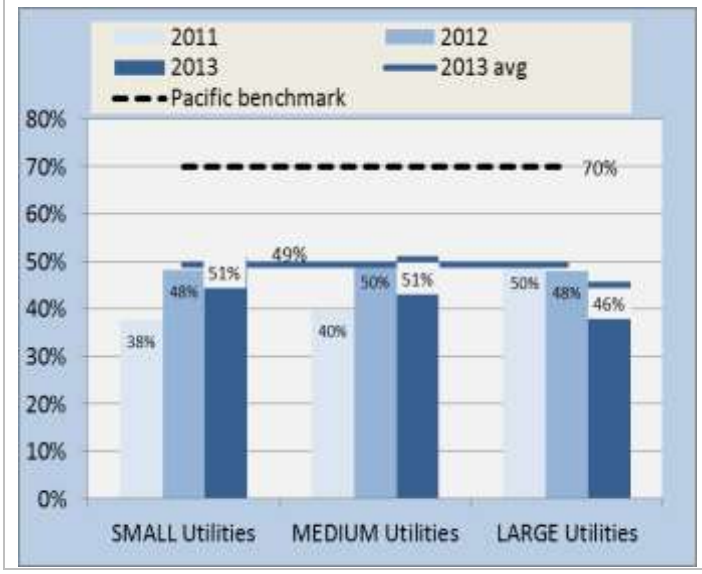
The average number of debtor days for accounts receivable remained almost the same, with 199 days in 2012 and 198 days in 2013.

Observation:
The high number of debtor days is still more than twice the Pacific benchmark. A sharp decrease in the small utilities mainly reflects the decrease RMI Majuro reported, and the incomplete data from utilities.

A substantial increase is observed for medium utilities, mainly due to a significant increase for PUC in Pohnpei.

2.9 Overall efficiency

Figure 2.22: Overall Efficiency Indicator (OEI)



Overall Efficiency Indicator (OEI)

The OEI is a combined indicator of the non-revenue water and collection ratio using the equation:

OEI = (1-NRW) x Collection Ratio

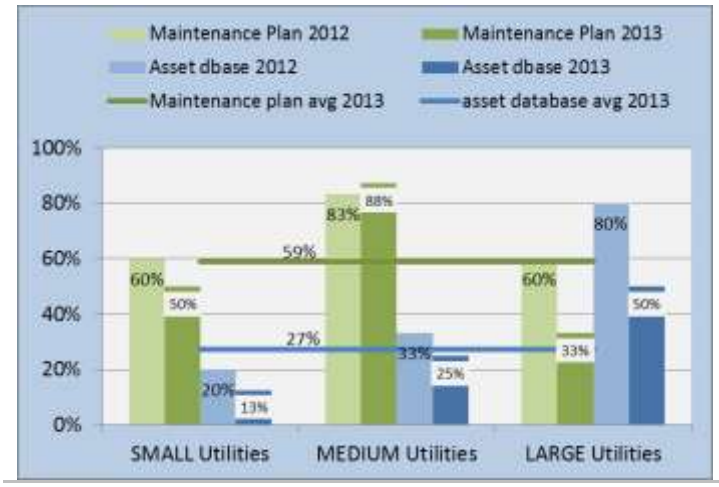
The OEI therefore represents the percentage of water produced that actually generates utility income.

Observation: *The average OEI for all PWWA utilities remained 49%, the same as for 2012. While the OEI in large utilities decreased by 2%, the small utilities showed the best improvements followed by the medium utilities.*

2.10 Maintenance

Maintenance is generally overlooked in Pacific utilities' operations. PWWA and its members therefore decided in 2012 to include maintenance as an additional benchmarking topic for which an additional set of questions was added to the questionnaire. The observations follow below:

Figure 2.23: Maintenance Plan and Asset Database



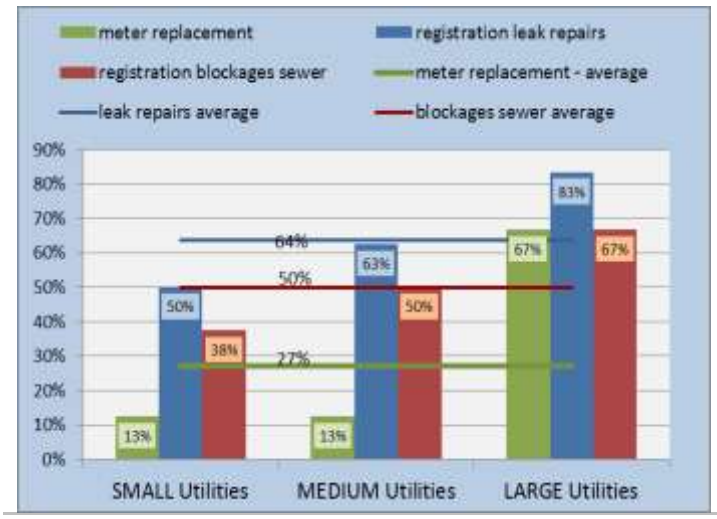
Maintenance Plan and Asset Database

While 59% of utilities reported having a maintenance plan, only 27% maintain an asset database.

Observation: *Most small and medium utilities perform poorly on asset management. Improved maintenance is prerequisite for developing and sustaining the utilities in the future.*

Maintenance budgets are generally very low and dampen operational performance – poor cost recovery, low service levels, and unsatisfied customers. Notice this in the corresponding indicators.

Figure 2.24: Meter Replacement and Failure Registration



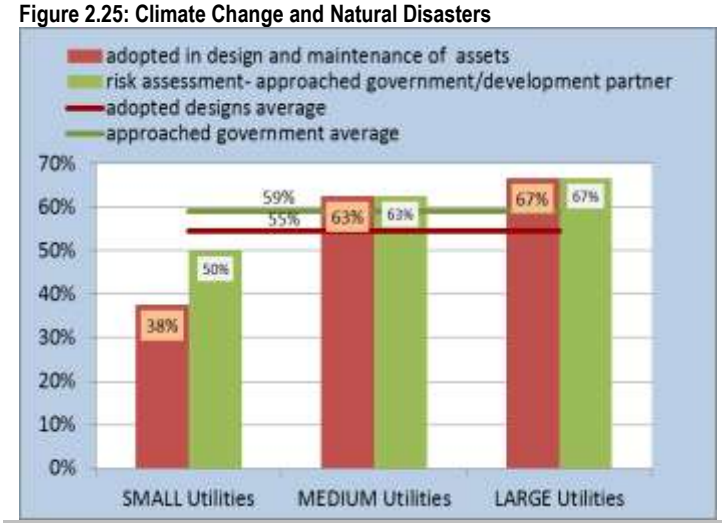
Meter Replacement and Failure Registration

About 64% of utilities register the number of leak repairs, 50% register blockages in sewers, and only 27% replace meters under routine maintenance.

The small and medium utilities reported less positively, particularly on meter maintenance.

Observation: *Many small and medium utilities have no means and facilities for meter maintenance themselves.*

Figure 2.25: Climate Change and Natural Disasters



Climate Change and Natural Disasters

On average 55% of utilities reported being prepared for climate change and natural disasters, while 59% of utilities have approached their governments for support for a risk assessment.

Observation: *Many utilities are unprepared for climate change and natural disasters.*

2.11 Overall utility performance

Using the data collected, an overall performance indicator (OPI) was developed to enable the overall comparison of water utilities. The OPI is essentially an average score based on a range of key performance indicators, which is then standardised using the standard normal distribution to create a dataset with a mean of zero and standard deviation of one. Each indicator used for the calculation is given equivalent weight. This method for calculating and ranking utilities has been used in other similar benchmarking exercises such as SEAWUN.

For calculating the OPI, the following criteria (same as in 2011 and 2012) have been applied for selecting key performance indicators for the OPI:

OPI Selection Criteria
▪ The ability of utilities to manage that indicator (e.g., volumes have been omitted as there are many variables which influence water production and consumption beyond the utilities' control)
▪ The completeness of the dataset for that indicator (i.e., only indicators that the majority of utilities can calculate have been included)
▪ The full range of key result areas are represented in the OPI
▪ Indicators reflect similar services, which basically means removing wastewater services from the calculation

As in 2012, the following key indicators[1] across the key result areas (KRA) have been used to calculate the OPI for 2013:

Table 2.2: Key Result Areas Used to Calculate OPI

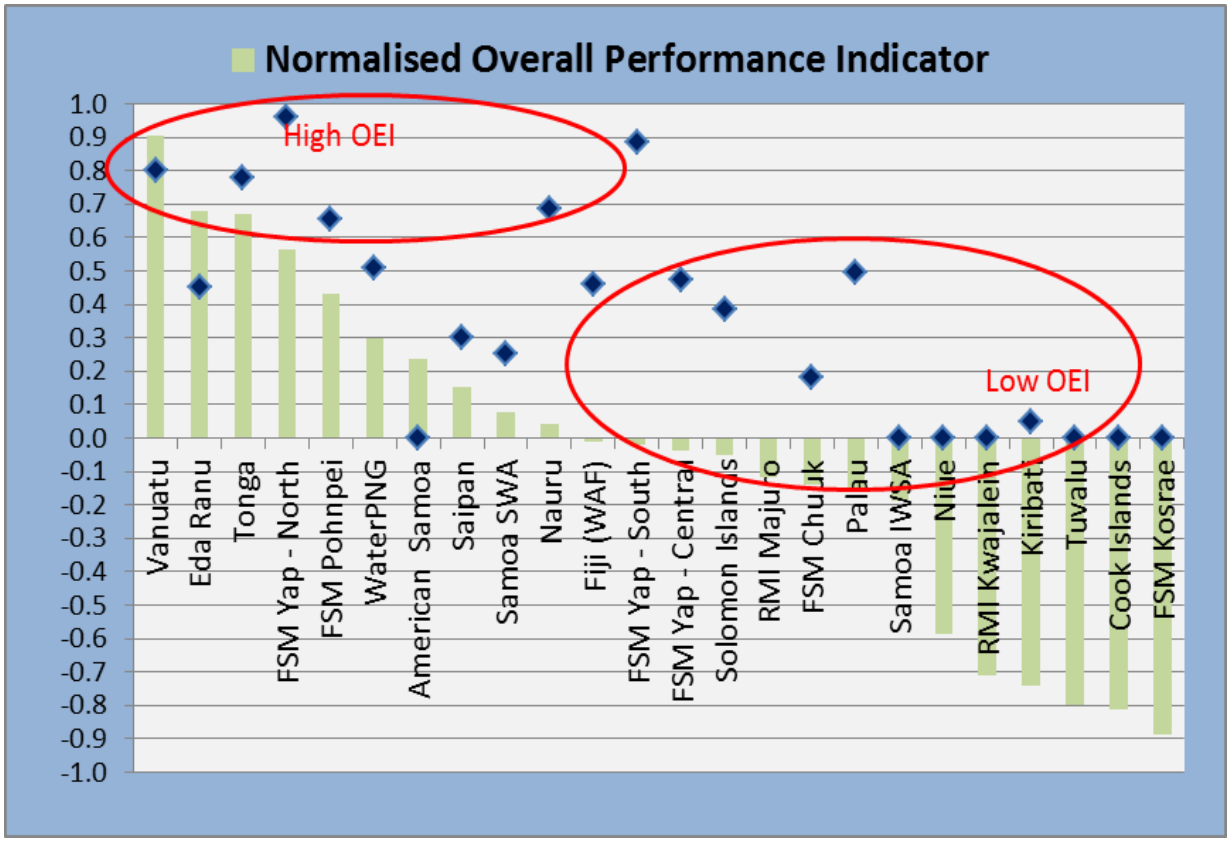
KRA 2 Technical Performance (Operational)	O1 O3	Continuity of water supply service (hours available) Non-revenue water (%)
KRA 3 Health and Environment	HE1 HE2 HE3	Drinking water quality compliance - residual chlorine Drinking water quality compliance - microbiological Percentage of drinking water treated
KRA 4 Human Resources	HR1 HR2	Water and sewerage business staff/1000 connections Training days (no. days/year)
KRA 5 Customers Management	CM2 CM4	Meter coverage rate for water supply customers (for all water meters) Customer complaints /1000 connections
KRA 6 Financial Sustainability	F1 F3	Operating cost recovery ratio (excluding depreciation) Collection ratio – actual cash income versus billed revenue

For each KRA, the normalised scoring of the indicators is compounded to an average score per KRA. The KRA scores are then totalised for all the KRAs.

Figure 2.26 illustrates the normalised OPI results, which rank the 24 utilities' overall performance.

[1] Indicators are provided with a code; e.g., the indicators related to key result area Human Resources are coded with HR1, etc.

Figure 2.26: Overall Performance Indicator (OPI)



Observations on OPI

The following observations arise from the collected data:

1 Utilities with a high OEI (high percentage of revenue water) are more likely to be in the higher overall performance group (financial and technical performance).

2 Similarly, utilities with a high overall performance are more likely to have high levels of revenue water.

> "The top three performing utilities are UNELCO (Vanuatu), Eda Ranu (PNG) and Tonga Water Board"

3 The two utilities managed by private operators (UNELCO and Edu Ranu)) show excellent results for OPI and OEI.

4 It appears that utility performance, both OPI and OEI, relates to size, with the large and medium utilities generally performing better than the small ones.

5 The top three performing utilities are UNELCO (Vanuatu), Edu Ranu (PNG), and TWB (Tonga).

PWWA awards for 2013

PWWA has issued awards to the best performing utilities in 2013 per key result area (KRA), per category (small, medium, and large utilities), and for the best improved utilities over 2012.

Table 2.4: PWWA Performance Awards 2013

	Awards 2013	Utility
1	KRA Health and Environment	PNG - Eda Ranu
2	KRA Operational Performance	FSM - Yap - North
3	KRA Human Resources	Samoa - IWSA
4	KRA Customer Services	FSM - Pohnpei -PUC
5	KRA Financial Performance	Tonga -TWB
6	Best Small Utility	FSM - Yap North
7	Best Medium Utility	Vanuatu - UNELCO
8	Best Large Utility	PNG - Eda Ranu
9	**Best Overall**	Vanuatu - UNELCO
10	Best Improved Utility	FSM - Chuuk
11	Best Maintenance	American Samoa -ASPA
12	Best Sanitation	Fiji - WAF

3. Benchmarking results in large utilities

3.1 Introduction

This chapter presents the benchmarking results for the following six participating large utilities, each serving more than 10,000 connections:

- Water Authority of Fiji (WAF)
- Samoa Water Authority (SWA)
- Saipan Commonwealth Utilities Corporation (CUC)
- Tonga Water Board (TWB)
- Eda Ranu from Papua New Guinea
- WaterPNG from Papua New Guinea

WAF is by far the largest utility with over 141,000 water connections and 28,000 sewerage connections. Apart from Eda Ranu, the large utilities are statutory entities that governments regulate, with some services outsourced to the private sector. Eda Ranu is a state owned enterprise (SOE) operating under commercial law.

All utilities participated in last year's benchmarking, which makes it possible to compare performance with 2012 results.

Participating utilities were asked for important details about their operations for easier interpretation and comparison of results across performance indicators. Table 3.1 presents the large utilities' main characteristics.

Table 3.2 provides the data on the benchmarking indicators for all utilities for each key result area. Sections of this chapter analyse these data in detail with comparison between utilities including current and past performance.

Table 3.1: Characteristics – Large Utilities

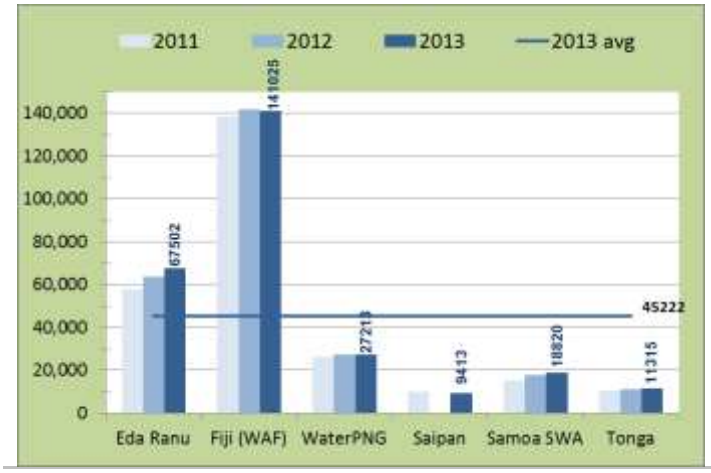
	Utility Characteristics		Eda Ranu	Fiji (WAF)	WaterPNG	Saipan	Samoa SWA	Tonga
1	Legal status of the utility		Jointly Government and Private	Government Statutory organisation	Government Statutory organisation	Government Statutory organisation	State Owned Enterprise	State Owned Enterprise
2	Sevices provided by Utility **W**ater/**S**ewerage/**P**ower	W/S/ P	W/S	W/S	W/S	W/S/P	W/S	W
	Water							
3	number of connections	number	67502	141025	27213	9413	18780	11315
4	population served	number	533740	609938	205832	53867	129000	62338
5	number of schemes	number	1	31	18	3	35	5
6	length pipe mains (all diameters)	km	1872	3690	715	630	1080	165
7	distrubution reticulated yes/no	YES/NO	YES	YES	YES	YES	YES	YES
8	estimated % of houses with household tank	%	N/A	20%	0%	0%	7%	90%
9	Water resources constraints during droughts	YES/NO				YES	YES	
10	Volume water produced	ML/year	58400	112675	25091	16735	27000	3947
11	Drinking water quality guidelines used		WHO	Fiji Standards	WHO & national	USEPA	SNDWS	WHO
12	Drinking water safety plan in use	number	1	4	Unsure	3	3	5
13	Laboratory in house by utility	YES/NO	YES	YES	NO	YES	Yes	yes
14	Number of microbiological samples	nr/year	1152	2180	52	1050	429	360
15	Number of samples for residual chlorine	nr/year	1440	2180	720	1050	429	360
	Sewerage							
16	Number of connections	number	14669	28204	2949	2582	75	
17	Population Served	number	124687	132559	29490	21000	120	NA
18	Number of schemes	number	2	11	6	1	1	NA
19	Length of sewer mains (all diameters)	KM	370	520	130	104	6	NA
20	Volume sewage collected	ML/year	25600	18401	3124	3535	8	NA
21	Sewage treatment up to primary standard	%	100%	100%	100%	100%	100%	NA
22	Sewage treatment up to secundary standard	%	71%	100%	0%	100%	100%	0%
23	Number of effluent samples tested	number	252	138	60	1538	44	0
	Operations							
24	Maintenance plan in use	YES/NO	NO	NO	NO	n/a	YES	YES
25	Asset database in use	YES/NO	NO	YES	YES	n/a	YES	NO
26	Meter replacement programme in use	YES/NO	NO	YES	YES	n/a	YES	YES
27	Registration leak repairs in water network	YES/NO	YES	YES	YES	n/a	YES	YES
28	Registration of blockages/overflows in sewer	YES/NO	YES	YES	YES	n/a	YES	NO
29	Climate change/natural disasters management adopted	YES/NO	YES	YES	NO	n/a	YES	YES
	Customers							
30	Customer complaints	nr/year	3999	53951	4560	0	6900	986
31	Customers - charter specifying service levels and response commitment?	YES/NO	NO	Yes	Yes	NO	Yes	Yes
32	Most common complaint		Leaks/billings & collections	billing, metering	Water Quality	NA	Burst pipes/ Leakages	billing, metering
	Human Resources							
33	Number of staff (full time equivalent)	number	258	1190	370	162	235	96
34	Technical staff with diploma in engineering or science	number	10	42	40	24	26	5
35	Administrative staff with a higher business qualification	number	27	61	120	8	30	5
	Financial							
36	Total Operating (recurrent) costs excl depreciation	Million USD/year	28.8	33.0	25.7	14.2	9.0	2.3
37	Annual depreciation	Million USD/year	1.7	26.8	3.9	4.4	1.9	0.9
38	Annual Interest on loans	Million USD/year	0.3	0.0	0.0	0.0	0.0	0.0
39	Total Operating Revenue excl subsidies	Million USD/year	50.7	16.5	29.6	12.0	8.8	4.0
40	Operating subsidies and grants (for operating expenses only)	Million USD/year	0.0	26.0	0.0	0.6	2.1	0.0
41	Net book value of assets	million USD	23.3	1002.1	117.8	NA	43.2	8.3
42	Average water tariff per m3	USD/KL	1.57	0.24	1.66	2.04	0.58	1.06

Table 3.2: Performance Indicators – Large Utilities

No.	Indicator	Units	PWWA benchmark	Average (2013)	Eda Ranu	Fiji (WAF)	WaterPNG	Saipan	Samoa SWA	Tonga
KRA1 - Production										
V1	Volume of water produced - total produced from sources and treatment	kL/conn/day	**1.25**	**2.81**	2.37	2.19	2.53	4.87	3.94	0.96
V1b	Volume of water produced (L/capita/day)	L/capita/day	**250**	**456**	300	506	334	851	573	173
V2	Volume of water sold (i.e. billed) - through meters or estimated unmetered	kL/conn/day	**1.00**	**1.17**	1.07	1.07	1.47	1.46	1.24	0.74
V2b	Volume of water sold (i.e. billed) in L/capita/day	L/capita/day	**150**	**191**	135	247	194	255	181	135
V3	Volume of sewage produced - total	kL/conn/day	**0.75**	**2.70**	4.78	1.79	2.90	3.75	0.28	NA
V3b	Volume of sewage produced (L/capita/day	L/capita/day	**200**	**374**	563	380	290	461	174	NA
KRA2 - Technical Performance										
O1	Water supply coverage	% of population	**95%**	**90%**	100%	98%	64%	100%	80%	95%
O2	Continuity of water supply service (hours available)	Hrs/day	**24**	**22.3**	24	19	24	21	24	22
O3b	Non-revenue water (%)	% of water produced	**25%**	**51%**	55%	51%	42%	70%	69%	22%
O3	Non-revenue water (m3/conn/day)	kL/conn/day	**0.3**	**1.6**	1.3	1.1	1.1	3.4	2.7	0.2
O3c	Non-revenue water (m3/km/day)	kL/km/day	**NA**	**14.8**	17.2	15.6	14.7	18.6	17.1	5.3
O4	Sewerage coverage	% of population	**80%**	**64%**	89%	88%	9%	44%	89%	NA
KRA3 - Health and Environment										
HE1	Drinking Water quality compliance - residual chlorine	% compliance	**100%**	**94%**	100%	90%	100%	100%	79%	97%
HE1a	Percentage of customers on treated water or % of water treated	% water produced	**100%**	**89%**	100%	100%	90%	100%	67%	78%
HE2	Drinking Water quality compliance - microbiological	% compliance	**100%**	**94%**	100%	93%	100%	97%	79%	97%
HE3	% of sewage produced which is treated to at least primary standard	% of sewage	**100%**	**100%**	100%	100%	100%	100%	100%	NA
KRA4 - Human Resources										
HR1	Water and sewerage business staff/ 1000 connections	#FTE/1000 conn	**8.0**	**9.5**	3.1	7.0	12.3	13.5	12.5	8.5
HR2	Training days (no days/year)	days/FTE/year	**5.0**	**1.6**	0.8	1.2	0.5	0.6	4.9	1.6
HR3	Average cost of staff (total labour cost / no of staff/GNI)	%	**NA**	**525%**	1182%	184%	1008%	195%	343%	238%
KRA5 - Customer Service										
CM1	Meter coverage rate for water supply customers (for all water meters)	% of customers	**100%**	**98%**	100%	100%	100%	98%	89%	100%
CM2	Customer complaints / 1000 connections	#/1000 conn	**20**	**194**	49	319	151	NA	366	87
CM3	Affordability new connection	% of GNI per capita	**NA**	**4.1%**	9.3%	4.5%	NA	1.4%	2.8%	2.7%
CM4a	Affordability - average bill	% of GNI per capita	**NA**	**1.6%**	1.7%	0.5%	3.6%	1.6%	1.1%	1.1%
CM4b	Affordability - 6m3/month/connection	% of GNI per capita	**NA**	**0.2%**	0.3%	0.1%	0.3%	0.2%	0.1%	0.4%
KRA6 - Financial Sustainability										
F1	Operating cost recovery ratio (excluding dep)	%	**120%**	**117%**	176%	50%	115%	84%	98%	177%
F2	Collection ratio - actual cash income vs billed revenue	%	**95%**	**94%**	100%	94%	88%	100%	85%	100%
F3	Accounts receivable (days)	Days	**90**	**205**	116	476	189	NA	206	39
OV1	**Overall Efficiency Indicator ((1-NRW)*collection ratio)**	**%**	**70%**	**46%**	45%	46%	51%	30%	27%	78%

3.2 Technical performance in large utilities

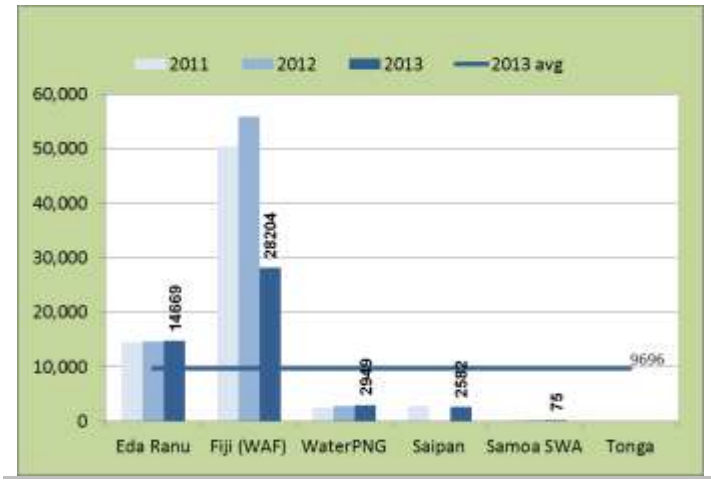
Figure 3.1: Water Connections



Water Connections
The six large utilities' total water connections increased by 1.5% from 271,332 in 2012 to 275,288 connections in 2013.

Observations:
As coverage for water supply in large utilities' service areas is relatively high, the trend shows no significant growth in number of connections. It follows population growth.

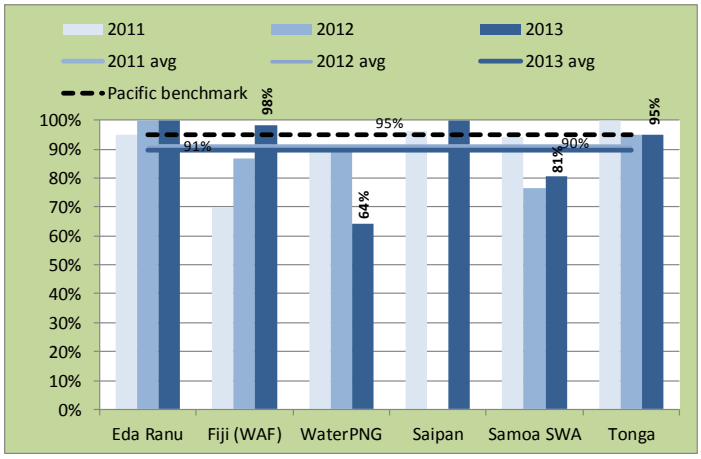
Figure 3.2: Sewerage Connections



Sewerage Connections
In 2013 the six large utilities' total sewerage connections add to 48,479 connections.

Observations:
The past 3 years note no significant increase. The number of sewerage connections of WAF (Fiji) decreased as numbers were misreported previously.

Figure 3.3: Population Coverage – Water Supply (Indicator O1)

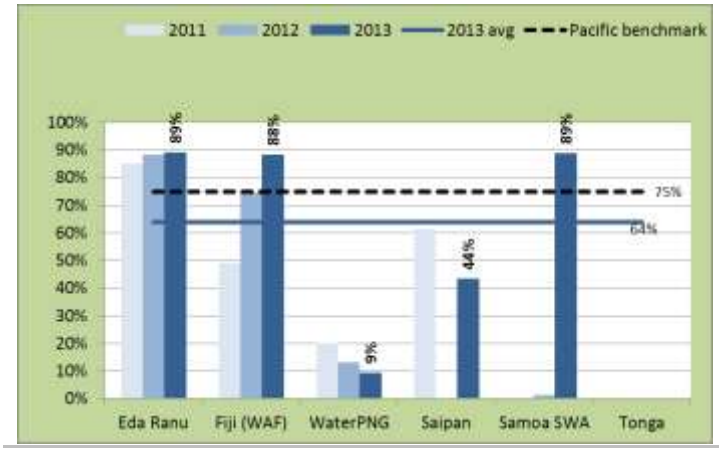


Population Coverage – Water Supply
Average population coverage for water supply within the service areas remained unchanged at a level of about 90%, which is still below the 95% Pacific benchmark.

Observations:

Data from the utilities are based on estimated population living in the jurisdiction area. These areas are often ill-defined. Changes mostly relate to correction of service areas and corresponding populations, which happened in WaterPNG.

Figure 3.4: Population Coverage – Sewerage (Indicator O4)



Population Coverage – Sewerage

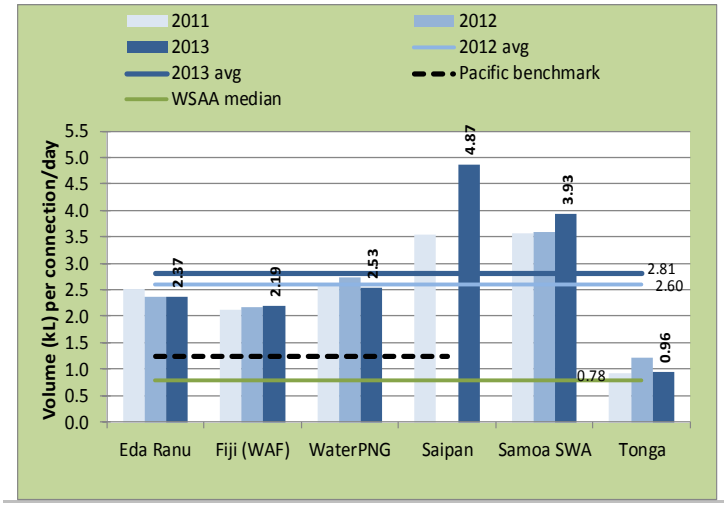
The sewerage systems coverage of large utilities averages 64%, which is below the Pacific 75% benchmark. Tonga Water Board operates no sewerage system.

Observations:

WAF (Fiji) and Eda Ranu (PNG) perform well and comply with the Pacific benchmark.

SWA (Samoa) operates a small but dedicated well-performing wastewater treatment system in Apia serving the business/tourist centres and hospital. SWA serves no residential areas.

Figure 3.5: Volume of Water Produced (Indicator V1)



Volume of Water Produced

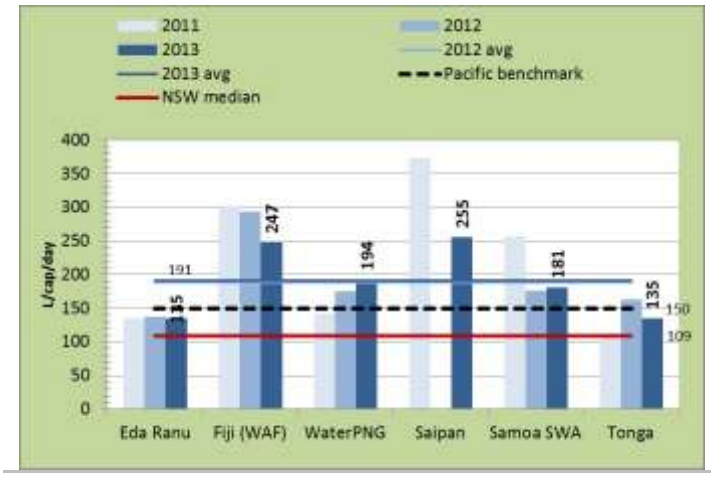
Water produced per connection increased from 2.60 kL in 2012 to 2.81 kL per connection per day in 2013. The figures are very high when compared to the Pacific benchmark and international benchmarks.

Observations:

The main reasons for the high water volumes are: (a) the high percentage of physical water losses; (b) high operating pressures; (c) lack of demand management practices; and d) educational campaigns.

Only Tonga Water Board performs well and complies with the Pacific benchmark.

Figure 3.6: Volume of Water Sold (L/capita/day) (Indicator V2)



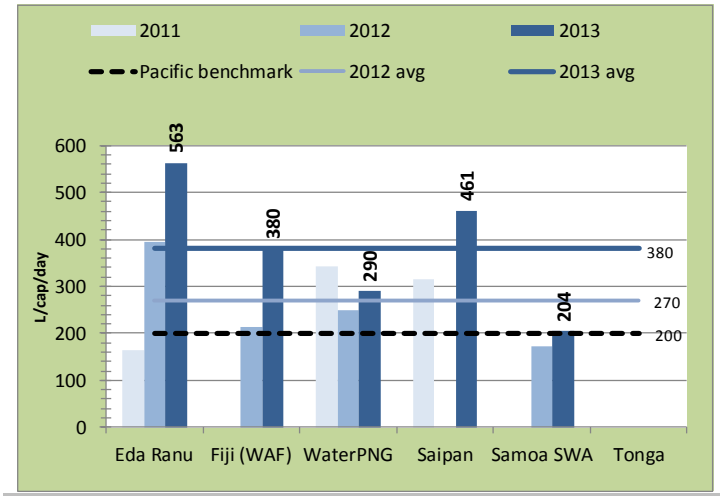
Water Sold

Average per capita consumption in 2013 was 191 litres per capita per day. Levels among utilities vary. Water sold per capita is highest in the WAF (Fiji) and CUC (Saipan). Eda Ranu (PNG), SWA (Samoa), and TWB (Tonga) are on or just below the Pacific benchmark.

Observations:

No overall trend is observed over the past 3 years. For WAF, CUC Saipan, and Tonga Water Board volumes have declined. At WaterPNG water volumes sold have increased over the past 3 years.

Figure 3.7: Volume of Sewage Collected (Indicator V3b)

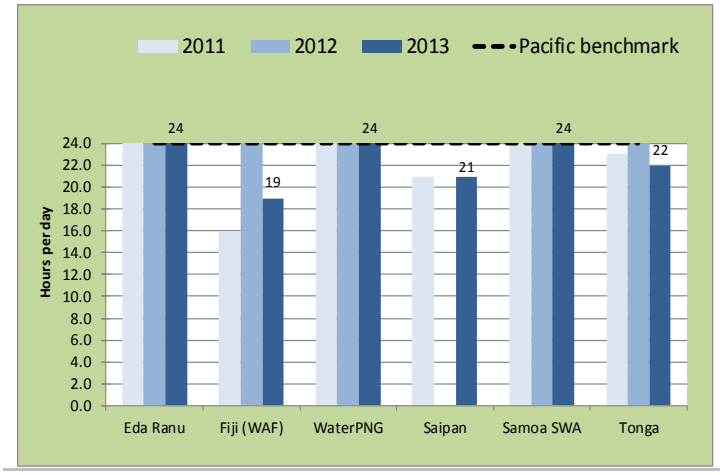


Volume of Sewage Collected
The average volumes of collected sewage increased from 270 litres per capita per day to 380 l/cap/day. The figure is about double the Pacific benchmark.

Observations:
Utilities provided unstable data. Adjustment and data corrections are still ongoing; it is impossible to analyse the trends.

Volumes of sewage collected are higher than the volumes of drinking water sold (see fig 3.6). This indicates that ground water or seepage water from drains mixes with the collected wastewater.

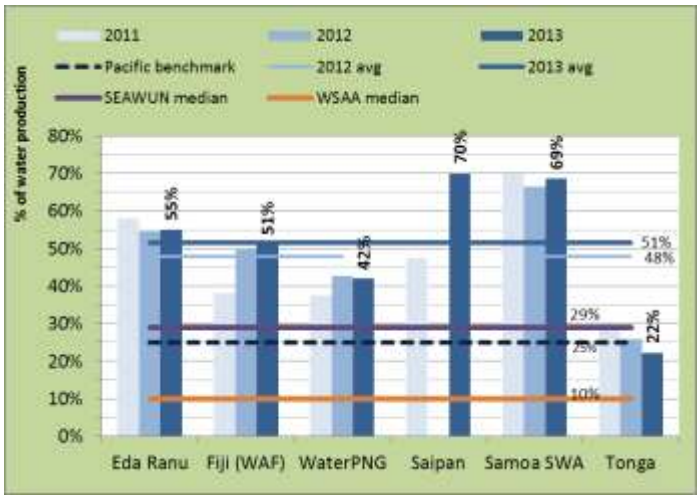
Figure 3.8: Continuity of Water Supply (Indicator O2)



Continuity of Water Supply
Edu Ranua, WaterPNG, and Samoa SWA operate 24/7, while Tonga Water Board, CUC Saipan, and WAF still supply water intermittently.

Observations:
WAF (Fiji), CUC Saipan, SWA (Samoa), and TWB (Tonga) report that discontinuity occurs during droughts or in remote areas lacking distribution capacity.

Figure 3.9: Non-Revenue Water as % of Production (Indicator O3b)

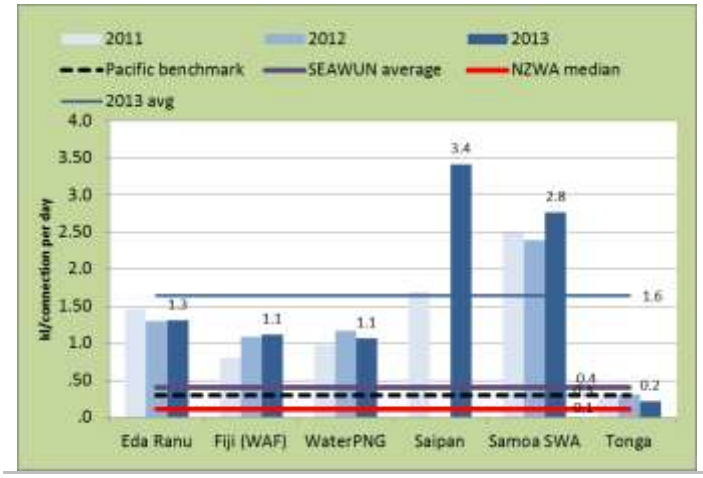


Non-Revenue Water (NRW)
Average NRW increased from 48% in 2012 to 51% in 2013, and these high levels concern most utilities. Except for Tonga Water Board all large utilities report high or very high NRW levels.

Observations:
NRW in most utilities is caused by i) physical leakages due to old and poorly maintained networks operated under high pressure, and ii) administrative losses.

All utilities prioritize NRW and have started leak reduction programs. For example SWA (Samoa) started a leak reduction project through a pressure management approach. TWB (Tonga) has been very successful in reducing NRW for years, reaching a value below the Pacific benchmark.

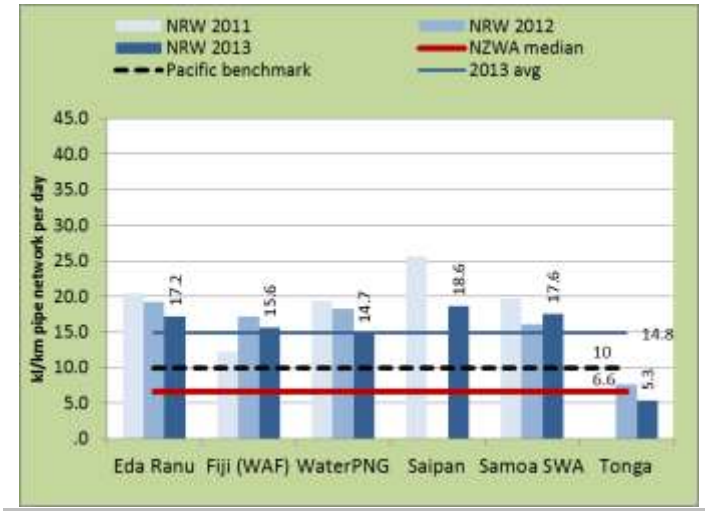
Figure 3.10: Non-Revenue Water per Connection/Day (Indicator O3)



Non-Revenue Water per Connection/Day
On average, more than 1,600 litres of non-revenue water is lost per connection daily.

Observations:
All utilities except TWB Tonga show very high NRW volumes per connection per day, far more than South East Asia or New Zealand utilities consider typical.

Figure 3.11: Non-Revenue Water per km of Main (Indicator O3c)



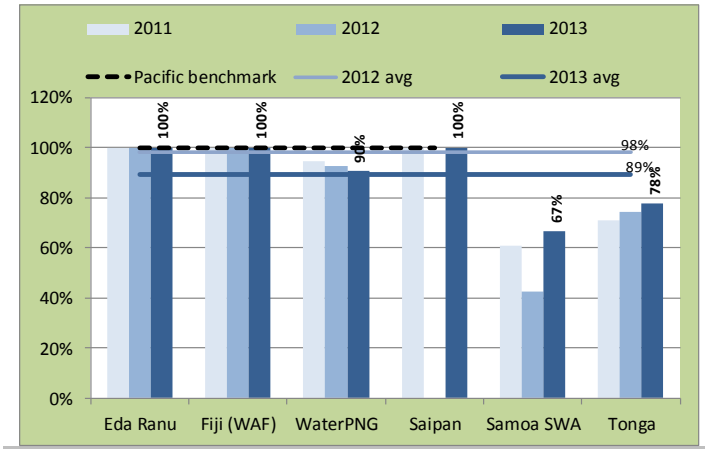
Non-Revenue Water per km of Main
NRW is also expressed in kL per kilometre of pipe network. The 2013 data records almost 15 kL of NRW daily, per km of the pipe network, which is above the Pacific benchmark of 10 kL/km/day.

Observations:
Only Tonga Water Board complies with the Pacific benchmark, which is set at 10 kL per km pipe length.

One should draw conclusions carefully on trends, as the data on pipe lengths is so far inaccurate.

3.3 Health and environment in large utilities

Figure 3.12: Treated Water as a % of Water Production (Indicator HE1a)

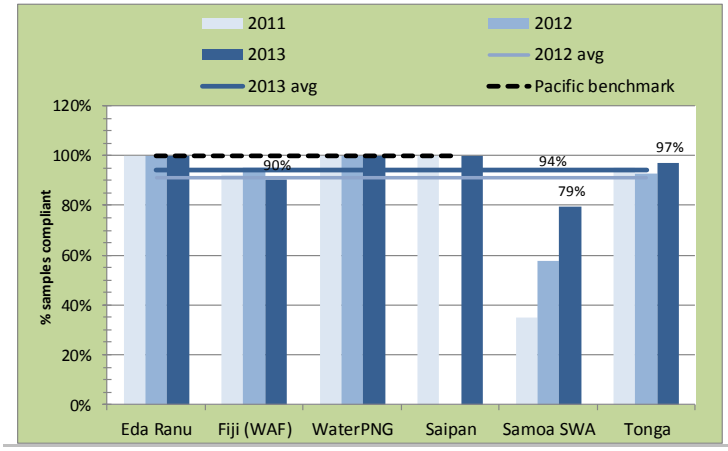


Treated Water
On average, ten per cent of water produced is untreated. However, four out of six of the utilities are at or close to the Pacific benchmark.

Eda Ranu (PNG), the WAF (Fiji), and the CUC (Saipan) provide 100% treated water, while SWA (Samoa), TWB (Tonga), and WaterPNG do not yet meet the Pacific benchmark.

Observations:
SWA has recovered well from the drop in 2012 and improved considerably after rehabilitating its water treatment plants.

Figure 3.13: Drinking Water Quality – Residual Chlorine (Indicator HE1)



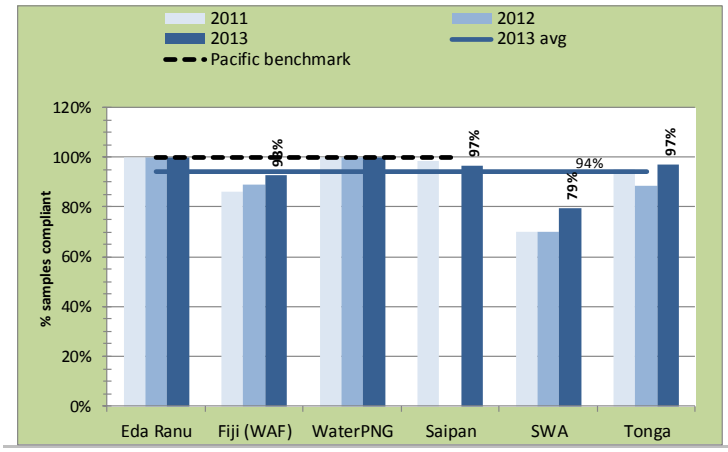
Residual Chlorine

The large utilities reported that 94% of samples analysed comply for residual chlorine.

Observations:

Overall, the compliance of drinking water quality has improved. Eda Ranu (PNG), WaterPNG, CUC (Saipan), and TWB reported full compliance for residual chlorine. WAF (90%) is approaching the Pacific benchmark and SWA (79%) has progressed considerably during the past 3 years after upgrading its treatment systems.

Figure 3.14: Drinking Water Quality – Microbiology (Indicator HE2)



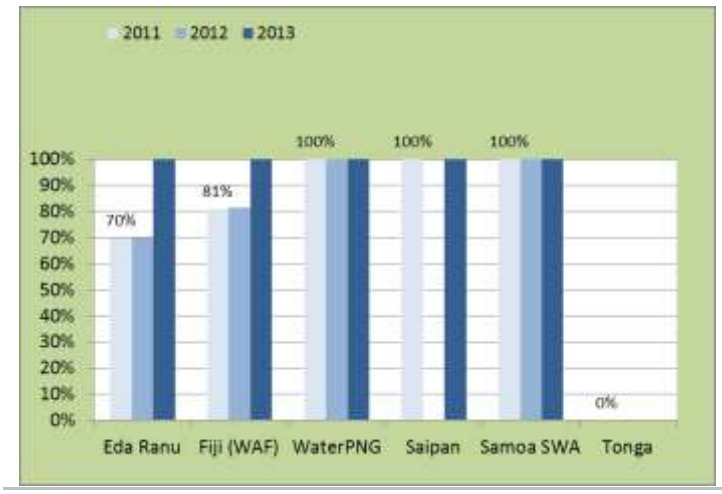
Microbiology

On average 94% of all samples analysed comply with microbiological water quality.

Observations:

A positive trend can be observed. SWA, WAF, and Tonga Water Board progressed considerably during the past year. Two utilities (Water PNG and TWB) reported compliance with the 100% Pacific benchmark.

Figure 3.15: Sewage Primary Treatment (Indicator HE3)



Sewage Treatment

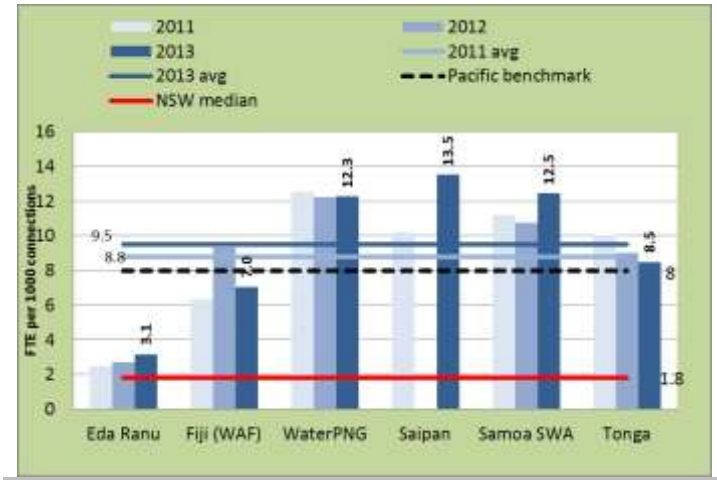
Five of the six large utilities treat wastewater to at least primary standard. Tonga Water Board operates no sewerage system.

Observations:.

Fiji treats wastewater to secondary level. Existing plants are being upgraded and will advance the standard tol comply with international standards. SWA's (Samoa) small treatment plant performs well at high standards.

3.4 Human resources development in large utilities

Figure 3.16: Staff per 1000 Connections (Indicator HR1)

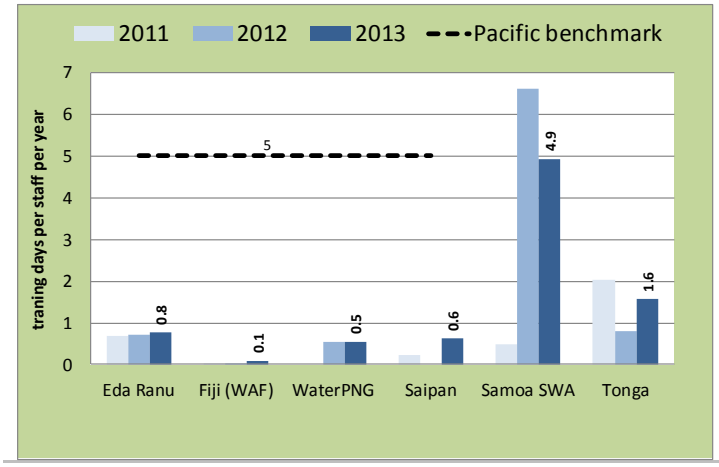


Staff per 1000 Connections
Utilities report that the staff utilisation ratio amounts to an average of 9.5 FTE per thousand connections.

Observations:
Overall an increasing trend exists with a considerable increase in SWA (Samoa) and CUC Saipan. Eda Ranu's (PNG) very low ratio of 3.1 probably reflects the level of service outsourcing. The improved staff utilisation ratio in WAF is mainly due to the correction of last year's data.

It is remarkable that the average staff utility ratio in large utilities is similar to that in medium utilities. One would expect economies of scale in larger utilities' operations.

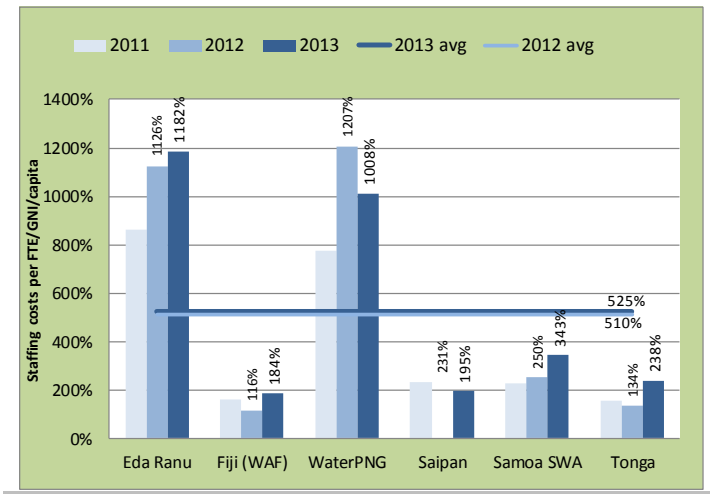
Figure 3.17: Training Days per Staff per Year (Indicator HR2)



Training Days
Generally, staff receive insufficient training for the Pacific benchmark. Only SWA, Samoa has almost reached the Pacific benchmark of 5 days per staff annually.

Observations:
A common concern in the Pacific Islands is staff qualifications. Most staff capabilities are learned 'on the job,' with little time and budget allocated to train employees. The results illustrate that, with the exception of the SWA (Samoa), all utilities remain far below the Pacific benchmark.

Figure 3.18: Average Cost of Staff/GNI Ratio (Indicator HR3)

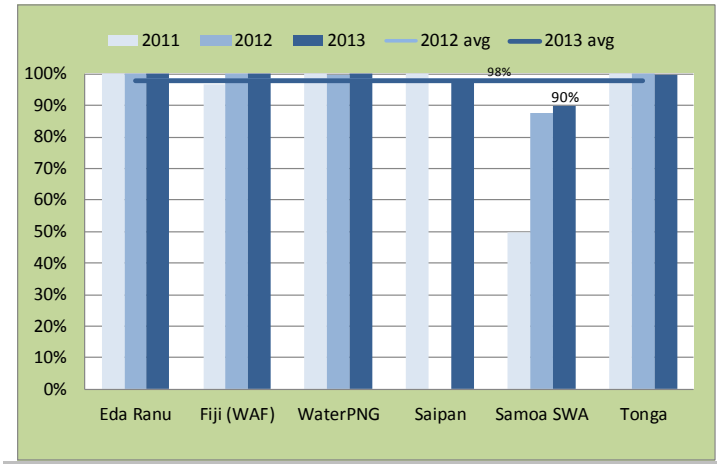


Salary Costs:
To enable comparison between countries the staffing costs are compared with gross national income (GNI) per capita. The average cost of staff/GNI ratio is highest for the two utilities in Papua New Guinea and lowest for Fiji.

Observations:
Overall the ratio increased from 510% (2012) to 525% (2013) which indicates that staff salaries show an increasing trend compared to GNI.

3.5 Customer services in large utilities

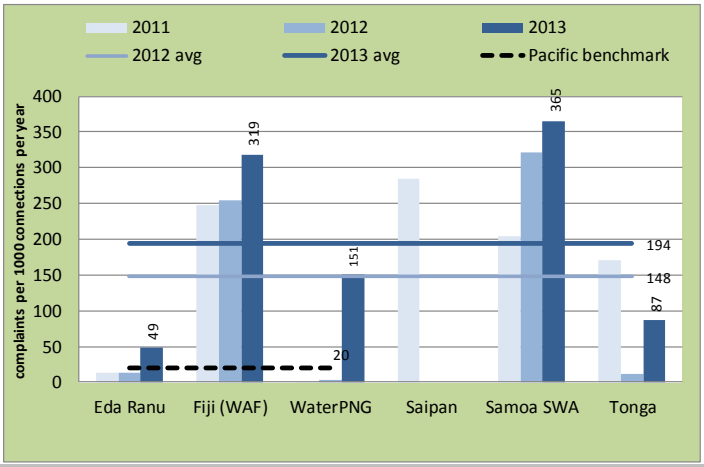
Figure 3.19: Meter Coverage Rate (Indicator CM1)



Meter Coverage
Meter coverage in large utilities is high. Five of the six utilities are at or near 100% meter coverage.

Observations:
Only SWA is below 100%, but has improved considerably since 2011.

Figure 3.20: Customer Complaints per 1000 Connections (Indicator CM2)

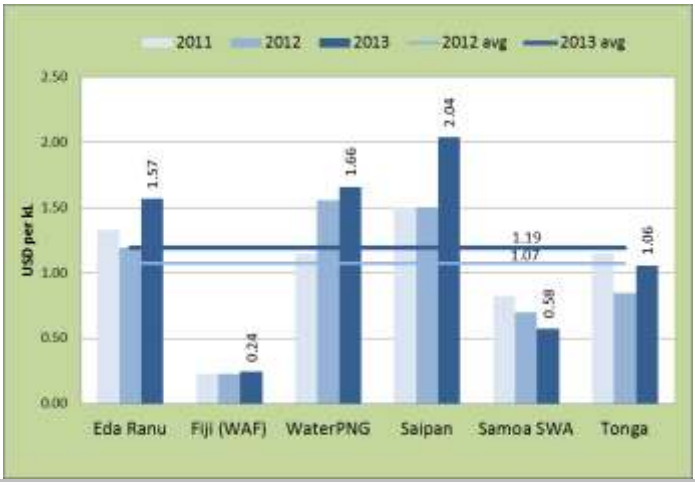


Customer Complaints
Customer complaints increased significantly and are very high compared to the Pacific benchmark.

The number of complaints per 1000 connections is still high in SWA (Samoa), WAF (Fiji), and CUC (Saipan) (2011) when compared to the other large utilities.

Observations
Not all utilities keep complete records of complaints, so the data are still inaccurate.

Figure 3.21: Average Revenues per kL

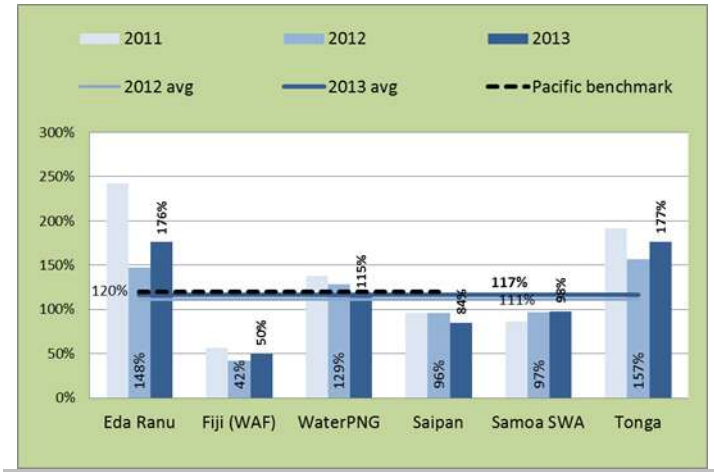


Average Revenues per kL
The revenues per kL increased, but large differences occur. Saipan reports the highest revenue per kL. WAF (Fiji) applies very low tariffs, and SWA's (Samoa) tariffs are relatively low.

Observations:
Though PWWA has not defined a Pacific benchmark, a water tariff ranging US$1.00–US$1.50/kL would normally be required to recover basic operating and maintenance costs.

3.6 Financial performance in large utilities

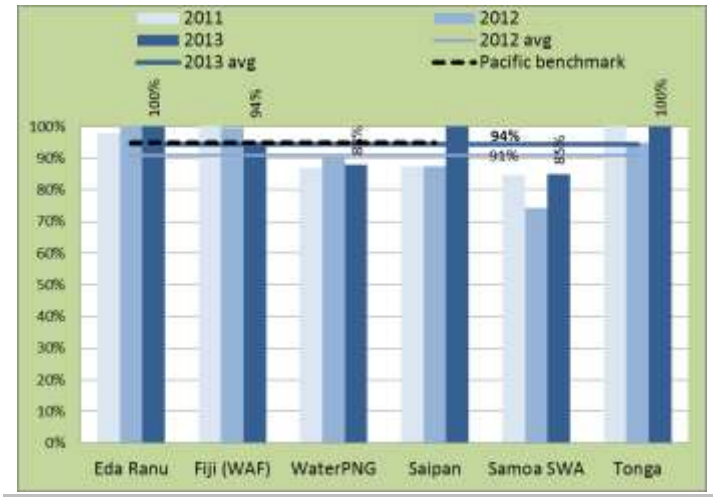
Figure 3.22: Operating Cost Recovery Ratio (Indicator F1)
(excluding depreciation)



Operating Cost Recovery Ratio (OCR)
The overall average OCR (excluding depreciation) increased from 111% in 2012 to 117% in 2013, almost reaching the Pacific benchmark. But the results vary widely among the utilities.

Observations:
Eda Ranu (PNG), WaterPNG, and the TWB (Tonga) operate on a positive operating cost recovery ratio. The WAF (Fiji), CUC (Saipan), and SWA (Samoa) still depend on government subsidies.

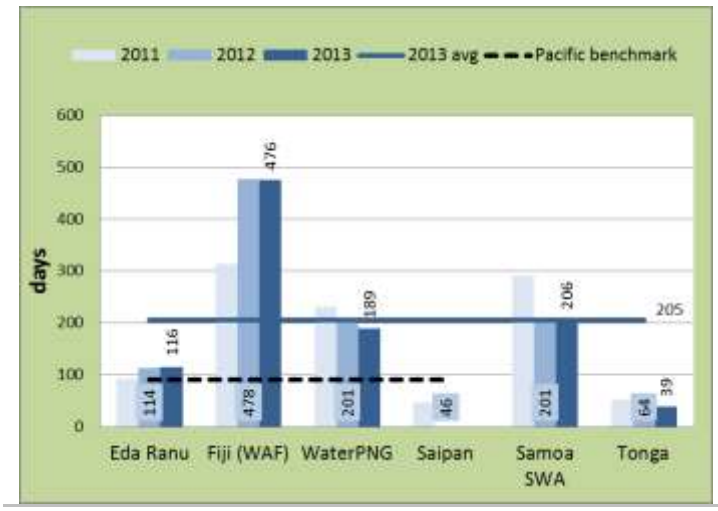
Figure 3.23: Collection Ratio – Actual Income vs. Billed Revenue (Indicator F2)



Collection Ratio
The average collection ratio improved from 91% in 2012 to 94% in 2013,

Observations:
Eda Ranu (PNG), CUC (Saipan), and TWB (Tonga) are on or above the benchmark of 95%, while WAF (94%), WaterPNG (88%), and SWA (Samoa) (85%) are still below target.

Figure 3.24: Debtor Days (Indicator F3)



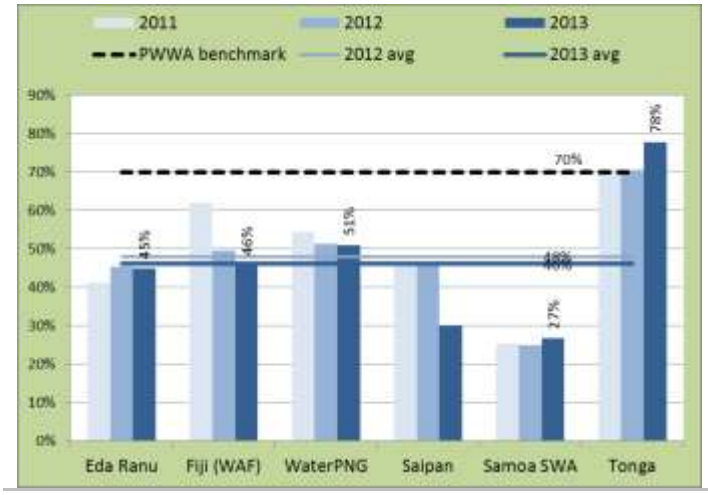
Debtor Days
The average number of debtor days decreased slightly for all large utilities to an average of 205 days in 2013.

WAF (Fiji) reports the highest number of debtor days with 476 days and TWB (Tonga) (39 days) and Edu Ranu (116 days) report the lowest. CUC (Saipan) did not provide data.

Observations:
The high figures for some utilities (e.g., WAF Fiji) are due to Government bills, which remain outstanding for years before being settled.

3.7 Overall performance in large utilities

Figure 3.25: Overall Efficiency Indicator (OEI)

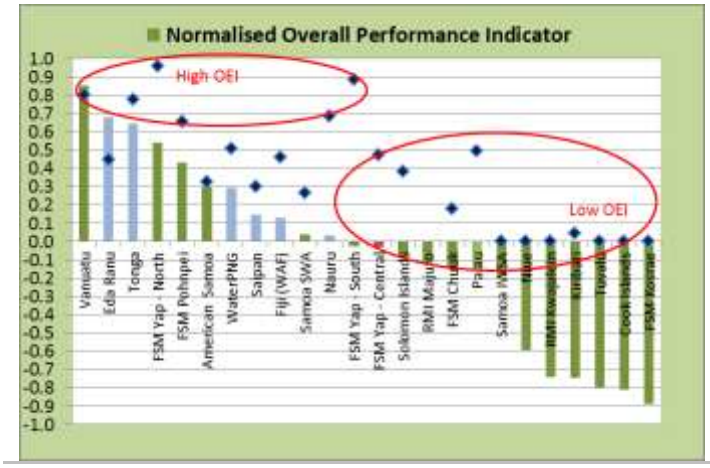


Overall Efficiency Indicator (OEI)

The OEI decreased slightly from 48% in 2012 to 46% in 2013, mainly due to Saipan's decrease.

Observations:
Only TWB (Tonga) and SWA improved since 2012.

Figure 3.26: Overall Performance Indicator (OPI) Normalised



Overall Performance
Of the large utilities Eda Ranu (PNG) and Tonga Water Board show the best overall performance.

Observations:
Compared to 2012 the ranking among large utilities remained the same. Compared to last year SWA and TWB showed considerable progress in overall performance. Eda Ranu and Fiji also improved their OPI scores. Average OPI for large utilities improved by about 8% compared with 2012.

Figure 3.26 also shows that utilities that score high on OPI generally also score high on OEI, and vice versa.

4. Benchmarking results in medium utilities

4.1 Introduction

This chapter presents the benchmarking results for the nine participating medium utilities. The medium category includes the following utilities serving 2,000 to 10,000 connections:

- American Samoa (ASPA)
- Vanuatu (UNELCO)
- FSM: Pohnpei Public Utilities Corporation (PUC)
- Kiribati: Public Utilities Board (PUB)
- Solomon Water (SW)
- Nauru Utilities Corporation (NUC)
- Samoa: Independent Water Schemes Association (IWSA)
- Cook Islands: Ministry of Infrastructure and Planning (MoIP)
- Palau Public Utilities Corporation (PUC)

The utilities vary by the size of their operations. ASPA (American Samoa) is the largest utility with over 9,300 water connections and 5,000 sewerage connections, while the Cook Islands Utility is the smallest with just over 2,000 water connections and 250 sewerage connections.

The institutional settings in each country vary. For example, the Cook Island's Ministry of Infrastructure and Planning operates as a government ministerial department while UNELCO (Vanuatu) is a 100% privately operated service provider. The independent water schemes in Samoa are community owned.

Each utility has unique characteristics such as size, supply area, and availability of water resources. The countries in which the utilities operate also vary by economy, demography, geography, and topography – features which can also affect utility operations.

Table 4.1 presents brief country oversights and the main utility characteristics, while Table 4.2 shows the benchmarking performance indicators. Sections 4.2 to 4.7 present the analysis and observations.

Table 4.1: Characteristics – Medium Utilities

	Utility Characteristics		Cook Islands	FSM Pohnpei	Kiribati	Nauru	Palau	American Samoa	Samoa IWSA	Solomon Islands	Vanuatu	TOTAL
1	Legal status of the utility		Govern. Dep.	Not-for-profit org.	Gov.Statutory org.	State Owned Enterprise	Gov.Statutory org.	State Owned Enterprise	Community owned	State Owned Enterprise	Privately owned company	
2	Sevices provided by Utility **W**ater/**S**ewerage/**P**ower	W/S/P	W/S	W/S	W/S	W/S/P	W/S	W	W	W/S	W	
	Water											
3	number of connections	number	2100	3580	4995	2700	4835	9315	4004	8082	7308	46919
4	population served	number	8400	16010	33896	10800	18875	50460	32032	56511	30869	257853
5	number of schemes	number	1	3	19	1	20	11	34	4	1	94
6	length pipe mains (all diameters)	km	0	79	139	10	200	209	0	250	220	1108
7	distrubution reticulated yes/no	YES/NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	
8	estimated % of houses with household tank	%	0	200%	9%	90%	50%	1%	30%	25%	?	
9	Waterresources constraints during droughts	YES/NO	YES	NO	YES	YES	YES	YES	YES	NO	NO	
10	Volume water produced	ML/year	5000	2998	719	35	6100	17850	NA	10047	4468	47217
11	Drinking water quality guidelines used		WHO/NZ	US EPA	WHO	Australian	EQPB	USEPA standards	Samoa standards	WHO, ADWG, EPA	French standards	
12	Drinking water safety plan in use	number	0	3	0	none	0	11	8	0	1	23
13	Laboratory in house by utility	YES/NO	YES	Yes	NO	NO	Yes	No	NO	YES	NO	
14	Number of microbiological samples	nr/year	0	24	0	72	12	840	136	501	3875	5460
15	Number of samples for residual chlorine	nr/year	0	24	0		365			1993	2321	4703
	Sewerage											
16	Number of connections	number	250	1260	2282		2240	5000		916	0	11948
17	Population Served	number	1000	6255	15974		11200	23000		6412		63841
18	Number of schemes	number	1	3	3		2	5		1		15
19	Length of sewer mains (all diameters)	KM	0	19	58		64	97		37		275
20	Volume sewage collected	ML/year	37	1066	383		4150	2304		574		8514
21	Sewage treatment up to primary standard	%	NA	0%	NA		0%	100%		NA		
22	Sewage treatment up to secundary standard	%	NA	0%	NA		0%	N/A		NA		
23	Number of effluent samples tested	number	NA	0	NA		0	320		NA		320

Table 4.1 Characteristics – Medium Utilities (continued)

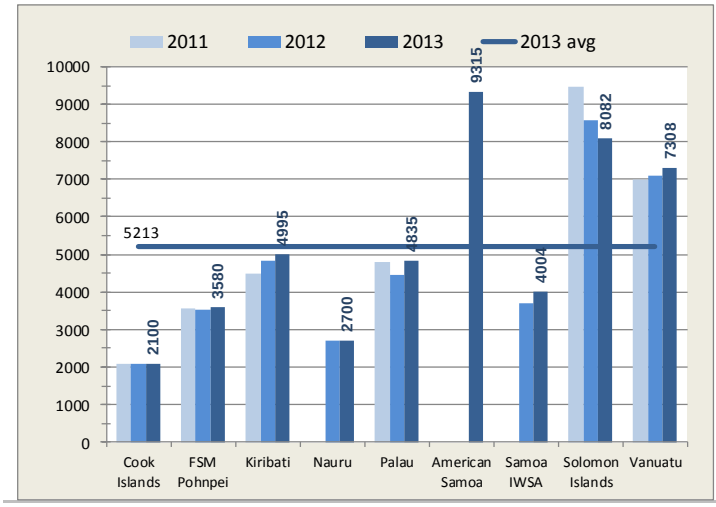
	Utility Characteristics		Cook Islands	FSM Pohnpei	Kiribati	Nauru	Palau	American Samoa	Samoa IWSA	Solomon Islands	Vanuatu	TOTAL
	Operations											
24	Maintenance plan in use	YES/NO	YES	YES	NO	YES	NO	YES	YES	YES	YES	
25	Asset database in use	YES/NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	
26	Meter replacement programme in use	YES/NO	YES	YES	NO	YES	NO	YES	YES	YES	YES	
27	Registration leak repairs in water network	YES/NO	YES	YES	NO	NO	NO	YES	NO	YES	YES	
28	Registration of blockages/overflows in sewer	YES/NO	YES	YES	NO	NO	NO	YES	NO	YES	NO	
29	Climate change/natural disasters adopted		YES	YES	NO	YES	NO	YES	YES	NO	NO	
	Customers											
30	Customer complaints	nr/year	0	157	0	30	ND	3800	NA	8228	116	12331
31	Customers - charter specifying service levels and response commitment?	YES/NO	0	Yes	Yes	NO	NO	Yes	NO	NO	Yes	
32	Most common complaint		Leaks	Low Pressure	Leaks	Water Delivery	No	Low pressure	na		Bills & leaks	
	Human Resources											
33	Number of staff (full time equivalent)	number	17	35	69	35	115	120	37	118	11	557
34	Technical staff with diploma in engineering or science	number	1	4	2	0	0	29	0	9	1	46
35	Administrative staff with a higher business qualification	number	1	0	6	0	0	3	3	11	0	24
	Financial											
36	Total Operating (recurrent) costs excl depreciation	MUS$/yr	0.27	0.82	1.03	1.13	6.38	8.05	0.16	5.71	2.45	26.01
37	Annual depreciation	MUS$/yr	0.01	0.53	0.61	0.00	1.18	3.24	0.00	0.42	0.85	6.83
38	Annual Interest on loans	MUS$/yr	0.00	0.10	0.05	0.00	0.00	0.02	0.00	0.00	0.02	0.19
39	Total Operating Revenue excl subsidies	MUS$/yr	0.02	1.39	0.87	0.23	1.71	10.65	0.10	6.51	3.84	25.32
40	Subsidies and grants (for operating expenses only)	MUS$/yr	0.00	0.02	1.40	0.00	4.67	0.08	0.05	0.42	0.00	6.64
41	Net book value of assets	million US$	0.00	10.00	17.20	NA	NA	57.24	0.00	4.30	36.96	126
42	Average water tariff per m3	US$/KL	0.00	0.55	3.65	9.55	0.39	1.28	0.00	1.53	1.00	

Table 4.2: Performance Indicators – Medium Utilities

No.	Indicator	Units	PWWA benchmark	Average (2013)	Cook Islands	FSM Pohnpei	Kiribati	Nauru	Palau	American Samoa	Samoa IWSA	Solomon Islands	Vanuatu
KRA1 - Production													
V1	Volume of water produced - total produced from sources and treatment	kL/conn/day	**1.25**	**2.88**	6.52	2.29	0.39	0.04	3.46	5.25	NA	3.41	1.67
V1b	Volume of water produced (L/capita/day)	L/capita/day	**250**	**619**	1631	513	58	9	885	969	NA	487	397
V2	Volume of water sold (i.e. billed) - through meters or estimated unmetered	kL/conn/day	**1.00**	**1.17**	NA	1.92	0.08	0.02	1.71	1.76	NA	1.38	1.34
V2b	Volume of water sold (i.e. billed) in L/capita/day	L/capita/day	**150**	**216**	0	429	12	6	438	325	NA	198	318
V3	Volume of sewage produced - total	kL/conn/day	**0.75**	**1.87**	0.40	2.32	0.46	NA	5.08	1.26	NA	1.72	NA
V3b	Volume of sewage produced (L/capita/day	L/capita/day	**200**	**420**	100	467	NA	NA	1015	274	NA	245	NA
KRA2 - Technical Performance													
O1	Water supply coverage	% of population	**95%**	**81%**	82%	71%	67%	92%	99%	92%	100%	52%	70%
O2	Continuity of water supply service (hours available)	Hrs/day	**24**	**17.5**	24.0	24.0	2.0	1.0	24.0	24.0	20.0	14.2	24.0
O3b	Non-revenue water (%)	% of water produced	**25%**	**53%**	100%	16%	80%	31%	50%	66%	NA	59%	20%
O3	Non-revenue water (m3/conn/day)	m3/conn/day	**0.3**	**1.9**	6.5	0.4	0.3	0.0	1.7	3.5	NA	2.0	0.3
O3c	Non-revenue water (m3/km/day)	m3/km/day	**-**	**15.9**	NA	6.18	4.14	1.10	15.40	56.68	NA	23.87	4.00
O4	Sewerage coverage	% of population	**80%**	**66%**	49%	103%	66%	NA	59%	115%	NA	6%	NA
KRA3 - Health and Environment													
HE1	Drinking Water quality compliance - residual chlorine	% compliance	**100%**	**75%**	NA	83%	NA	100%	NA	98%	0%	67%	99%
HE1a	Percentage of customers on treated water or % of water treated	% water produced	**100%**	**74%**	50%	62%	100%	91%	90%	100%	0%	75%	100%
HE2	Drinking Water quality compliance - microbiological	% compliance	**100%**	**81%**	50%	96%	NA	90%	NA	99%	50%	79%	100%
HE3	% of sewage produced which is treated to at least primary standard	% of sewage	**100%**	**70%**	NA	100%	NA	NA	100%	78%	NA	0%	NA
KRA4 - Human Resources													
HR1	Water and sewerage business staff/ 1000 connections	#FTE/1000 conn	**8.0**	**9.5**	7.2	7.2	9.5	13.0	16.3	8.4	9.2	13.1	1.5
HR2	Training days (no days/year)	days/FTE/year	**5.0**	**2.6**	0.2	0.1	0.1	1.1	0.5	0.3	15.6	2.8	3.2
HR3	Average cost of staff (total labour cost / no of staff/GNI)	%	*****	**395%**	126%	478%	178%	59%	155%	217%	NA	903%	1044%
KRA5 - Customer Service													
CM1	Meter coverage rate for water supply customers (for all water meters)	% of customers	**100%**	**53%**	0%	100%	0.2%	NA	73%	100%	0%	49%	100%
CM2	Customer complaints / 1000 connections	#/1000 conn	**20**	**248**	NA	32	NA	11	NA	265	NA	914	16
CM3	Affordability new connection	% GNI per person		**6.2%**	NA	NA	0.8%	NA	0.3%	1.9%	NA	22.2%	5.6%
CM4a	Affordability - average bill	% GNI per person		**2.1%**	0.0%	2.3%	0.8%	0.3%	0.4%	1.7%	NA	8.6%	2.2%
CM4b	Affordability - 6m3/month/connection	% GNI per person		**0.5%**	NA	0.4%	NA	0.3%	0.1%	1.5%	NA	0.5%	0.3%
KRA6 - Financial Sustainability													
F1	Operating cost recovery ratio (excluding dep)	%	**120%**	**85%**	6%	169%	85%	20%	27%	132%	60%	114%	157%
F2	Collection ratio - actual cash income vs billed revenue	%	**95%**	**87%**	NA	78%	23%	100%	100%	97%	100%	95%	100%
F3	Accounts receivable (days)	Days	**90**	**304**	NA	948	NA	NA	14	105	NA	295	158
OV1	Overall Efficiency Indicator ((1-NRW)*collection ratio)		70%	48%	NA	66%	5%	69%	50%	32%	NA	38%	80%

4.2 Technical performance in medium utilities

Figure 4.1: Water Connections (46,919)

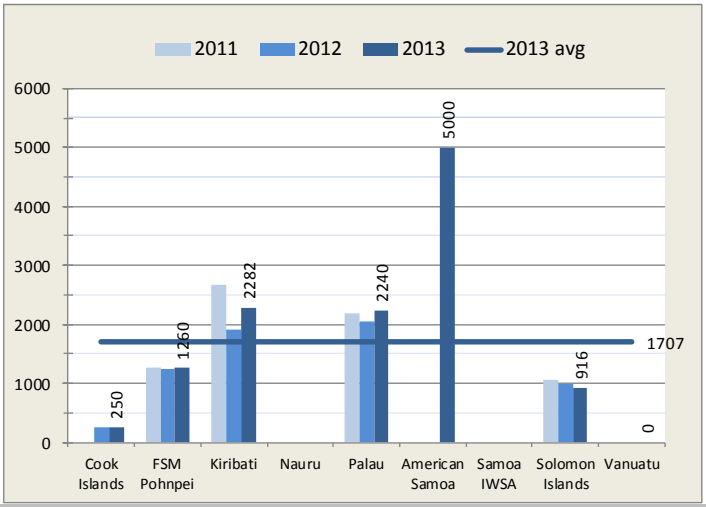


Water Connections
Except for Solomon Water the medium utilities showed a small increase in the number of connections.

Observations:
The number of Solomon Water connections decreased because the utility is checking connections and updating the administrative systems.

There is no significant growth in the number of connections over past years.

Figure 4.2: Sewerage Connections (11,948)

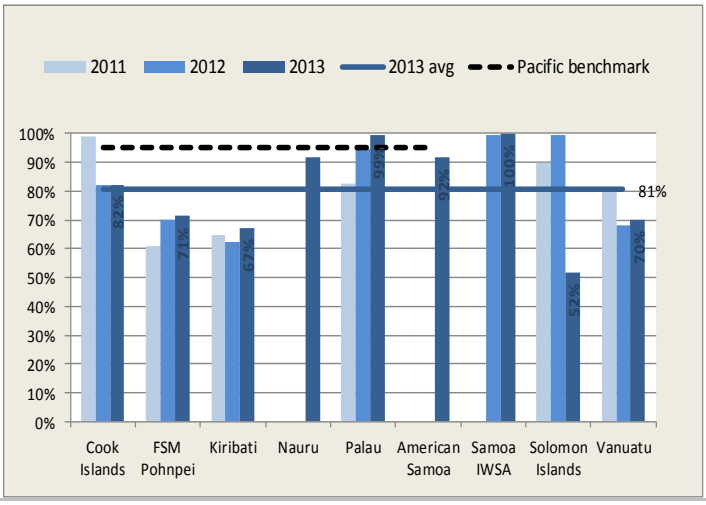


Sewerage Connections
The number of sewerage connections for medium size utilities increased (except Solomon Water). Nauru, Samoa IWSA, and Vanuatu (UNELCO) do not operate sewerage systems.

Observations
The total number of sewer connections increased from 6,443 connections in 2012 to 11,948 connections in 2013. This is mainly due to ASPA (American Samoa) connections, which were not included in last 2012's benchmarking.

The trend shows no significant growth in number of connections. It follows population growth.

Figure 4.3: Population Coverage – Water Supply (Indicator O1)

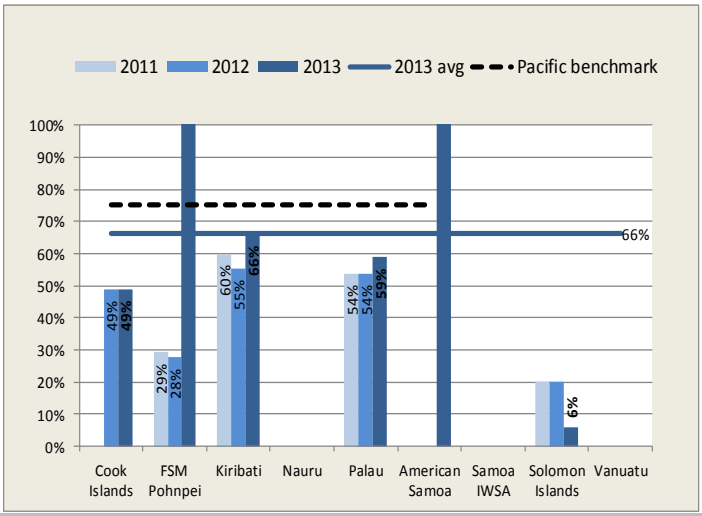


Population Coverage – Water Supply
Population coverage for water supply within the service areas averages 81% and varies from 52% (Solomon Water), to almost 100% in PUC (Palau). Except for Solomon Water all indicate a small increase over 2012.

Observations:
In the Solomon Islands the utility redefined and increased its service area, and therefore coverage decreased accordingly.

Utilities base their data on estimated population living in the jurisdiction area. These areas are not always clearly defined.

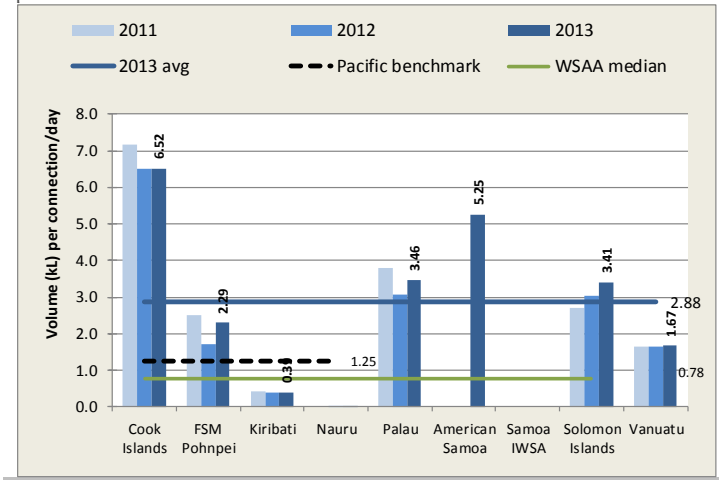
Figure 4.4: Population Coverage – Sewerage (Indicator O4)



Population Coverage – Sewerage
Two medium utilities ASPA (American Samoa) and PUC (FSM Pohnpei) serve 100% of the population in their service areas.

Observations:
Utilities base their data on estimated population living in the jurisdiction area. These areas are not always clearly defined. Changes mostly relate to correction of service areas and its corresponding population, which happened with PUC (Pohnpei) and Solomon Water.

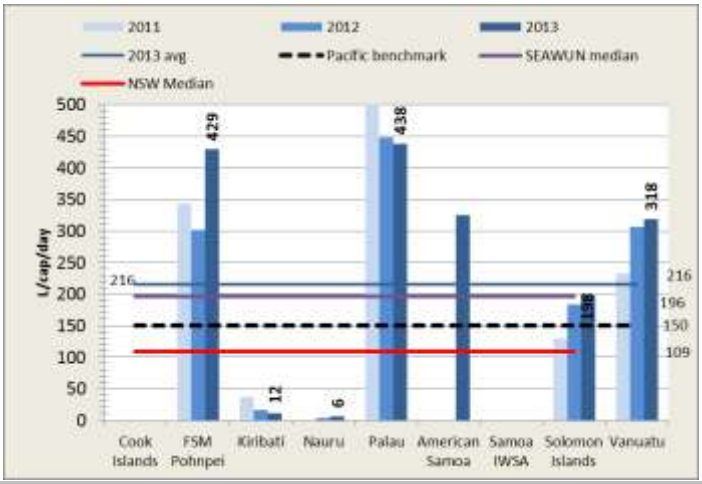
Figure 4.5: Volume of Water Produced (Indicator V1)



Volume of Water Produced
Water produced per connection is high for the Cook Islands, ASPA, (American Samoa), PUC (Palau), and Solomon Water when compared to international benchmarks. Conversely, for PUB (Kiribati) and NUC (Nauru), the very low volumes reflect the scarcity of water sources and/or limited production capacity. UNELCO (Vanuatu) and the PUC (FSM Pohnpei) are approaching the Pacific benchmark. IWSA (Samoa) reported no data.

Observations:
MOIP in Cook Islands distributes the water unmetered and at no cost to the user, which explains the extremely high production figure. Three utilities increased the volume of water produced per connection.

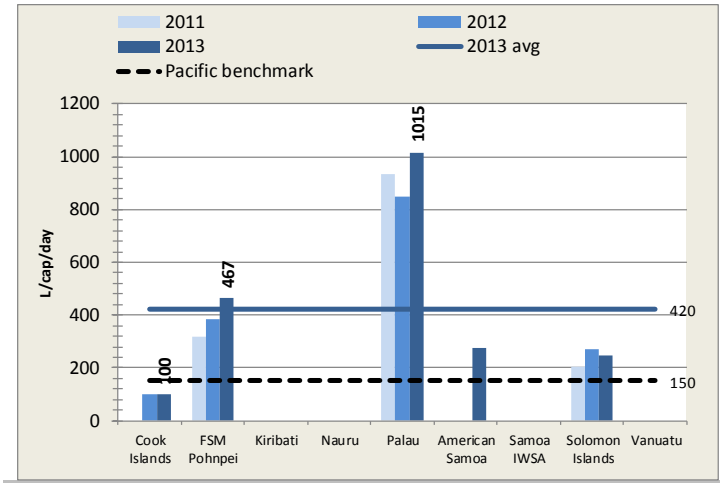
Figure 4.6: Water Sold (L/capita/day) (Indicator V2)



Water Sold
Average per capita levels of water sold/water consumed increased from 180 L/capita/day in 2012 to 216 L/capita/day in 2013. However, there are significant differences between utilities.

Observation:
The increase is mainly due to a large increase at PUC Pohnpei and ASPA American Samoa data, which was not included last year. The increase at PUC Pohnpei is remarkable.

Figure 4.7: Volume of Sewage Collected (Indicator V3b)



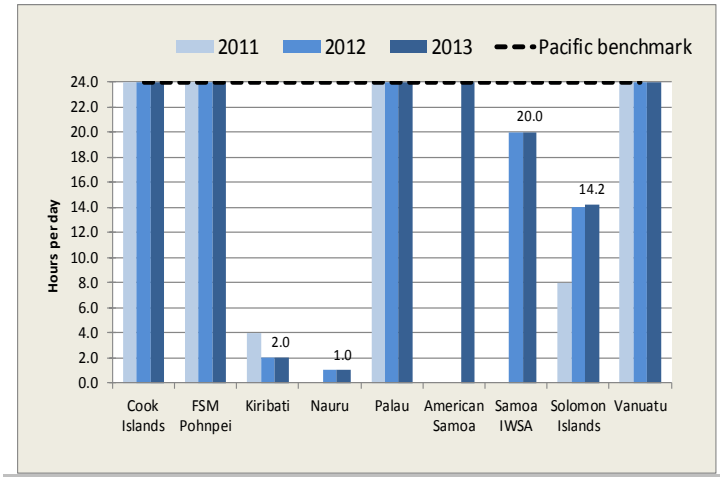
Volume of Sewage Collected

The average volume of collected sewage averages 420 litres per capita daily and varies considerably between utilities.

Observations:

Volumes of sewage collected are higher than volumes of drinking water sold (see Fig 4.6), which indicates that ground water or seepage water from drains mixes with the collected wastewater.

Figure 4.8: Continuity of Water Supply (Indicator O2)



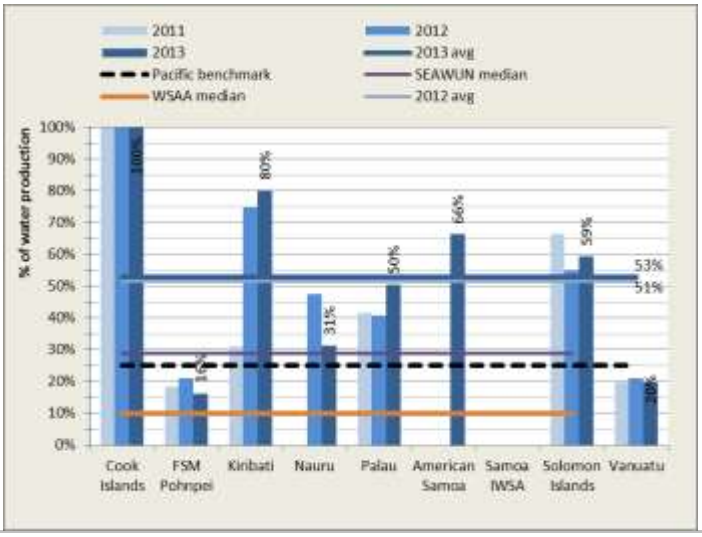
Continuity of Water Supply

Five of the utilities supply 24/7, while PUB Kiribati, Nauru, IWSA, and Solomon Water utilities supply intermittently, which is mostly due to shortages in fresh water sources and inadequate distribution systems.

Observations:

PUB (Kiribati) and NUC (Nauru) face scarcity of fresh water resources. IWSA (Samoa) and Solomon Water's intermittent supply is due to a lack of developed production and/or distribution capacity.

Figure 4.9: Non-Revenue Water as % of Production (Indicator O3b)



Non-Revenue Water (NRW)

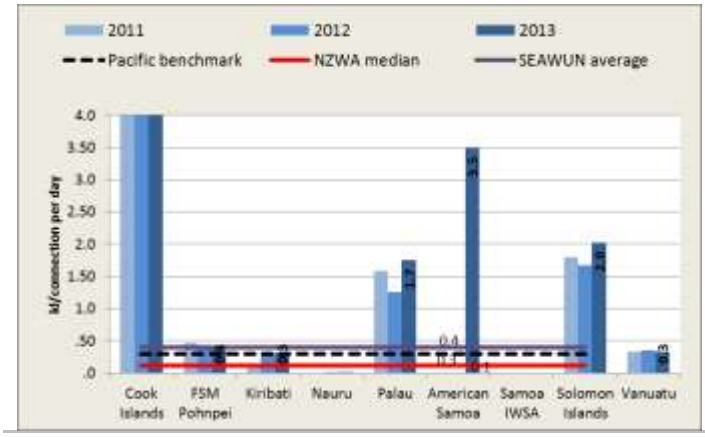
NRW remains a great concern and has further increased from 51% in 2012 to 53% in 2013.

Two utilities, PUC (FSM Pohnpei) and UNELCO (Vanuatu), are performing better than the PWWA benchmark. Other utilities show NRW levels far above the Pacific benchmark.

Observations:

The high increase PUB (Kiribati) reported reflects a re-assessment of data. The Cook Islands supply water free. PUB in Kiribati and Solomon Water have ongoing leakage reduction programs.

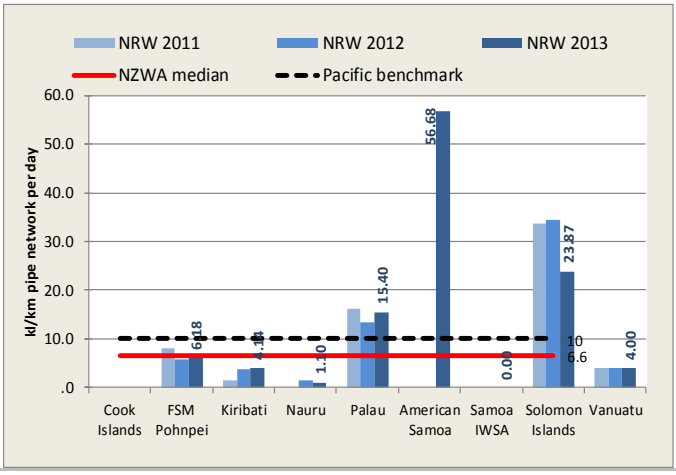
Figure 4.10: Non-Revenue Water per Connection/Day (Indicator O3)



NRW per Connection/Day
ASPA (American Samoa) and the Cook Islands show the highest NRW per connection daily. In Cook Islands water is still supplied free of charge and therefore it has 100% NRW.

Observations:
The results indicate that apart from the Cook Islands, American Samoa, PUC (Palau), and Solomon Islands show the highest NRW per connection, while the other utilities approach the Pacific benchmark of 0.3 kL/connection/day. Still, it should be realised that for Kiribati and Nauru the production figures are low and NRW is low by volume as well.

Figure 4.11: Non-Revenue Water per km of Main (Indicator O3c)

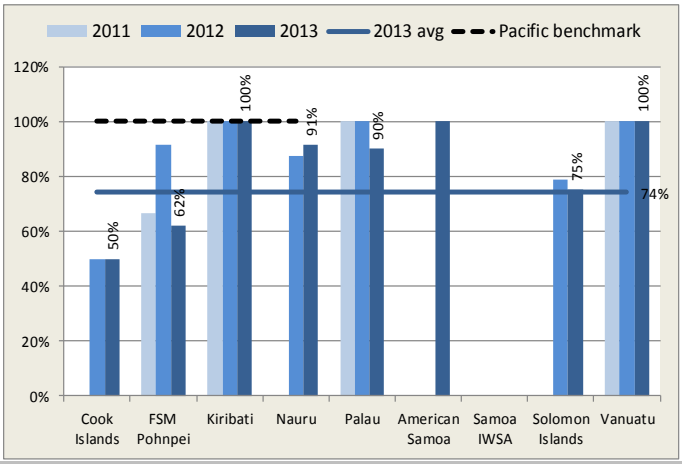


NRW per km of Main
ASPA (American Samoa), and the Solomon Islands show the highest figures followed by Palau PUC. Cook Islands did not provide data on its network length.

Observations:
Except for the three above utilities the other utilities appear to comply with the Pacific benchmark. However, for Kiribati and Nauru the production figures are low and hence the NRW volumes in absolute terms as well. The NRW percentage mostly remains high.

4.3 Health and environment in medium utilities

Figure 4.12: Treated Water as a % of Water Production (Indicator HE1a)



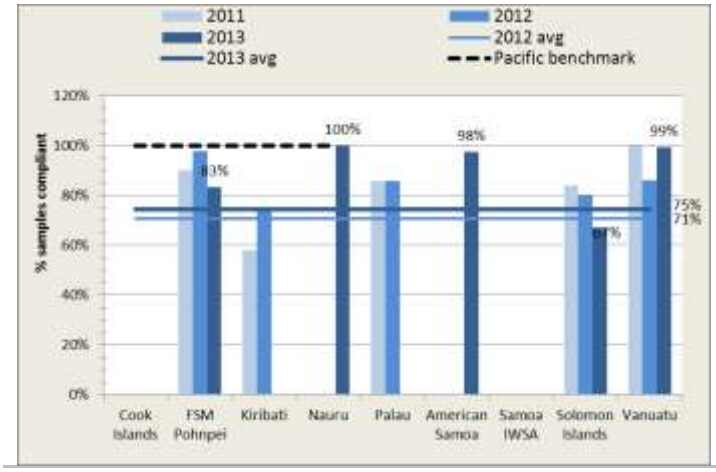
Treated Water
The average volume of water treated compared to water produced remained stable at 74%.

UNELCO (Vanuatu), ASPA (American Samoa), and PUB (Kiribati) report 100% treatment rates for water produced. The other utilities still need to improve their treatment facilities.

Observations:
Water treatment means full treatment for surface water and at least chlorination of deep wells.

A remarkable drop is noted at PUC (FSM Pohnpei) for which no reasons were given.

Figure 4.13: Drinking Water Quality – Residual Chlorine (Indicator HE1)

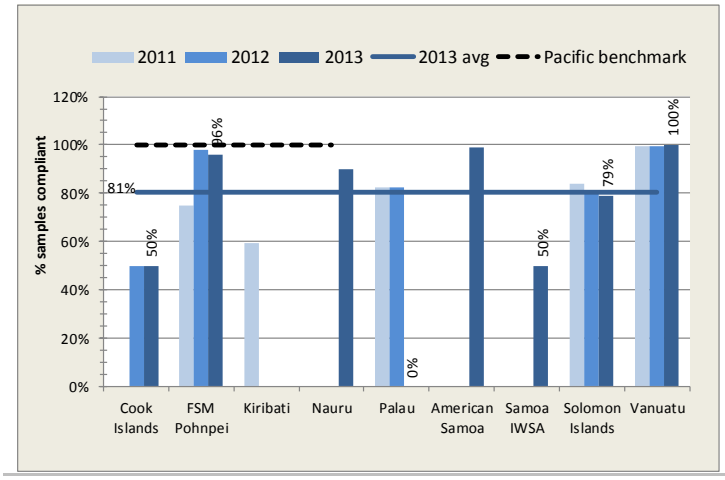


Residual Chlorine
About 75% of water samples comply for residual chlorine.

Observations:
Overall, compliance of drinking water quality for residual chlorine slightly improved from 71% in 2012 to 75% in 2013. UNELCO reports the best improvement.

Remarkable drops are noticed in PUC Pohnpei and Solomon Water.

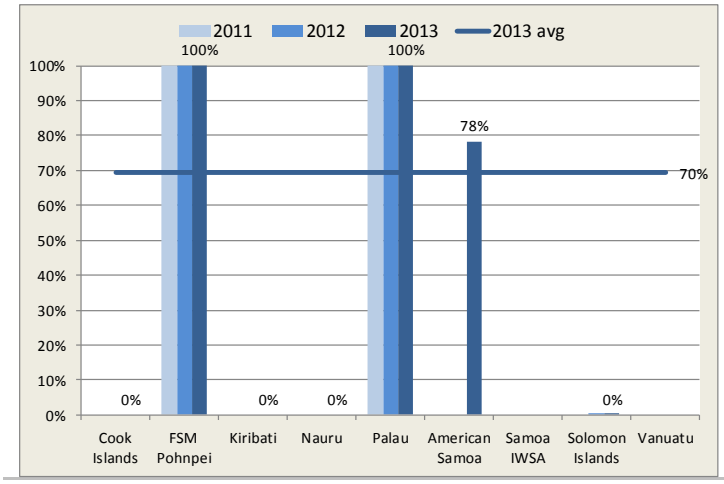
Figure 4.14: Drinking Water Quality – Microbiology (Indicator HE2)



Microbiology
About 81% of the samples comply for microbiological water quality.

Observations:
ASPA (American Samoa), PUC (Pohnpei), and UNELCO (Vanuatu report the best results. The other medium utilities are still not achieving the Pacific benchmark.

Figure 4.15: Sewage Treatment (Indicator HE3)



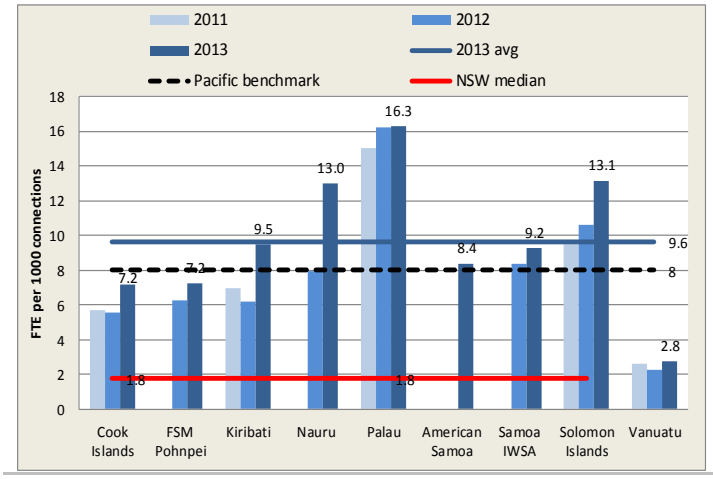
Sewage Treatment
PUC (Pohnpei), PUC (Palau), and ASPA (American Samoa) treat wastewater to at least primary standard.

PUB (Kiribati), NUC (Nauru), MOIP Cook Islands, and Solomon Water discharge wastewater untreated to the sea.

Observations:
FSM Pohnpei reported that 82% of its wastewater is treated up to secondary level.

4.4 Human resources development in medium utilities

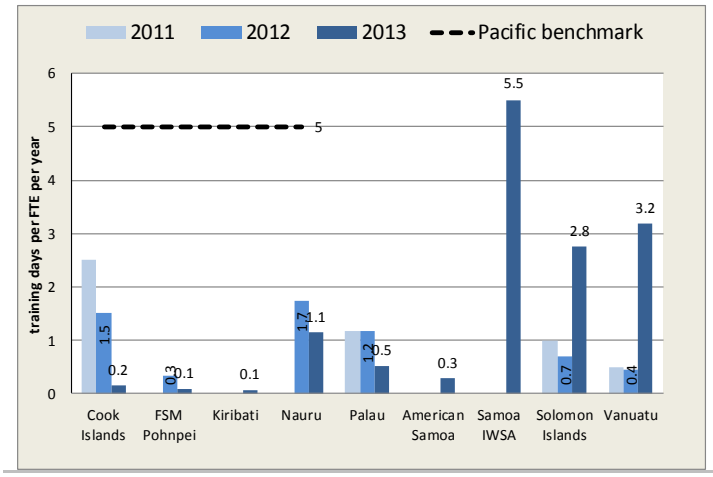
Figure 4.16: Staff per 1000 Connections (Indicator HR1)



Staff per 1000 Connections
With the exception of Solomon Water, PUC (Palau), and NUC (Nauru) all medium size utilities perform well on staff utilisation compared to the Pacific benchmark of eight staff per 1000 connections.

Observations:
Overall, an increasing trend is noticed in all utilities with a considerable increase at Solomon Water, NUC Nauru, and PUB Kiribati.

Figure 4.17: Training Days per Staff per Year (Indicator HR2)

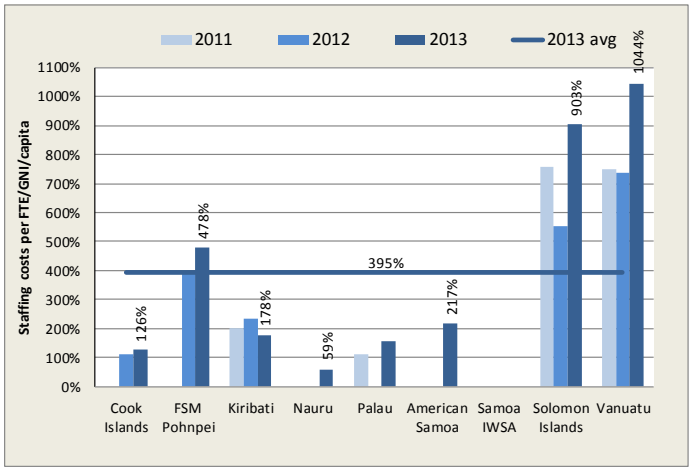


Training
The number of training days provided to staff is below the Pacific benchmark.

Only Samoa IWSA shows a high training intensity, which is due to the periodic training provided to community water staff on plumbing and system management. Solomon Water and Vanuatu improved considerably beyond previous years.

Observations:
A common Pacific Islands utilities' concern is the level of staff qualifications. Most staff capabilities are learned 'on the job'. Little time and budget is allocated to train employees. With the exception of IWSA, UNELCO, and Solomon water all utilities remain far below the Pacific benchmark.

Figure 4.18: Average Cost of Staff/GNI Ratio (Indicator HR3)

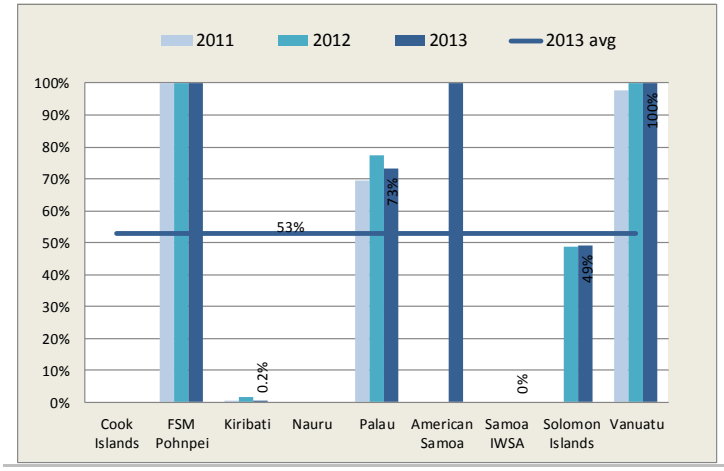


Average Cost of Staff
This indicator reflects salary costs compared to gross national income (GNI) per capita. The results indicate that Solomon Water and UNELCO (Vanuatu) are spending relatively more on salaries compared to GNI. The average cost of staff/GNI ratio is highest for UNELCO, Solomon Water, and PUC Pohnpei. .

Observations:
No trends are observed.

4.5 Customer services in medium utilities

Figure 4.19: Meter Coverage Rate (Indicator CM1)



Meter Coverage

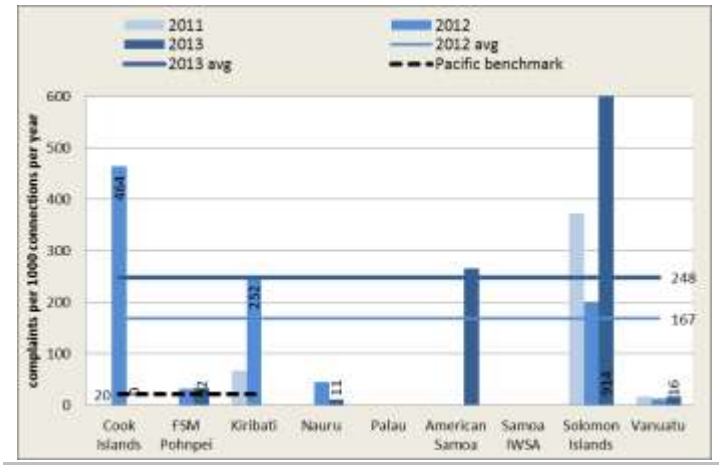
Overall only 53% of medium utilities' connections are metered. UNELCO (Vanuatu), ASPA (American Samoa), and the PUC (Pohnpei) have achieved 100% metering coverage.

Observations:

Nauru distributes water by truck and therefore has no water meters at HH level. Solomon Water has an active program for water meter management, but still needs to expand its metering coverage.

No trends are observed.

Figure 4.20: Customer Complaints per 1000 Connections (Indicator CM2)



Customer Complaints

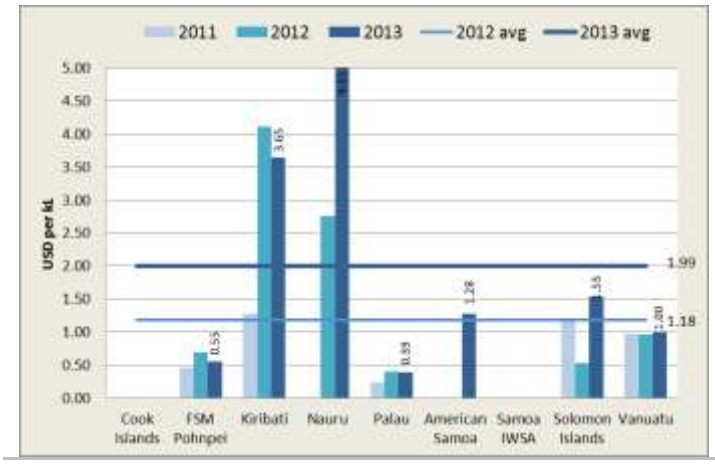
The average number of reported complaints increased from 167 per 1000 connections in 2012, to 248 complaints in 2012. This figure is very high and far exceeds the Pacific benchmark.

Observations:

Not all utilities have a complete record-keeping system. Consequently, the actual number of complaints may even be higher. Customer complaints increased partly due to improved record keeping.

Complaints to Solomon Water increased markedly.

Figure 4.21: Average Revenues per kL



Average Revenues

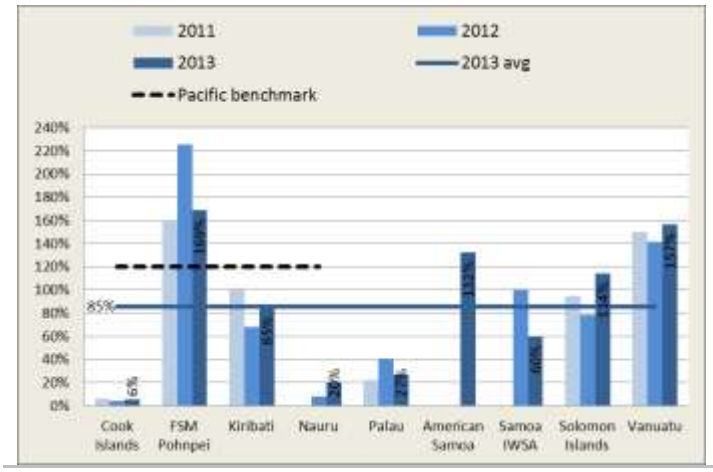
The average operating revenue increased from US$1.18/kL in 2012 to 1.99/kL in 2013, mainly influenced by the very high rate for water in NUC Nauru.

Observations:

NUC (Nauru) supplies desalinated seawater using water tankers. Consequently its charges are relatively high. PUB (Kiribati) is forced to ration the water and charges a flat rate per month resulting in a relatively high charge per kL. IWSA (Samoa) reported no data.

4.6 Financial performance in medium utilities

Figure 4.22: Operating Cost Recovery Ratio (Indicator F1)
(excluding depreciation)

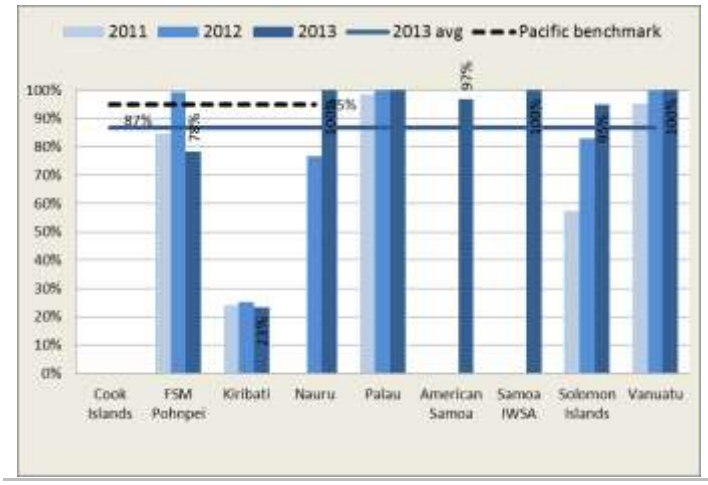


Operating Cost Recovery Ratio (OCR)
The overall OCR is 85% still below the 120% Pacific benchmark, which shows that most utilities are not financially sustainable. Only PUC (Pohnpei), UNELCO (Vanuatu), and Solomon Water operate on a positive operating cost recovery ratio. The other utilities rely on subsidies. PUB Kiribati's reported figures include cross subsidies from its power operations.

Observations:
The Vanuatu, Solomon Islands, Kiribati, and Nauru utilities show positive trends over the past 2 years.

The other utilities exhibit negative trends.

Figure 4.23: Collection Ratio – Actual Income vs. Billed Revenue (Indicator F2)

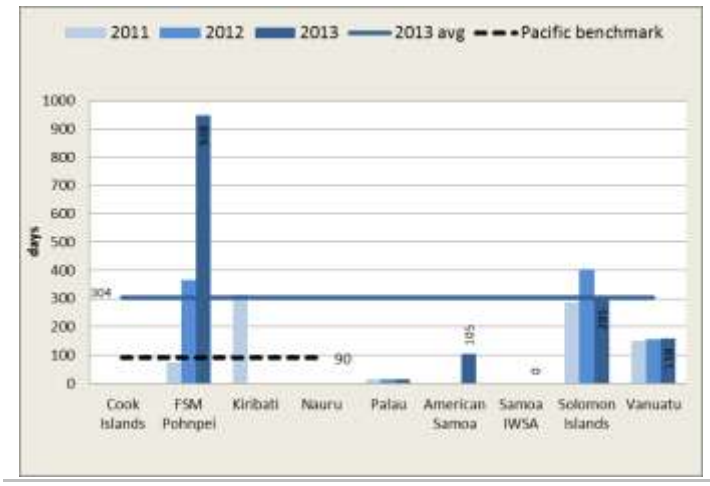


Collection Ratio
The average collection ratio amounts to 87%. Five utilities reported a 100% collection ratio, while the other four utilities face difficulties in collecting payments.

Observations:
Solomon Water reported a considerable improvement over 2012. PUC Pohnpei reported a considerable decline.

PUB Kiribati only collects 23% of the bills, while MOIP Cook Islands does not charge for water.

Figure 4.24: Debtor Days (Indicator F3)

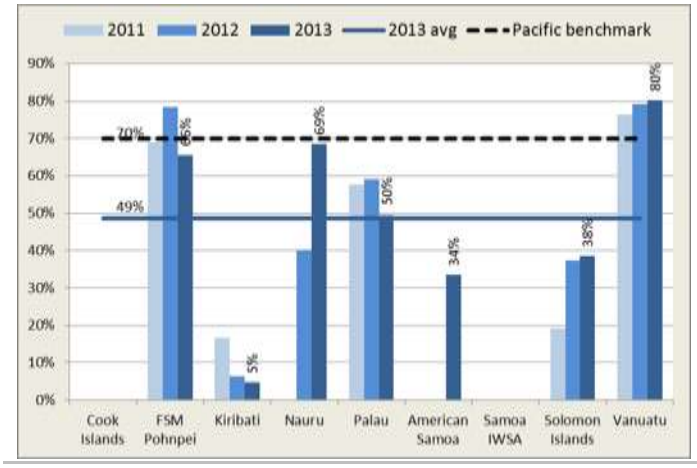


Debtor Days
The average number of debtor days amounts to 304 days, which is far above the Pacific benchmark of 90 days.

Observations:
The data still differ greatly over the years and are mostly unsubstantiated by audited reports. Therefore, it seems inappropriate to compare at this stage.

4.7 Overall performance in medium utilities

Figure 4.25: Overall Efficiency Indicator (OEI)

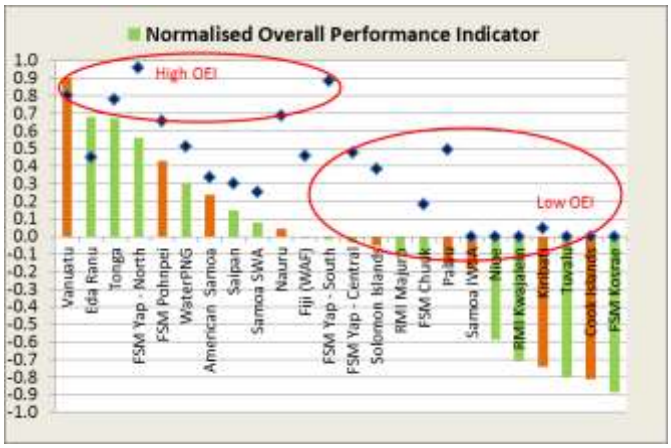


Overall Efficiency Indicator (OEI)
The overall OEI amounts to 49%, which is far below the 70% Pacific benchmark.

UNELCO (Vanuatu), PUC (Pohnpei), and NUC Nauru score the highest OEI. The utilities in Kiribati, Palau, American Samoa, and Solomon Islands all fall below the Pacific benchmark.

Observations:
MOIP Cook Islands and IWSA (Samoa) do not charge water tariffs; it is impossible to calculate OEI.

Figure 4.26: Overall Performance Indicator (OPI) Normalised



Overall Performance
UNELCO (Vanuatu) and PUC (FSM Pohnpei) are the best performing medium-sized utilities. UNELCO is also the best performing utility to have participated with benchmarking.

Observations:
Compared to 2012, the 2013 ranking Vanuatu improved from 2nd to 1st place, while FSM Pohnpei dropped from 1st place to 5th. The ranking of the other utilities is the same as last year. MOIP Cook Islands, NUC Nauru, IWSA Samoa, Solomon Water, and UNELCO Vanuatu all improved OPI over last year. Overall performance for all medium-sized utilities improved slightly.

Figure 4.26 also shows that utilities scoring high on OPI generally also score high on OEI and vice versa.

5. Benchmarking results in small utilities

5.1 Introduction

This chapter presents the benchmarking results for the nine participating small utilities, all with fewer than 2,000 connections:

- Marshall Islands, Majuro Water and Sewer Company (MWSC)
- Marshall Islands, Kwajalein Atoll Joint Utility Resources (KAJUR)
- Tuvalu, Ministry of Works, Water and Energy
- Niue, Public Works Water Supply Division
- FSM, Chuuk Public Utility Corporation (CPUC)
- FSM, Kosrae, Department of Transportation and Infrastructure
- FSM, Yap State, Public Service Corporation
- FSM, Yap North, the Gagil Tomil Water Authority
- FSM, Yap State, Southern Yap Water Authority

Within the group, the MWSC (RMI Majuro) is the largest utility with over 1,100 water connections and 1,796 sewerage connections, while FSM Yap North and Yap South are the smallest utilities with about 300 water connections and no sewerage connections.

Almost all small utilities operate as statutory government entities, are strongly regulated by their government, and outsource some services to the private sector. Only Tuvalu and Niue operate as government departments.

Table 5.1 presents brief country oversights and the main utility characteristics, while Table 5.2 shows the benchmarking performance indicators. Sections 5.2–5.7 present the analysis and observations. FSM Yap South, Kosrae, and Niue submitted no questionnaires this year. Therefore last year's data are presented in tables 5.1 and 5.2 and no data for these utilities are presented subsequently in this chapter.

Each utility has unique characteristics such as size, supply area, and availability of water resources, as well as some country characteristics such as economy, demography, geography, and topography.

Table 5.1: Characteristics – Small Utilities

	Utility Characteristics		FSM Chuuk	FSM Kosrae	FSM Yap - North	FSM Yap - Central	FSM Yap - South	Niue	RMI Kwajalein	RMI Majuro	Tuvalu	TOTAL
1	Legal status of the utility		Gov.Statutory org.	Gov.Statutory org.	Gov.Statutory org.	Not-for-profit org. under comm.law	Gov.Statutory org.	Govern. Dep.	State Owned Enterprise	State Owned Enterprise	Govern. Dep.	
2	Sevices provided by Utility **W**ater/**S**ewerage/**P**ower	W/S/P	W/S	W/S	W	W/S	W	W	W/S	W/S	W	
	Water											
3	number of connections	number	800	325	376	1231	289	579	857	1332	780	6569
4	population served	number	5408	4900	2196	6980	1445	1805	8320	7716	4680	43450
5	number of schemes	number	1	2	1	1	1	17	1	1	2	27
6	length pipe mains (all diameters)	km	33	11	32	50	28	114	4	116	0	388
7	distrubution reticulated yes/no	YES/NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	
8	estimated % of houses with household tank	%	90%	10%	3%	25%	1%	200%	7500%	70%	100%	
9	Waterresources constraints during droughts	YES/NO	NO	NO	NO	NO	NO		YES	YES	YES	
10	Volume water produced	ML/year	878	234	95	658	64	274	177	506	15	2900
11	Drinking water quality guidelines used		Chuuk State	NA	EPA	USEPA	EPA	WHO	Govt EPA Standards	RMI EPA	NA	
12	Drinking water safety plan in use	number	Yes	2	1	1	0	17	NONE	1	No	22
13	Laboratory in house by utility	YES/NO	NO	NO	NO	YES	NO	NO	No	NO	No	
14	Number of microbiological samples	nr/year	144	50	210	12	12	224	660	0	48	1360
15	Number of samples for residual chlorine	nr/year	144	10	15		0		0	NA	0	169
	Sewerage											
16	Number of connections	number	500	300		316			824	1796	0	3736
17	Population Served	number	3750	2400					8240	14368		28758
18	Number of schemes	number	1	4		1			1	1		8
19	Length of sewer mains (all diameters)	KM	25	8		NA			4	17		54
20	Volume sewage collected	ML/year	276	25		NA			23	171		495
21	Sewage treatment up to primary standard	%	NA	NA		0%			0%	0%		
22	Sewage treatment up to secundary standard	%	NA	NA		0%			0%	0%		
23	Number of effluent samples tested	number	NA	0					0	NA		

Table 5.1: Characteristics – Small Utilities (continued)

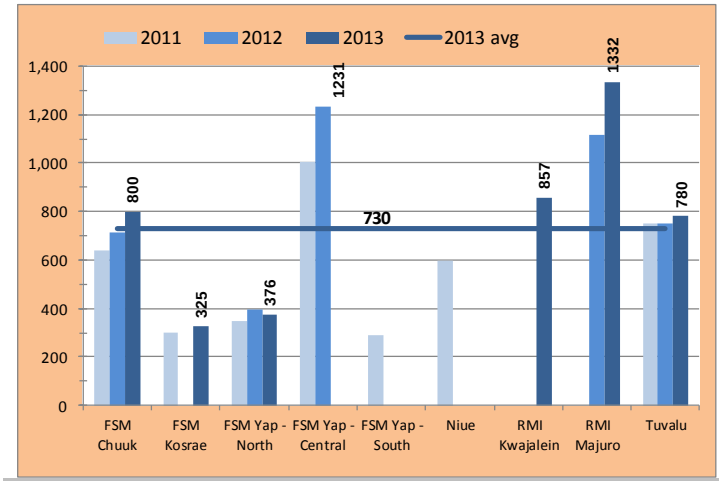
	Utility Characteristics		FSM Chuuk	FSM Kosrae	FSM Yap - North	FSM Yap - Central	FSM Yap - South	Niue	RMI Kwajalein	RMI Majuro	Tuvalu	TOTAL
	Operations											
24	Maintenance plan in use	YES/NO	YES	NO	YES	YES	NO	NO	NO	NO	YES	
25	Asset database in use	YES/NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	
26	Meter replacement programme in use	YES/NO	YES	NO	YES	YES	NO	NO	NO	NO	YES	
27	Registration leak repairs in water network	YES/NO	YES	NO	NO	YES	NO	NO	NO	YES	YES	
28	Registration of blockages/overflows in sewer	YES/NO	YES	NO	NO	YES	NO	NO	NO	YES	NO	
29	Climate change/natural disasters adopted		YES	YES	NO	NO	NO	NO	NO	YES	NO	
	Customers											
30	Customer complaints	nr/year	195	0	20	ND	0	100	54	500	0	869
31	Customers - charter specifying service levels and response commitment?	YES/NO	Yes	NO	NO	ND	0	Yes	NO	NO	NO	
32	Most common complaint		billing, metering		Financial/ leaks/ quality	Mostly Water Quality			(no water)	(no water)		
	Human Resources											
33	Number of staff (full time equivalent)	number	19	6	3	23	4	9	17	51	11	143
34	Technical staff with diploma in engineering or science	number	0	1	1	0	0	0	0	0	4	6
35	Administrative staff with a higher business qualification	number	1	2	0	3	0	0	1	2	0	9
	Financial											
36	Total Operating (recurrent) costs excl depreciation	MUSD/year	0.379	NA	0.055	0.416	0.035	0.285	0.807	1.482		3.459
37	Annual depreciation	MUSD/year	0.018	NA		0.156	0.002	0.141	0.000	0.080		0.397
38	Annual Interest on loans	MUSD/year	0.000	NA		0.088						0.088
39	Total Operating Revenue excl subsidies	MUSD/year	0.115	NA	0.057	0.528	0.032	0.004	0.200	1.426		2.364
40	Operating subsidies/grants (for operating exp. only)	MUSD/year	0.000						1.000	0.089		
41	Net book value of assets	MUSD	0.019	NA	NA	NA	NA	NA	NA	NA	NA	
42	Average water tariff per m3	USD/KL	0.41	NA	0.60	0.40	0.45	0.69	0.00	2.50	NA	

Table 5.2: Performance Indicators – Small Utilities

No.	Indicator	Units	PWWA benchmark	Average (2013)	FSM Chuuk	FSM Kosrae	FSM Yap - North	FSM Yap - Central	FSM Yap - South	Niue	RMI Kwajalein	RMI Majuro	Tuvalu
KRA1													
V1	Volume of water produced - total produced from sources and treatment	kL/conn/day	**1.25**	**1.25**	3.01	2.56	0.69	1.46	0.61	1.30	0.57	1.04	0.05
V1b	Volume of water produced (L/capita/day)	L/capita/day	**250**	**193**	445	131	118	258	122	416	58	180	9
V2	Volume of water sold (i.e. billed) - through meters or estimated unmetered	kL/conn/day	**1.00**	**0.40**	0.84	NA	0.66	NA	0.61	0.00	0.04	0.58	0.05
V2b	Volume of water sold (i.e. billed) in L/capita/day	L/capita/day	**150**	**68**	124	1	113	138	121	0	4	100	8
V3	Volume of sewage produced - total	kL/conn/day	**0.75**	**0.52**	1.51	0.23	NA	NA	NA	NA	0.08	0.26	NA
V3b	Volume of sewage produced (L/capita/day	L/capita/day	**200**	**68**	202	28	NA	NA	NA	NA	8	33	NA
KRA2 - Technical Performance													
O1	Water supply coverage	% of population	**95%**	**86%**	90%	82%	92%	93%	100%	100%	100%	26%	94%
O2	Continuity of water supply service (hours available)	Hrs/day	**24**	**16.2**	24.0	20.0	24.0	24.0	24.0	24.0	0.1	4.0	2.0
O3b	Non-revenue water (%)	% of water produced	**25%**	**52%**	72%	99%	4%	47%	1%	100%	NA	44%	NA
O3	Non-revenue water (m3/conn/day)	m3/conn/day	**0.3**	**1.2**	2.17	2.56	0.03	NA	NA	1.30	0.52	0.46	NA
O3c	Non-revenue water (m3/km/day)	m3/km/day	**-**	**12.4**	19.18	22.08	0.12	NA	0.01	2.41	40.92	1.94	NA
O4	Sewerage coverage	% of population	**80%**	**64%**	63%	40%	NA	70%	NA	NA	99%	48%	NA
KRA3 - Health and Environment													
HE1	Drinking Water quality compliance - residual chlorine	% compliance	**100%**	**32%**	100%	0%	100%	90%	0%	0%	0%	0%	0%
HE1a	Percentage of customers on treated water or % of water treated	% water produced	**100%**	**78%**	100%	0%	100%	100%	0%	100%	100%	100%	100%
HE2	Drinking Water quality compliance - microbiological	% compliance	**100%**	**73%**	85%	50%	71%	90%	70%	99%	67%	NA	50%
HE3	% of sewage produced which is treated to at least primary standard	% of sewage	**100%**	**0%**	0%	NA	NA	0%	NA	NA	NA	NA	NA
KRA4 - Human Resources													
HR1	Water and sewerage business staff/ 1000 connections	#FTE/1000 conn	**8.0**	**13.0**	14.6	9.6	8.0	14.9	13.8	15.5	10.1	16.3	14.1
HR2	Training days (no days/year)	days/FTE/year	**5.0**	**1.7**	7.68	0.33		0.00		1.11	1.76	0.80	0.45
HR3	Average cost of staff (total labour cost / no of staff/GNI)	%	*	**185%**	192%	NA	183%	102%	114%	225%	NA	296%	NA
KRA5 - Customer Service													
CM1	Meter coverage rate for water supply customers (for all water meters)	% of customers	**100%**	**54%**	76%	31%	98%	80%	100%	8%	0%	77%	20%
CM2	Customer complaints / 1000 connections	#/1000 conn	**20**	**114**	150	NA	53	NA	NA	173	32	160	NA
CM3	Affordability new connection	% GNI per person		**2.7%**	1.5%	NA	1.9%	NA	1.4%	0.7%	6.0%	4.8%	NA
CM4a	Affordability - average bill	% GNI per person		**0.8%**	0.5%	NA	0.7%	1.4%	0.6%	0.0%	0.6%	1.8%	NA
CM4b	Affordability - 6m3/month/connection	% GNI per person		**0.4%**	0.4%	NA	0.4%	NA	0.3%	0.2%	NA	0.6%	NA
KRA6 - Financial Sustainability													
F1	Operating cost recovery ratio (excluding dep)	%	**120%**	**55%**	30%	0%	103%	127%	92%	1%	25%	96%	23%
F2	Collection ratio - actual cash income vs billed revenue	%	**95%**	**79%**	65%	NA	100.0%	89%	89%	60%	49%	100%	NA
F3	Accounts receivable (days)	Days	**90**	**125**	84	NA	160	40	63	NA	NA	275	NA
OV1	**Overall Efficiency Indicator ((1-NRW)*collection ratio)**		**70%**	**51%**	**18%**	**NA**	**96%**	**47%**	**89%**	**0%**	**NA**	**56%**	**NA**

5.2 Technical performance in small utilities

Figure 5.1: Water Connections (=6,569)

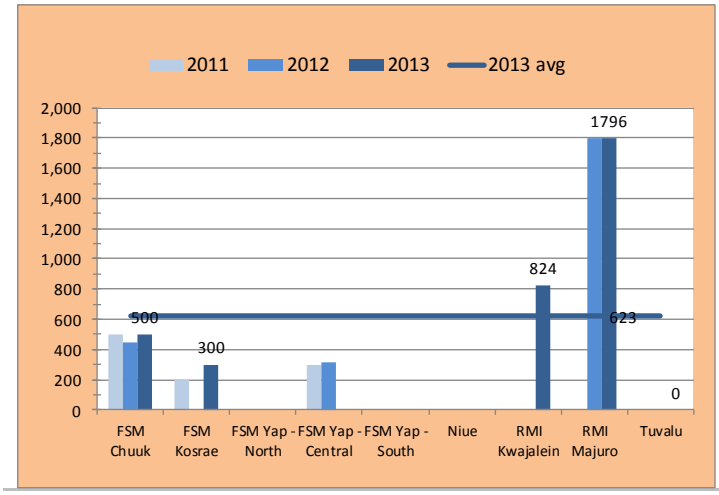


Water Connections
The total number of connections for the eight small utilities increased from 5,391 connections in 2012 to 6,569 in 2013.

Observations:
The overall increase is mainly due to including data from KAJUR (RMI Kwajalein), which was not included in last year's benchmarking.

CPUC Chuuk and RMI Majuro realized increased connection numbers.

Figure 5.2: Sewerage Connections (=3,736)

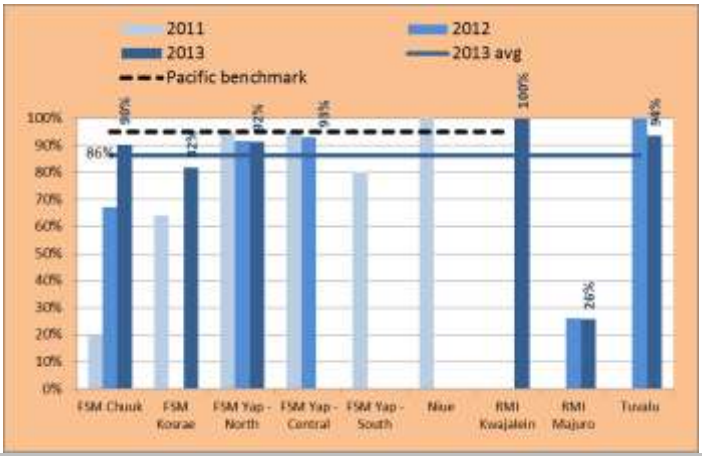


Sewerage Connections

The number of sewer connections compared to 2012 increased markedly from 2,762 to 3,736 connections. This is mainly due to including KAJUR (RMI Kwajalein) in this year's benchmarking.

Observations:
Five of the nine utilities do manage sewerage systems. No trends are observed.

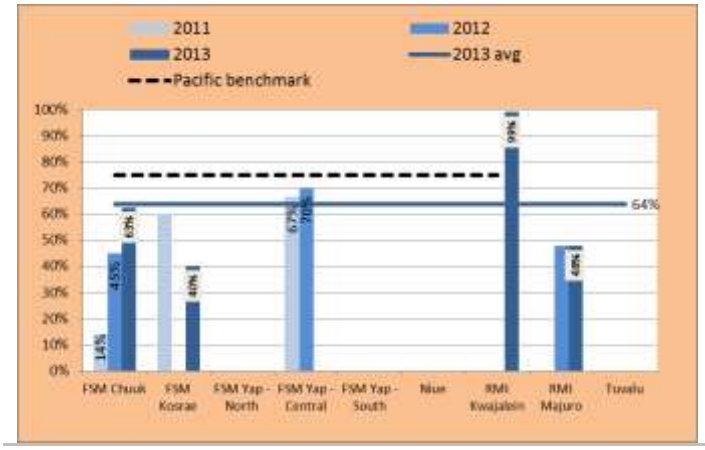
Figure 5.3: Population Coverage – Water Supply (Indicator O1)



Population Coverage – Water Supply
The population coverage for water supply within the utilities' service areas varies from 26% in MWSC (RMI Majuro) to above 90% in FSM Yap North, FSM Yap Central, and Niue.

Observations:
The coverage relates to service area only. The indicator does not reflect the country's national population with access to water and sanitation facilities.

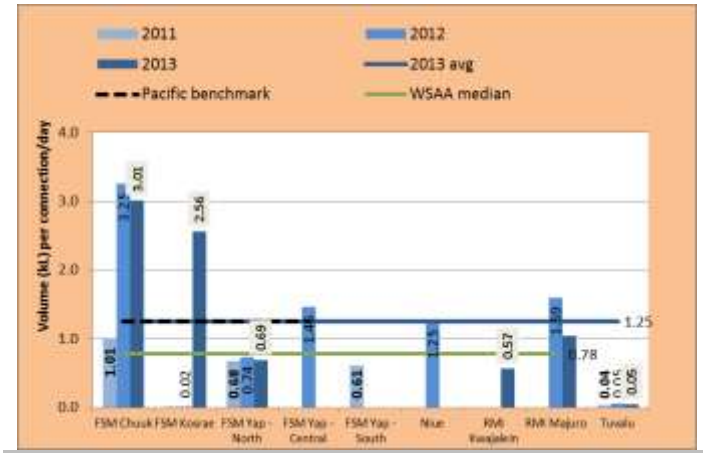
Figure 5.4: Population Coverage – Sewerage (Indicator O4)



Population Coverage – Sewerage
Five of the nine small utilities manage the collection and treatment of wastewater. These utilities show an average coverage of 64%.

Observation:
Since 2011 FSM Chuuk has increased coverage greatly as a result of upgrading and rehabilitating its works.

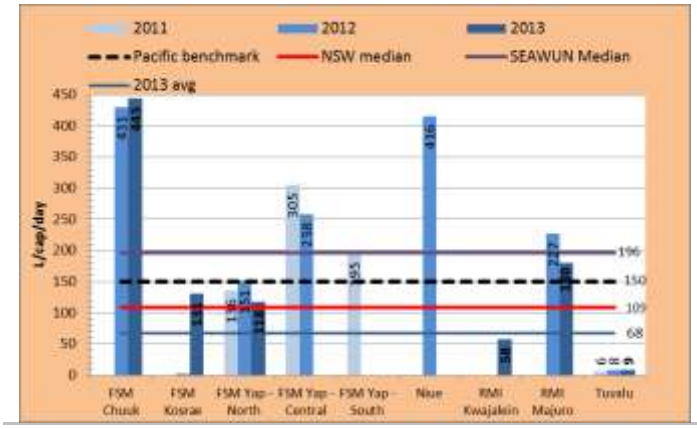
Figure 5.5: Volume of Water Produced (Indicator V1)



Volume of Water Produced
Water produced per connection in the small utilities is 1.25 kL per connection daily, which equals the Pacific benchmark. FSM Chuuk, followed by FSM Kosrae report the highest production per daily connection.

Observations:
High production reflects the high volumes of non-revenue water and the way water is charged to customers (see also Figure 5.9).

Figure 5.6: Volume of Water Sold (L/capita/day) (Indicator V2)

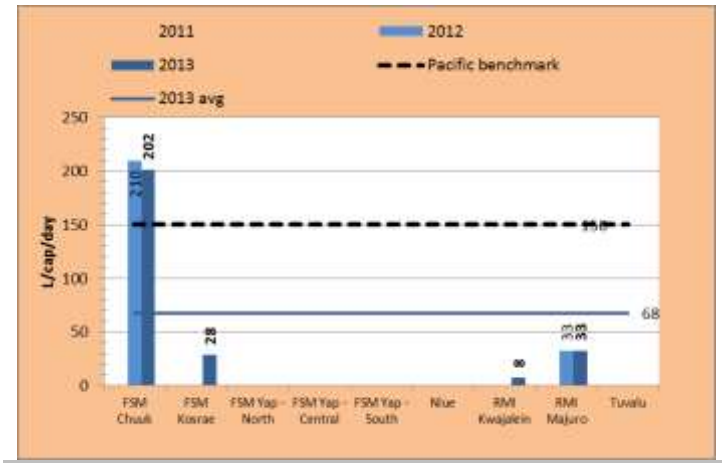


Volume of Water Sold
The average volume of water sold per capita is 68 l/c/day. This varies between the high-end FSM Chuuk with 445 l/c/d and the low-end Tuvalu with only 9 l/c/d.

Observations:
Tuvalu has a very low level of water sold as all houses use rainwater tanks and the volume of water sold consists of additional desalinated water delivered by water trucks. The low consumption rate at KAJUR is because the supply is rationed.

FSM Chuuk shows very high consumption rates. It is installing meters and expects consumption will decrease once customers are charged for metered consumption.

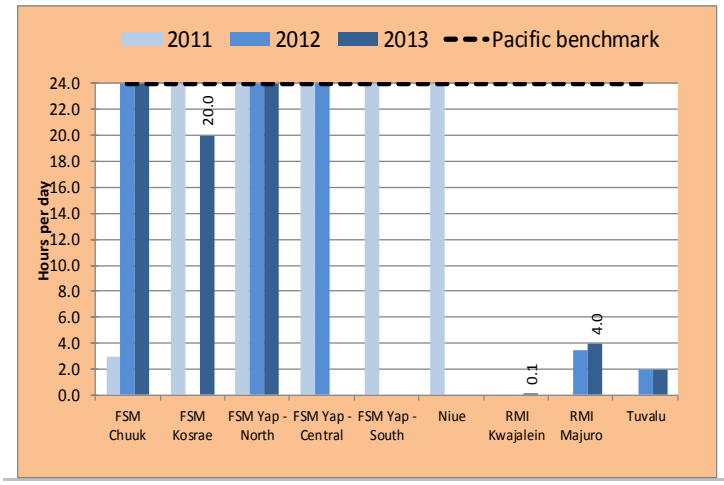
Figure 5.7: Volume of Sewage Collected (Indicator V3b)



Volume of Sewage Collected
Five of the nine small utilities collect sewage. CPUC (FSM Chuuk) collects the highest volume per capita.

Observations:
FSM Yap Central operates a sewerage system, but measures no volumes.

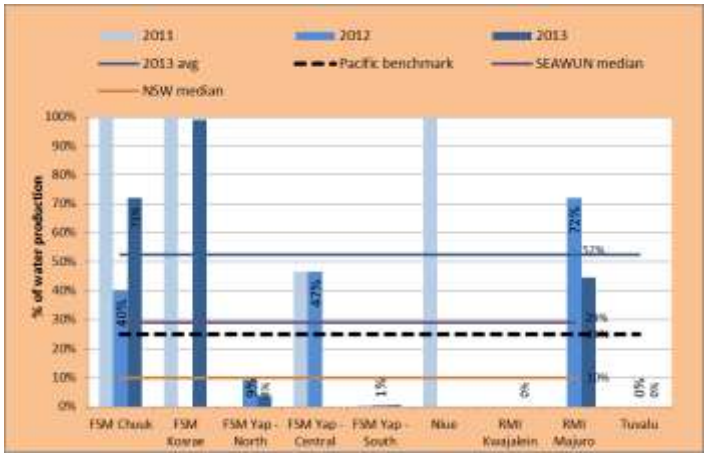
Figure 5.8: Continuity of Water Supply (Indicator O2)



Continuity of Water Supply
Five of the nine utilities provide 24/7 supply.

Observations:
KAJUR and RMI Majuro operate only a few hours daily. Tuvalu distributes water by trucks, while most houses rely on rainwater tanks.

Figure 5.9: Non-Revenue Water as % of Production (Indicator O3b)



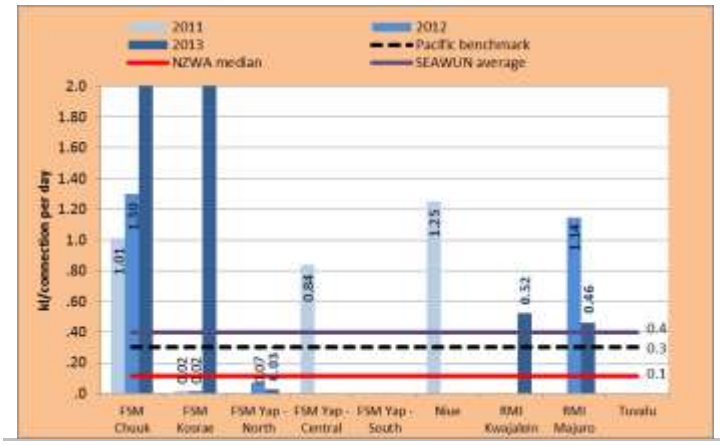
Non-Revenue Water (NRW)
The level of Non-Revenue Water is still very high at an average 52%. FSM Yap North continues to perform very well.

Observations:
PUC's (FSM Chuuk) NRW increased due to increased production capacity. Through an on-going rehabilitation project, physical losses are now being repaired and the NRW is expected to decrease in 2014.

FSM Kosrae does not charge its customers.

Kajur (RMI Kwajalein) and Tuvalu provided no figures as these utilities distribute water by trucks.

Figure 5.10: Non-Revenue Water per Connection/Day (Indicator O3)

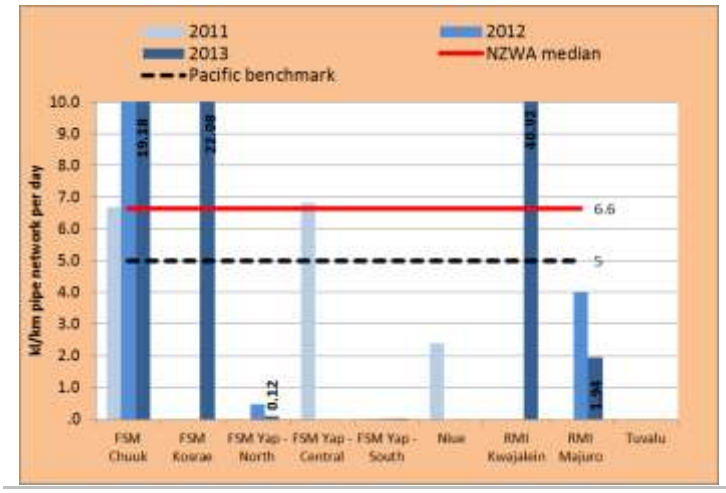


NRW per Connection/Day

The NRW expressed as kL per connection per day varies greatly among utilities. To further analyse NRW characteristics, water losses are expressed in kL per connection. FSM Chuuk and FSM Kosrae report high figures as both don't fully operate on metered consumption.

Observations:
Kajur (RMI Kwajalein) and Tuvalu offered no figures, as these utilities distribute water by trucks.

Figure 5.11: Non-Revenue Water per km of Main (Indicator O3c)

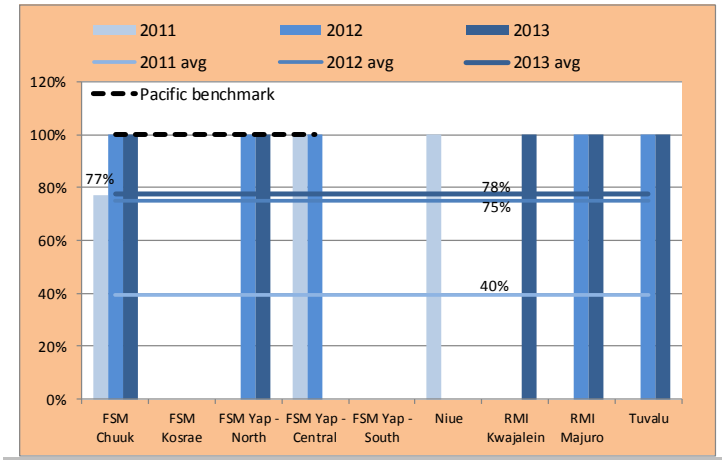


NRW per km of Main
NRW is often also expressed as volume of water losses per kilometre of pipe network.

Observations:
FSM Chuuk, FSM Kosrae, and RMI Kwajalein show high figures above the PWWA Benchmark of 5 kL per kilometre pipe length .

5.3 Health and environment in small utilities

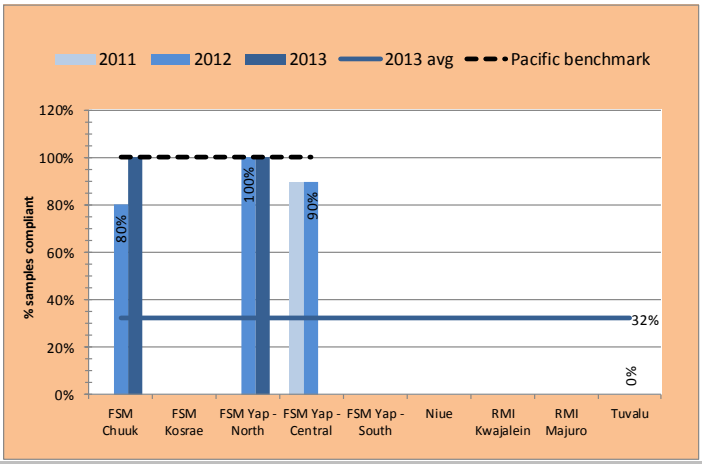
Figure 5.12: Treated Water as % of Water Production (Indicator HE1a)



Treated Water
About 78% (7 of 9) of the utilities report they provide treatment. Water treatment means full treatment for surface waters and at least chlorination of water from deep wells.

Observations:
FSM Kosrae and FSM Yap South distribute water without treatment.

Figure 5.13: Drinking Water Quality – Residual Chlorine (Indicator HE1)

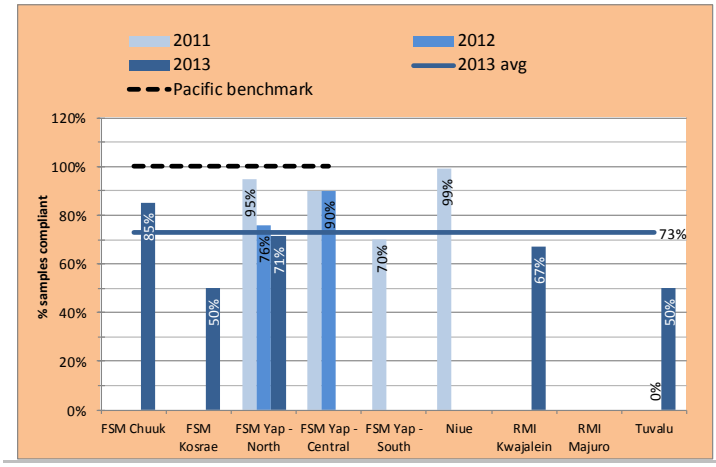


Residual Chlorine
EPA – government departments usually monitor water quality, but don't always offer the data to the utilities.

Only three utilities (Yap Central, Yap North, and Chuuk) reported testing for residual chlorine. Two of them report 100% compliance.

Observations:
RMI (Majuro), RMI (Kwajalei), and Tuvalu utilities offer treatment and chlorination, but provide no data on sampling and testing.

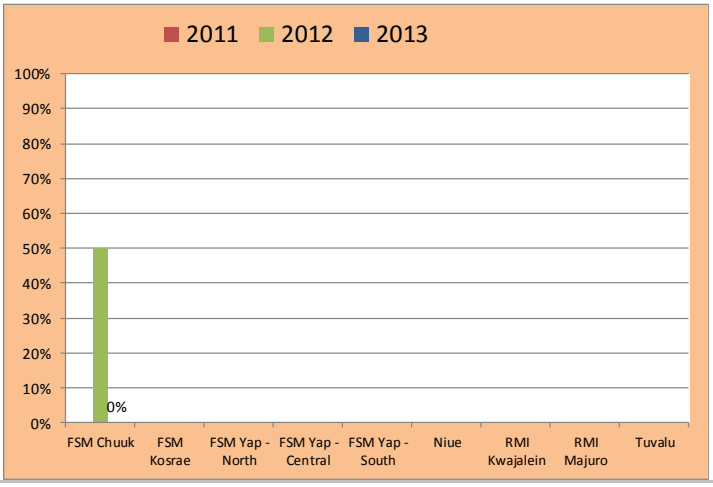
Figure 5.14: Drinking Water Quality – Microbiology (Indicator HE2)



Microbiology
Government health or environmental departments usually monitor water quality, and don't always share the data with utilities. In 2013 5 of 9 small utilities reported such data. About 73% of the samples tested comply with microbiological water quality.

Observations:
Generally all utilities are not compliant for most of the analysed samples. Only FSM Chuuk shows a reasonable 85% compliance.

Figure 5.15: Sewage Treatment (Indicator HE3)

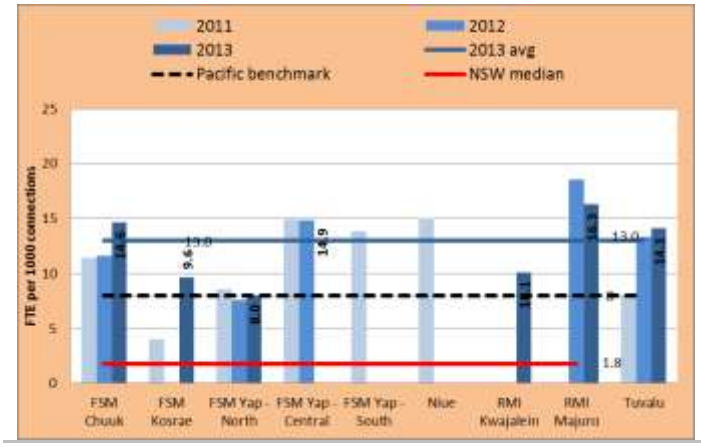


Sewage Treatment
FSM Chuuk, FSM Yap Central, FSM Kosrae, RMI Kwajalein, and RMI Majuro operate sewerage systems. Although treatment facilities are available the plants are not functioning.

Observations:
The treatment plant at Chuuk was reported not to function. The plant at Kosrae does function, but without testing.

5.4 Human resources development in small utilities

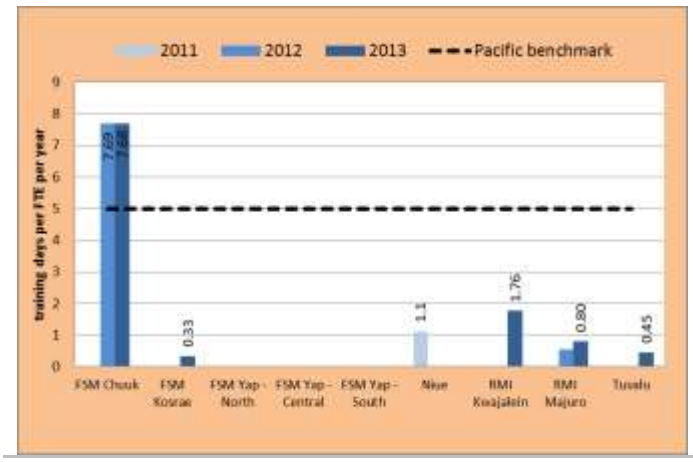
Figure 5.16: Staff per 1000 Connections (Indicator HR1)



Staff per 1000 Connections
The average of the staff utilisation is 13 staff per 1000 connections, which is above the Pacific benchmark.

Observations:
As the utilities are small,sized, the Pacific benchmark for small utilities may need adjusting.

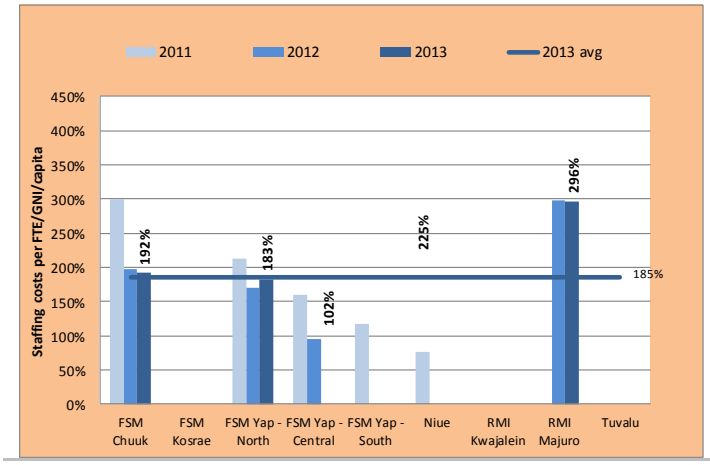
Figure 5.17: Training Days per Staff per Year (Indicator HR2)



Training Days
The number of training days provided annually to staff is below the Pacific benchmark. Only FSM Chuuk shows a high training intensity of 7.68 days per staff annually.

Observations:
Pacific utilities worry over staff qualifications. Most staff capabilities are learned 'on the job'. Little time and budget is allocated to train employees. Except for FSM Chuuk, all small utilities perform far under the Pacific benchmark.

Figure 5.18: Average Cost of Staff/GNI Ratio (Indicator HR3)

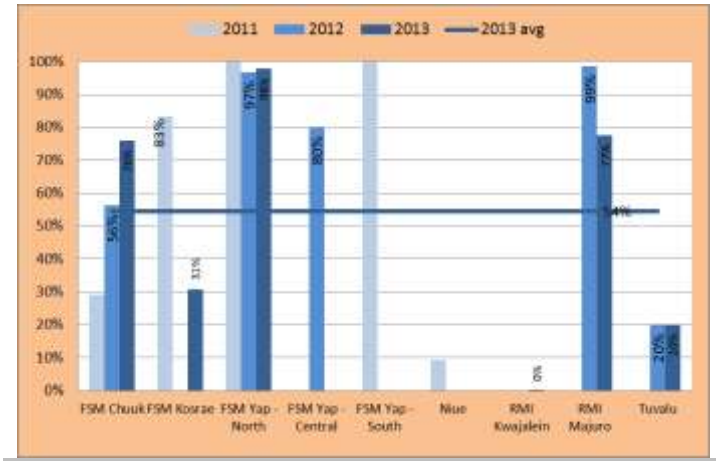


Average Cost of Staff
This indicator reflects salary costs compared to the GNI per capita. The results indicate that RMI Majuro is spending considerably more on salaries than do other small utilities.

Observations:
No trends are observed.
Only three small utilities provided data for 2013.

5.5 Customer services in small utilities

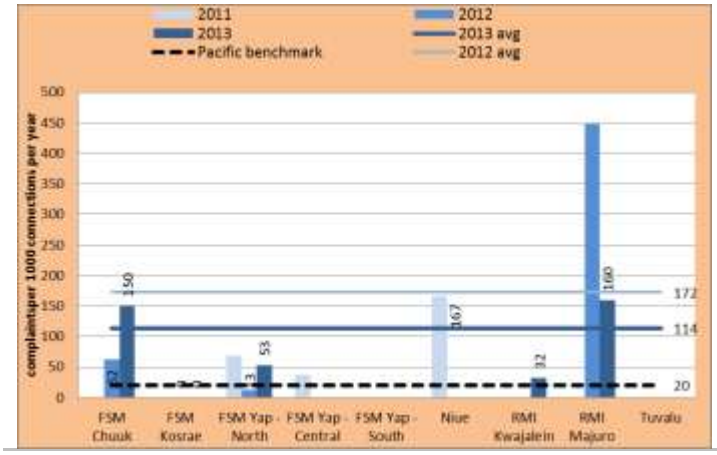
Figure 5.19: Meter Coverage Rate (Indicator CM1)



Meter Coverage
Though some utilities make progress, only 54% of small utility connections are metered.

Observations:
The coverage of metering is progressing well at FSM Chuuk where metering commenced only in 2012. The drop in RMI Majuro reflects data correction.

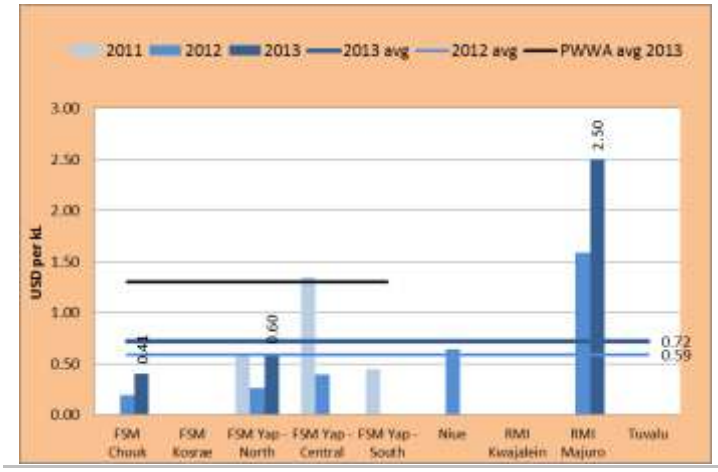
Figure 5.20: Customer Complaints per 1000 Connections (Indicator CM2)



Customer Complaints
The average number of complaints per 1,000 connections decreased significantly from 172 in 2012 to 114 in 2013, mainly due to the drop in complaints at RMI Majuro.

Observations:
Not all utilities keep regular records. Complaint numbers may be higher.

Figure 5.21: Average Revenues per kL

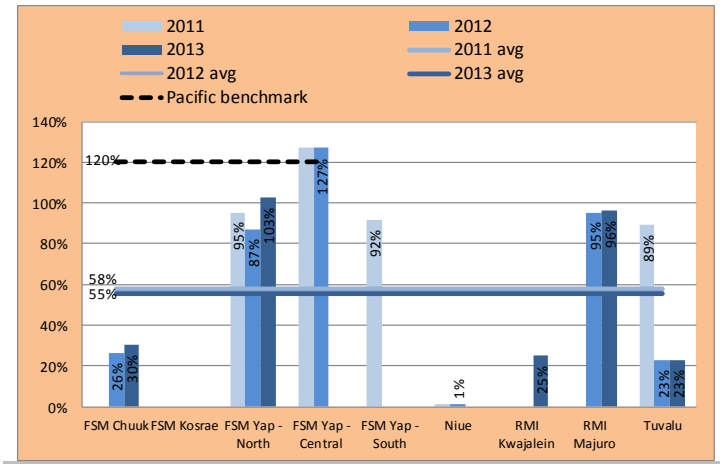


Average Revenues
The average revenues small utilities bill increased from US$0.59/kL in 2012 to US$ 0.72/kL in 2013.

Observations:
With much data missing for this indicator, it is difficult to analyse the situation.

5.6 Financial performance in small utilities

Figure 5.22: Operating Cost Recovery Ratio (Indicator F1)
(excluding depreciation)

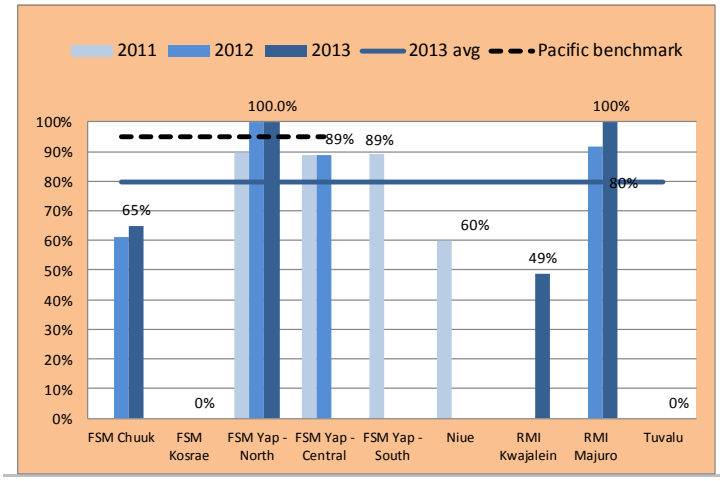


Operating Cost Recovery Ratio (OCR)
Only FSM Yap North and FSM Central (2012 data) show a positive operating cost recovery ratio (OCR, excluding depreciation).

Observations:
Most small utilities depend on cross subsidies. For example, MWSC (RMI Majuro) is unable to pay its electricity bills.

Though some positive trends are visible, there remains a distance until small utilities become financially sustainable.

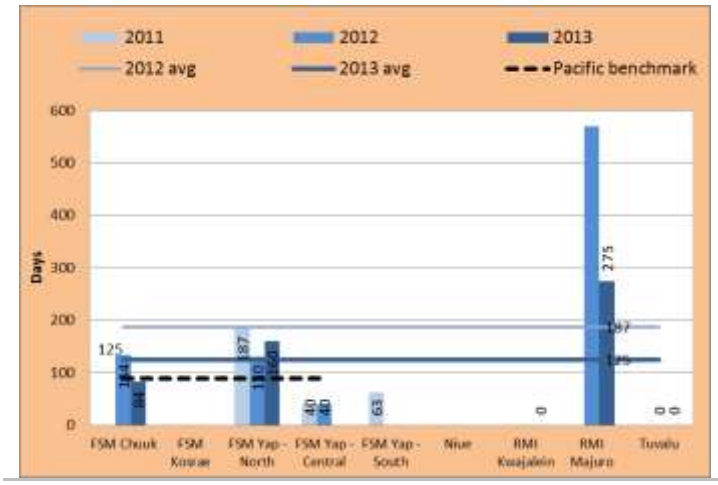
Figure 5.23: Collection Ratio – Actual Income vs. Billed Revenue (Indicator F2)



Collection Ratio
The overall collection ration is 80%, which is well below the 95% Pacific benchmark.

Observations:
Only two small utilities perform well (Yap North and RM Majuro).

Figure 5.24: Debtor Days (Indicator F3)

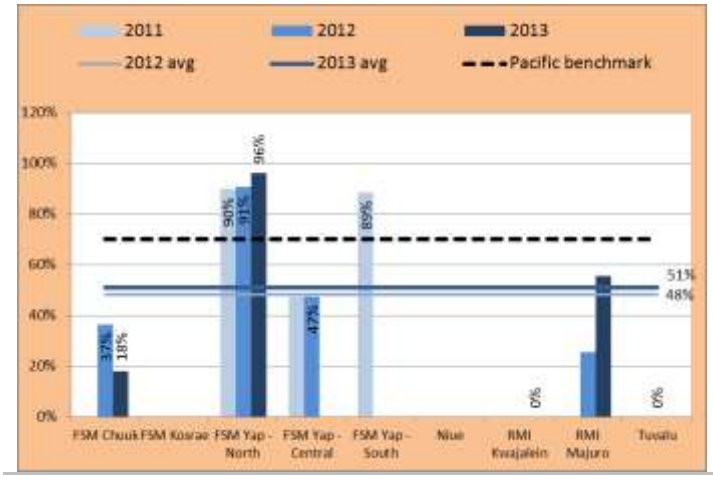


Debtor Days
Overall the debtor days improved from 187 days in 2012 to 125 days in 2013. The drop is mainly due to RMI Majuro reporting significant improvement.

Observations:
The data still differ greatly over the years and are mostly unverified by audited reports. Therefore, it seems inappropriate to draw comparisons and conclusions yet.

5.7 Overall performance in small utilities

Figure 5.25: Overall Efficiency Indicator (OEI)

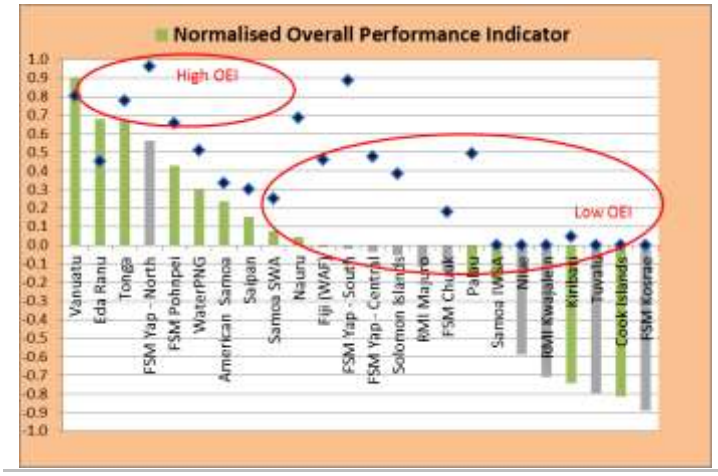


Overall Efficiency Indicator
The overall OEI improved from 48% in 2012 to 51% in 2013, but is still well below the 70% Pacific benchmark.

Observations:
FSM Yap North performs well on NRW and the collection ratio.

The data still differ greatly over the years and are mostly unverified by audited reports. Therefore, it seems inappropriate to draw conclusions yet.

Figure 5.26: Overall Performance Indicator (OPI) Normalised



Overall Performance

Figure 5.26 illustrates the normalised results on the OPI and shows that FSM Yap North is the best performing small utility. All other utilities score below the average OPI of all PWWA utilities.

Observations:
Compared to 2012 FSM Chuuk and RMI Majuro have improved, while the other small utilities continue to show similar overall performance results.

6. Performance Improvement and Follow Up

6.1 Action plans and utility profiles

The action plans utilities completed focus on the coming year and also comment on the achievements of the previous year's action planning. Appendix H outlines the action planning discussed at the Rarotonga workshop. The priorities in the utilities' action plans for 2014 can be broadly summarised as follows:

- Reduce non-revenue water by improving billing and leak detection.
- Improve drinking water quality and laboratory standards.
- Implement asset management systems/databases.
- Increase staff training.
- Improve customer service levels.
- Improve sanitation services.

For the utilities that prepared action plans and those which requested profiles, individual utility profiles were prepared that compared the individual utilities' results against their peer groups' overall benchmarking results. These profiles were sent to the utilities' CEOs for use in their organizations. A summary of the main points from the some utilities' action planning follows:

Table 6.1: Action Plans

UTILITY	ACTION PLAN
American Samoa Power Authority (ASPA)	• Reduce non-revenue water (NRW) to a reasonable amount by 2014 with $2m dollars already budgeted for this initiative. • Improve water quality compliance by drilling at least five new (producing) wells and rehabilitating microfiltration plants. • Increase water supply coverage.
Vanuatu (UNELCO)	• Survey the water protection Zone 2 and Zone 3. • Employ additional staff. • Improve customer service.
Nauru Utilities Corporation	• Complete asset management and auditing activity – asset registry assessment completed and budget allocation for asset review. • Meter bulk water storage tanks to improve non-revenue water detection and monitoring – to continue. • Improve data collection and maintenance of data base – currently delayed due to upgrading information systems.
Nauru Utilities Corporation	• Upgrade infrastructure and replacement of assets. • Implement training and capacity building. • Improve customer services.
Water Authority of Fiji	• Maximise use of supplied water – improved data collection from bulk and flow meters. • Improve effluent quality in STPs – achieved. • Reduce energy bill – saved FJD$100,000.
Saipan Commonwealth Utilities Corporation	• Reduce NRIV and energy costs and eliminate flat rate customers. • Complete service areas (TSA)/pressure zones. • Improve operation of water system.

It is expected that next year's benchmarking conference will follow up on these outlined action plans.

6.2 Training needs analysis

As part of the 2013 benchmarking survey for the Pacific water and wastewater utilities a training needs assessment survey was distributed for utilities to state their training needs.

The training needs survey showed that

- About 70% of water utilities have a process for identifying future training needs.
- About 43% have line managers who determine training needs and assess future training needs.
- Most utilities responded that their training needs assessment considers the next 12 months, while only 43% have a 2-3 year horizon for their assessed training needs.
- All utilities stated that they document their training needs assessment.

The section on *Technical Management and Operations* identified the main priority areas for training:

- network operations and management;
- inventory asset and management which includes GIS;
- non-revenue water management/leak detection techniques; and
- engineering skills.

The section on *Financial Management/Accounting and Customer Care Management* identified the main priority areas for training:

- billing and database administration for customers;
- customer care/relations;
- customer complaint management;
- inventory management and accounting; and
- asset register.

Responses in the section on *Human Resources* were mixed with most utilities requiring 'some training' in the following:

- employee retention;
- employee handbooks and policies and procedures manuals; and
- human resource management information systems.

The main factor that prevented water utilities from meeting or achieving their training/professional development needs was the cost or lack of budgetary support (70%). The next factor was that the training was unavailable in the country (60%) followed by the workforce capacity. Another constraint mentioned for meeting future training needs is the lack of qualified staff suitable for advanced training and the lack of basic qualifications among most staff.

Water utilities identified the following three areas where the training needs process could be improved for their utilities:

i. Appoint a training coordinator; arrange closer liaison between human resource department and line managers; and identify areas most needing training.
ii. Implement follow-up and review sessions on the training; arrange closer liaison between human resource department and donors; and train the trainers.
iii. Promote more secondment/attachment opportunities for training in larger utilities; allocate budget and funding for training; and evaluate trainings.

6.3 Data presentation through IB-NET

Part of PWWA 2012 and 2013 benchmarking indicators has been entered into the IB-NET benchmarking database. IB-NET is the World Bank administered International Benchmarking Network for Water and Sanitation Utilities with direct access to the world's largest database for water and sanitation utilities performance data.

The PWWA website presents PWWA results through the following link: www.pwwa.ib-net.org

6.4 Future benchmarking

PWWA's *Future Benchmarking Strategy 2013-2017* was presented in the 2012 Benchmarking Report with PWWA Board approval.

The PWWA Benchmarking Strategy 2013-2017 aims at providing a quality sustainable benchmarking system as a regular service to its members. The 5-year strategy was presented in the 2012 Benchmarking Report. Key elements include i) using PWWA as lead agency; ii) collecting and reporting data annually; iii) focusing on improving benchmarking data quality; iv) developing a web-based system for data collection and presentation; and v) sharing benchmarking costs between utilities and other data users.

Introducing web-based benchmarking through IB-Net justifies reviewing the strategy as it opens new possibilities and challenges for PWWA and utilities.

The main areas in the benchmarking strategy for review include:

- Collection and processing of benchmarking data – What are the consequences of using IB-NET for this process and how will this be achieved in the future?
- Frequency and timing of reporting – Is there still a need for annual benchmarking reports?
- Benchmarking workshops – Stay with the current model of regional workshops or hold utility-specific or sub-regional workshops?
- Willingness to pay for benchmarking – Should utilities start paying for benchmarking reports or contribute towards benchmarking costs?
- Improvements to the questionnaire – Some utilities at the 2013 benchmarking workshop suggested a 'lighter' version was more applicable to smaller utilities.

Appendices

Appendix A: Utilities and key benchmarking contacts

Country/ Region	Utility name	Title	Role	Name of Key Contact	Email address
Cook Islands	Ministry of Infrastructure and Planning	CEO	Head of Ministry (HOM)	Mr Mac Mokoroa	numa@oyster.net.ck
		Benchmarking Rep	Acting Director of Water Works Division	Mr Adrian Teotahi	hydro@moip.gov.ck
Papua New Guinea	NCD Water and Sewerage Ltd trading as Eda Ranu	CEO	CEO	Mr Billy Imar	blimar@edaranu.com.pg
		Benchmarking Rep	Benchmarking Rep	Dr Fifaia Matainaho	fmatainaho@edaranu.com.pg
Fiji	Water Authority of Fiji	CEO	Acting CEO	Mr Opetaia Ravai	oravai@waf.com.fj
		Benchmarking Rep	Benchmarking Rep	Mr Manasa Tusulu	manasa.t@waf.com.fj
FSM Chuuk	Chuuk Public Utility Corporation	CEO	CEO	Mr Mark Waite	mwaite_cpuc@mail.fm
		Benchmarking Rep	Water and Wastewater Manager	Mr Paul Howell	howell_gkw@yahoo.com.au
FSM Kosrae	Department of Transportation and Infrastructure	CEO	CEO	Mr Weston Luckymis	weston@mail.fm
		Benchmarking Rep	Supervisor	Mr Soloman Talley	none
FSM Pohnpei	Pohnpei Public Utilities Corporation	CEO	General Manager/CEO	Mr Marcelino Actouka	pucgm@mail.fm
		Benchmarking Rep	Manager, Water Works	Mr Leerenson Airens	pucwater@mail.fm
FSM Yap North	Gagil Tomil Water Authority	CEO	CEO	Mr Manikam Razakrisnan	gtw@mail.fm
		Benchmarking Rep	As above		
FSM Yap Central	Yap State Public Service Corporation (YSPSC)	CEO	CEO	Mr Faustion Yanmog	
		Benchmarking Rep	Benchmarking Rep	Mr Charles Falmeyog	charlesfalmeyog@yspsc.fm
FSM Yap South	Southern Yap Water Authority	CEO	CEO	Mr John Guswel	
		Benchmarking Rep	As above		
Kiribati	Kiribati Public Utilities Board	CEO	CEO	Mr Kevin Rouatu	kevinrouatuki@gmail.com
		Benchmarking Rep	Water Engineering Manager	Mr Timona Itienang	itienangtimona@gmail.com
Nauru	Nauru Utilities Corporation	CEO	CEO	Mr Thomas Tafia	ttafia@gmail.com
		Benchmarking Rep	Benchmarking Rep	Mr Nixon Toremana	nixon.toremana@naurugov.nr
Samoa	Independent Water Schemes Association	CEO	President	Sulutumu Sasa Milo	zultum@yahoo.com
		Benchmarking Rep	Senior Officer	Mr Morwenna Petaia	
Papua New Guinea	WaterPNG	CEO	MR. (Chief Operating Officer and Acting CE-MD)	Mr Raka Taviri	rtaviri@waterpng.com.pg
		Benchmarking Rep	Planning Manager	Mr Sibona Vavia	svavia@waterpng.com.pg

Country/ Region	Utility name	Title	Role	Name of Key Contact	Email address

Palau	Palau Public Utilities Corporation	Acting CEO	Acting CEO/GM	Mr Kione Isechal	kji@ppuc.com
		Benchmarking Rep	PPUC Water Operations Manager	Mr Dave Dengkoki	bpw@palaunet.com
RMI Majuro	Majuro Water and Sewer Company (MWSC), Inc	CEO	CEO	Mr Josef Batol	jbatol96960@yahoo.com
		Benchmarking Rep	Benchmarking Rep	Mr Josef Batol	jbatol96960@yahoo.com
Saipan	Commonwealth Utilities Corporation	CEO	Executive Director	Mr Alan Fletcher	alan.fletcher@cucgov.org
		Benchmarking Rep	Senior Engineer	Mr Brian Bearden	brian.bearden@cucgov.org
Samoa	Samoa Water Authority	CEO	CEO	Mr Tainau Moefaauo	Moefaauo@swa.gov.ws
		Benchmarking Rep	Project Coordinator	Ms Siatua Lautua Muliagatele	siatua@swa.gov.ws
Samoa	Independent Water Schemes Association (IWSA)	CEO	President	Mr Sasa Milo	zultum@yahoo.com
		Benchmarking Rep	Benchmarking Rep	Mr Morwenna Petaya	
American Samoa	American Samoa Power Authority (ASPA)	CEO	Executive Director	Mr Utu Abe Malae	Utum@aspower.com
		Benchmarking Rep	Water Quality Supervisor	Mrs Daniele Meleah	Danielle@aspower.com
Solomon Islands	Solomon Water	CEO	General Manager	Mr Richard Austin	richard.austin@siwa.com.sb
		Benchmarking Rep	Technical Officer	Mr Bejimen Billy	bbilly@siwa.com.sb
Tonga	Tonga Water Board	CEO	CEO	Mr Saimone Pita Helu	twbhelu@kalianet.to
		Benchmarking Rep	Benchmarking Rep	Mr Pita Moala	pita.moala@gmail.com
Tuvalu	Ministry of Works, Water and Energy	CEO	Director of Works	Mr Ampelosa Tehulu	ampextehulu@yahoo.com
		Benchmarking Rep	Deputy Director of Works	Mr Uatea Maimoaga Salesa	fatukala@yahoo.com.au
Vanuatu	UNELCO GDF SUEZ	CEO	GENERAL MANAGER	Mr Philippe Mehrenberger	philippe.mehrenberger@UNELCO.com.vu
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Appendix B: List of documents consulted

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Appendix C: Summary of benchmarking data

No.	Indicator	Units	Pacific Benchmark	PWWA Previous Years Average				2013		WSAA	NZWA		Africa		SEA
				PWWA (2009)	PWWA (2010)	PWWA (2011)	PWWA (2012)	Average	Median	WSAA Median	NZWA G1 Median	NZWA G2 Median	WOP Africa Avg	WOP Africa Target	SEAWUN Median
KRA1 - Production															
V1	Volume of water produced	kL/conn/day	1.25	2.64	3.33	2.05	1.95	2.13	1.93	0.78	0.92	0.91	0.73	-	0.46
V1b	Volume of water produced (L/capita/day)	L/capita/day	250	-	-	442	380	393	317	363	385	473	145	-	249
V2	Volume of water sold (i.e. billed)	kL/conn/day	1.00	-	1.48	1.11	0.96	0.90	0.95	0.69	0.79	0.73	0.46	-	0.38
V2b	Volume of water sold (i.e. billed) in L/capita/day	L/capita/day	150	-	-	179	161	151	135	328	324	356	91	-	196
V3	Volume of sewage produced	kL/conn/day	0.75	-	-	2.47	1.81	1.79	1.51	0.58	0.87	0.55	-	-	-
V3b	Volume of sewage produced (L/capita/day	L/capita/day	200	-	-	380	291	303	260	216	389	385	-	-	-
KRA2 - Technical Performance															
O1	Water supply coverage	% of population	95%	-	76%	82%	83%	85%	92%	-	-	-	73%	90%	50%
O2	Continuity of water supply service (hours available)	Hrs/day	24	-	-	20.2	19.3	18.2	24.0	-	-	-	17	24	23
O3b	Non-revenue water (%)	% of water produced	25%	-	67%	53%	51%	52%	51%	10%	13%	20%	36%	25%	29%
O3	Non-revenue water (m3/conn/day)	m3/conn/day	0.3	-	-	1.3	1.2	1.6	1.2	-	0.1	0.2	0.6	0.3	0.4
O3c	Non-revenue water (m3/km/day)	kL/km/day	-	-	-	12.6	10.9	14.3	15.1	-	6.6	8.9	32.0	12.0	39.8
O4	Sewerage coverage	% of population	80%	-	-	43%	48%	65%	64%	-	-	-	42%	82%	-
KRA3 - Health and Environment															
HE1	Drinking Water quality compliance - residual chlorine	% compliance	100%			57%	62%	62%	90%	-	-	-	-	-	90%
HE1a	Percentage of customers on treated water	%	100%	93%	100%	70%	78%	79%	100%						
HE2	Drinking Water quality compliance - microbiological	% compliance	100%			87%	86%	82%	90%	100%	-	-	-	-	-
HE3	% of sewage produced which is treated to at least primary standard	% of sewage	100%			54%	64%	71%	100%	100%	-	-	-	-	-
KRA4 - Human Resources															
HR1	Water and sewerage business staff/ 1000 connections	#FTE/1000 conn	8	10.2	9.6	9.4	9.8	10.8	11.2	-	-	-	16.0	7.0	7.5
HR2	Training days (no days/year)	days/FTE/year	5	-	-	0.97	1.34	2.08	0.82	-	-	-	9.00	-	1.80
HR3	Average cost of staff (total labour cost / no of staff/GNI)	%	*	-	-	340%	355%	371%	206%	-	-	-	-	-	259%

No.	Indicator	Units	Pacific Benchmark	PWWA Previous Years Average				2013		WSAA	NZWA		Africa		SEA
				PWWA (2009)	PWWA (2010)	PWWA (2011)	PWWA (2012)	Average	Median	WSAA Median	NZWA G1 Median	NZWA G2 Median	WOP Africa Avg	WOP Africa Target	SEAWUN Median
KRA5 - Customer Service															
CM1	Meter coverage rate for water supply customers	% of customers	100%			69%	73%	68%	85%	-	45%	23%	74%	100%	100%
CM2	Customer complaints / 1000 connections	#/1000 conn	20		41	138	161	185	150	10	-	-	53	53	168
CM3	Affordability - new connection	% GNI per person			1.1%	1.8%	2.6%	2.9%	2.0%	-	-	-	7.0%	2.0%	-
CM4a	Affordability - average household bill	% GNI per person				1.6%	1.8%	1.1%	0.9%	1.1%	0.8%	0.7%	-	-	-
CM4b	Affordability - 6m3/month/connection	% GNI per person				0.3%	0.34%	0.31%	0.27%	-	-	-	7.0%	3.0%	0.9%
KRA6 - Financial Sustainability															
F1	Operating cost recovery ratio (excluding dep)	%	120%	104%	96%	97%	85%	86%	92%	-	-	-	-	120%	140%
F2	Collection ratio - actual cash income vs billed revenue	%	95%	-	-	83%	85%	86%	84%	-	-	-	73%	93%	-
F3	Accounts receivable	days	90	-	-	154	199	211	158	-	-	-	243	90	67
OV1	**Overall Efficiency Indicator ((1-NRW)*collection ratio)**		70%	-	-	**51%**	49%	49%	47%	-	-	-	52%	66%	-

Appendix D: Benchmarking questionnaire and guidance notes

Questionnaire

PWWA BENCHMARKING PROJECT

DATA QUESTIONNAIRE CONTENTS

The data questionaire is segregated into the following sections
or the following worksheet tabs:

PWWA BENCHMARKING PROJECT

SECTION 1 - UTILITY DETAILS AND CONTACTS

PRIMARY DATA (REQUIRED)		Units	Utility Response
1.1	Utility name	-	
1.2	Country	-	
1.3	Geographical region within the country (i.e. province, division, city)	-	
1.4	Name of Chief Executive Officer	-	
	CEO First Name	-	
	CEO Last Name	-	
	CEO Title	-	
1.5	CEO contact details	-	
	Mailing Address	-	
	Telephone (including country and region code)	-	
	Fax (including country and region code)	-	
	Email address	-	
1.6	Name of Benchmarking Representative	-	
	Rep First Name	-	
	Rep Last Name	-	
	Rep Title	-	
1.7	Rep contact details	-	
	Mailing Address	-	
	Telephone (including country and region code)	-	
	Fax (including country and region code)	-	
	Email address	-	
1.8	What type of water utility are you? *(PLEASE PLACE A "X" ALONGSIDE THE MOST CORRECT DESCRIPTION)*	-	
	Government department with no separate financial reporting for water & sewerage	-	
	Government department with separate financial reporting for water & sewerage	-	
	Statutory organisation following state requirements	-	
	State Owned Enterprise operating under commercial law	-	
	Jointly (Government and private) owned company operating under commercial law	-	
	Privately owned company operating under commercial law	-	
	Not-for-profit organisation (e.g. Co-operative) operating under commercial law	-	
	Community Owned Water Schemes	-	
1.9	Who has general oversight of the utility's services and prices? *(PLEASE PLACE A "X" ALONGSIDE THE MOST CORRECT DESCRIPTION)*		
	Local, regional or national government department	-	
	Independent board of stakeholders	-	
	Independent service & price regulator	-	
	Other (Describe....)	-	

PWWA BENCHMARKING PROJECT 2

SECTION 2 - SCHEMES AND ASSETS

PRIMARY DATA (REQUIRED)

Water supply		Units	Response	Utility Comments
2.1	No. of water supply schemes in total (both urban + rural) under your responsibility	No.		
2.2	Length of transport & distribution pipes (all diameters excl service connections)	km		
2.3	What best describes the types of water supply systems you operate (i.e. how was it designed to operate)? PLEASE PLACE A "X" ALONGSIDE THE MOST CORRECT DESCRIPTION			
(a)	Traditional reticulated water supply systems	-		
(b)	Constant flow system (household tanks to fill over the day to buffer peak demand)	-		
(c)	Unreticulated system (household or community tanks with water delivered/ tankered to them)	-		
2.4	Total number of property meters (i.e. domestic and non-domestic)	No.		
(a)	Number of domestic property meters (i.e. domestic)	No.		
(b)	Number of non-domestic property meters (i.e. domestic)	No.		
(c)	Number of operating property meters (i.e. not reading errors)	No.		
2.5	Estimated % of houses with household tank *(PLEASE ESTIMATE TO THE BEST EXTENT POSSIBLE)*	%		

Sewerage				
2.6	No. of sewerage schemes - total	No.		
2.7	Total length of sewer mains (all diameters excl service connections)	km		
2.8	What best describes the types of sewerage schemes you operate (i.e. how was it designed to operate)? PLS ANSWER YES / NO			
(a)	Traditional reticulated sewerage schemes with gravity sewers, pumping stations, or rising mains	yes/no		
(b)	Common Effluent Drainage Scheme (i.e. septic tank with liquid flowing into low grade shallow gravity pipework)	yes/no		
(c)	Pressure system	yes/no		

Water Resources				
2.9	Please provide an estimate of the type of water resources used for water production from all schemes.	% of total production		
(a)	Ground water intakes (boreholes)	%		
(b)	Spring water intakes	%		
(c)	Surface water intakes (rivers and dams)	%		
(d)	Seawater intakes (desalination)	%		
(e)	RAIN Water Harvesting	%		

Service Area Features				
2.10	Topography of area of coverage			
(a)	Minimum elevation	m (above SL)		
(b)	Average elevation	m (above SL)		
(c)	Maximum elevation	m (above SL)		

PWWA BENCHMARKING PROJECT - 2013

SECTION 3 - VOLUMES PRODUCED AND WATER RESOURCES

PRIMARY DATA (REQUIRED)

Water supply		Units	Response		Utility Comments
3.1	Total volume of water produced - total (Includes volume of water sourced from all sources or volume of water produced at treatment facilities.)	ML/annum			
3.2	Volume of water treated (please describe type of 'treatment' in the far column)	ML/annum			
3.3	Has a water audit been prepared for your utility in accordance with the IWA method? *(PLEASE ANSWER YES / NO AND PROVIDE DETAILS IN RIGHT HAND COLUMN)*	YES / NO			
3.4	Total Volume of Billed Authorised Consumption	ML/annum			
(a)	What is the volume of water billed to your customers through operating meters?	ML/annum			
(b)	What is the volume of water billed to your customers through other means - i.e. flat rates, estimated consumption, tanker supply etc	ML/annum			
3.5	Total Volume of Non Revenue Water (= result 3.1- result 3.4)	ML/annum			
	Volume of NRW as % of production (=result 3.5/result 3.1 x 100%)	%			
3.6	Unbilled authorised consumption:				
	Is all authorised consumption billed to your customers? If not, then what is the estimated volume of this metered consumption which is 'free water'? E.g the utility may for certain situations provide free water to some customers villages / communities	ML/annum			
Water Resources					
3.7	What is the major water resource constraint for you? *(PLEASE SELECT THE MOST APPROPRIATE REASONS FROM THE LIST BELOW by marking an "X" and explaining in the right column)*	-	Explanatory Comments		
(a)	Natural yield of the source (e.g. Low volume groundwater resources with inadequate recharge from rainfall)	-			
(b)	Existing infrastructure limitation (e.g. Capacity of pumps, capacity of dams / pipelines, power outages that limit pumping)	X			
(c)	Cost of infrastructure expansion (e.g. Cost for new dams or pumps)	-			
(d)	Land ownership and access issues (e.g. Private or village ownership of land in areas which could benefit the broader community)	-			
(e)	Source water quality issues (e.g. Saline intrusion to aquifers, sanitary issues with surface water)	-			
Sewerage			N/A		
3.8	Estimated volume of sewage collected by your authority (i.e. transported in your sewerage network of pipes and pumps)	ML/annum			
3.9	Total volume of sewage treated by your authority	ML/annum			
(a)	Volume of sewage treated (to primary standard only)	ML/annum			
(b)	Volume of sewage treated (to secondary standard or above)	ML/annum			
For sewage, secondary treatment or above means anything more than screening, clarification and grease removal.					
3.10	Capacity of all sewage treatment facilities	ML/day			
3.11	Typical flows during dry and wet weather				
	Typical dry weather flow in previous year	ML/day			
	Typical wet weather flow in previous year	ML/day			

SECTION 4 - CUSTOMER INFORMATION

PRIMARY DATA (REQUIRED)

Water supply

			Response	Utility Comments
4.1	Total number of direct (active) water connections	No.		
(a)	Number of residential connections	No.		
(b)	Number of non-residential connections (i.e. industrial, commercial, community, institutional, government)	No.		
(c)	Number of public standposts (total) (i.e. those currently in use - not those abandoned)	No.		
(d)	If you do not have a reticulated water network, how many 'customers' do you serve by means of supply through tank trucks?	No.		
4.2	Average population served per connection			
(a)	avg number of persons served by residential connection	person/connection		
(b)	avg number of persons served by public standpost	person/connection		
(c)	avg number of persons served by tank truck	person/connection		
4.3	Total population served with water services by the water utility	Persons	multiply 4.1 x 4.2	
(a)	Current population served with water supply - direct connection	Persons		
(b)	Current population served with water supply - within 200m of standpipe	Persons		
(c)	Current population served with a tankered supply under normal operating conditions (i.e. not emergency or back-up supply)	Persons		
4.4	Total population within jurisdiction of water utility	Persons		
4.5	Total number of service connections with functional meters (i.e. only meters that are functional) - both direct connections and standpipes	No.		

Sewerage

4.6	Total number of active sewerage connections	No.		
4.7	Total population served with sewerage services by the water utility	Persons		
4.8	Total population within jurisdiction for sewerage services of utility	Persons		

Customer Complaints

4.9	How many customer complaints did you receive in the previous financial year?	No.		
4.10	Do you have a customer charter which specifies your proposed service levels and response commitment?	Yes/No		
4.11	Is that customer charter communicated to your customers? If so, how?	-		
4.12	How do you proactively find out the views of your customers? Place a "X"	-		
	Letters, telephone calls etc from customers	-		
	Inviting customers' views through radio, TV or other publicity	-		
	Questionnaire survey	-		
	Other (please state)	-		
4.13	Are the following types of complaints recorded? (PLEASE ANSWER YES OR NO)			
	Faults / outages	Yes/No		
	Leaks	Yes/No		
	Water quality problems	Yes/No		
	Connection, billing, metering issues	Yes/No		
	Financial hardship	Yes/No		
	Other (please state)	Yes/No		
4.14	What is the most common legitimate complaint to your utility? (i.e. of those listed in question 4.13 above)	-		
4.15	Do you have a system for logging and managing customer complaints?	Yes/No		

PWWA BENCHMARKING PROJECT

SECTION 5 - SERVICE LEVELS & SYSTEM PERFORMANCE

PRIMARY DATA (REQUIRED)

Water supply		Units	Response	Utility Comments
5.1	How many customers received intermittent supply under normal operating conditions?	No. Customers		
5.2	What is the average or typical duration of supply in hours / day	Hrs/day		
5.3	What is your minimum desired water pressure at the customer's property boundary?	m		
5.4	Total number of main breaks for the previous year	No.		
5.5	Total energy usage for the water supply			
	Electricity usage (KWH)	KWH		
	Diesel (liters)	Liters		
5.6	Total energy cost for water supply	$/annum		
5.7	Energy source (please consult your energy provider) (For example, hydro power, diesel generation, wind power, solar).			
	Hydropower			
	Diesel generation			
	Natural gas (LNG)			
	Wind power			
	Solar power			
	Coal based power			

Sewerage				
5.8	Do you have uncontrolled overflows from your sewer network?	yes/no		
5.9	If yes, how many times per year do you have uncontrolled overflows?	No.		
5.10	Total energy usage for sewerage			
	Electricity usage (KWH)	kWH		
	Diesel (liters)	liters		
5.11	Total energy cost for Sewerage	$/annum		
5.12	Energy source (please consult your energy provider) (For example, hydro power, diesel generation, wind power, solar). Please mark with an "X".			
	Hydropower			
	Diesel generation			
	Natural gas (LNG)			
	Wind power			
	Solar power			
	Coal based power			

PWWA BENCHMARKING PROJECT

SECTION 6 - HEALTH AND ENVIRONMENT

PRIMARY DATA (REQUIRED)

Water supply		Units	Response	Utility Comments
6.1	What drinking water quality guidelines do you use?	-		
6.2	Who is your health / water quality regulator?	-		
6.3	Do you have a water quality monitoring program?	yes/no		
6.4	How many of your supply schemes have a drinking water safety plan?	No.		
6.5	How many of the Plans have been externally verified and audited?	No.		
6.6	Is drinking water quality compliance information publicly available?	yes/no		
6.7	Does your water utility own and operate its own water quality testing laboratory?	yes/no		
6.8	If yes, is your laboratory independently certified or checked for quality of results? And by who (i.e. Which organisation?)	-		
6.9	Is your water quality compliance testing done by your utility or your water quality regulator?	yes/no		
6.10	What do you believe are your most critical water quality issues? (please place a cross)			
	Raw water physical parameters - e.g. turbidity, total suspended solids, colour, salinity, total dissolved solids	-		
	Raw water chemical parameters - e.g. high iron / high manganese, nitrates	-		
	Treatment effectiveness - appropriate technology, operations	-		
	Operator skills	-		
	Cost of chemicals / energy etc	-		

Drinking Water Quality - Compliance				
6.11	Total number of microbiological indicator samples taken and tested	No./year		
6.12	Number of microbiological tests passing minimum standard required by water quality guidlines or laws in 6.11	No./year		
	% of samples compliant with microbiology requirements	%		
6.13	Total number of residual chlorine water samples taken and tested according to adopted guidelines or water quality law	No./year		
6.14	Number of residual chlorine tests passing minimum standard required by water quality guidelines or laws in 6.11	No./year		
	% of samples compliant with residual chlorine requirements	No./year		

Sewerage				
6.15	What environmental discharge guidelines do you use? (e.g. SPREP guidelines or local guidelines)	-		
6.16	Who is your environmental / effluent regulator?	-		
6.17	Do you have a sewage effluent quality monitoring program?	yes/no		

Environmental discharges - Compliance				
6.18	Total number of treated sewage samples	No.		
6.19	Number of treated sewage samples passing standard for primary treatment	No.		
	% of samples compliant with standard for primary treatment	%		
6.20	Number of treated sewage samples passing standard for secondary treatment	No.		
	% of samples compliant with standard for secondary treatment	%		

PWWA BENCHMARKING PROJECT

SECTION 7 - HUMAN RESOURCE UTILISATION AND DEVELOPMENT

PRIMARY DATA (REQUIRED)

	SECONDARY DATA (TO SUPPORT DATA ANALYSIS)		**UTILITY COMMENTS**
Staffing Numbers and Turnover			
7.1	Total number staff	No.	
(a)	How many of the above staff are working on a partime basis?	No.	
(b)	What would be the full time equivalent of those partime employees?	No.	
7.2	How many of your staff terminated their employment in the previous year (i.e. retirement, resignation, termination for poor performance)?	Persons/ year	
7.3	Of these terminated how many would you consider to be in the category of senior (in terms of responsibility) or management?	No.	
7.4	Total number of technical staff with at least a diploma in engineering or science	No.	
7.5	Total number of staff with a business qualification (e.g. Diploma or higher in accounting, commerce, economics, business, MBA)	No.	
7.6	Total number of engineering staff (i.e. with 4 year engineering degree)	No.	
7.7	Do you have a system for assessing employee satisfaction?	Yes/No	
Training			
7.8	Total number of staff training days throughout the year	days/year	
7.9	What was your (i.e.. your utility's) total training budget for the year?	$/annum	
7.10	Do you keep a training register which shows the training attended by each staff member?	Yes/No	
7.11	Do you have a training or learning and development strategy ?	Yes/No	
7.12	Do you assess the effectiveness of training delivered?	Yes/No	
7.13	What was your (i.e. your utility's) total training budget for the year?	$/annum	
(a)	Training budget for internal training (e.g. the cost of employing trainers internally)	$/annum	
(b)	Training budget for external training (i.e. to external training institutes, universities, colleges etc)	$/annum	
7.14	In addition to your own internal training budget, can you estimate what value of training was delivered by external sources of funding (e.g. under Tas, donor funded projects etc)	$/annum	
7.15	Similarly, what number of training days were provided by externally funded sources?	days/year	
7.16	What do you consider the most important training needs for your staff? Select one of the following? And specify in the right column	select using X	Please specify the type of training
(a)	technical training		
(b)	administrative		
(c)	financial		
(d)	management/governance		

PWWA BENCHMARKING PROJECT -

SECTION 8 - FINANCIAL

PRIMARY DATA (REQUIRED)

Financial Year and Statements		Units	Total / Overall	Utility comments
8.1	In which month does your financial year begin? (e.g. July each year or January each year or other month)?	-		
8.2	What is the currency in which your financial information is presented in this section? (e.g.: $USD, $AUD, $TOP, $NZD, $FJD etc.). Please input financial data using your own currency?	-		
8.3	Please attach your previous year's annual financial statements (preferably audited however unaudited is okay)	-		

Total Operating Cost				
8.4	Total Operating (recurrent) costs excluding depreciation	$/annum		
8.5	Of the total operating costs per question 8.4 above, please provide the following costs:	$/annum		
(a)	Energy costs (electricty and fuel/diesel costs for all assets including buildings, transport, power for water and wastewater assets)	$/annum		
(b)	Purchases of raw water	$/annum		
(c)	Chemical costs	$/annum		
(d)	Maintenance costs (Repairs, Preventative maintenance)	$/annum		
(d) (i)	If part of your maintenance costs are contracted out can you estimate or provide the total value of contracted out services?	$/annum		
(e)	Total labour costs (incl admin. & corporate/management)	$/annum		
(f)	Overhead (admin., communication, ict, advertising & corporate etc. excl labour)	$/annum		
(g)	Annual depreciation	$/annum		
(h)	If you have any external borrowings what is the cost of servicing your debt per year (i.e. how much is the annual interest expense?)	$/annum		

Total Operating Revenue				
8.6	Total operating revenue	$/annum		
(a)	Actual revenue from water sales (i.e. consumption + fixed charge)	$/annum		
(b)	Revenue from sewerage services	$/annum		
(c)	Other water related revenue (e.g. New connections, materials, sales)	$/annum		
(d)	Operating subsidies and grants (for operating expenses only) or government funding for community service expenditures.	$/annum		

Collection Rates				
8.7	Cash income (i.e.. actual revenue in the form of cash collected or receipted from billed water sales)	$/annum		
8.8	End of financial year accounts receivable (gross) balance	$/at year end		
8.9	Your provision or allowance for doubtful debts at the end of the financial year	$/at year end		

Affordability				
8.10	New connection fee (typical domestic connection fee)	$/ connection		
8.11	Average tariff per m3 (billed revenue/water consumed) - *PLEASE ATTACH SEPARATE SHEET WITH YOUR TARIFF POLICY FOR RESIDENTIAL AND NON RESIDENTIAL*			
8.12	Average annual water bill for average consumption of 6m3 per month *(PLEASE CALCULATE)*	$/annum		

Asset values				
8.13	What is the net book value (or written down value) of your total assets at financial year end (i.e.: net book value = total asset cost minus accumulated depreciation)?	$		
8.14	What is the total asset cost at financial year end (total historical cost)?	$		
8.15	What is the average age of your total assets in years?	Years		

PWWA BENCHMARKING PROJECT ·

SECTION 9 - DATA RELIABILITY

PRIMARY DATA (REQUIRED)

			Utility Comments
9.1	How is the volume of water produced calculated or derived? (PLEASE PLACE A CROSS AGAINST THE MOST APPROPRIATE ANSWER)	Please place a "X"	
a	The quantity of water produced is computed on the basis of measurement by bulk flow meters at the outlet of the treatment plant and/or at all bulk production points, which are calibrated / verified for accuracy at least every 2 years. The volume of losses and bulk industrial consumption are periodically monitored.		
b	The quantity of water produced is estimated on the basis of measurement of period sample surveys of production flows at all bulk production points (i.e. short term monitoring, not continuous monitoring). Reliable estimates of transmission losses and industrial water consumption are available.		
c	The quantity of water produced is estimated on the basis of assumed pump capacities and efficiencies, and pump run hours.		
d	The quantity of water produced is estimated on the basis of operator judgement or turnover of reservoirs (e.g. Use 50% of the volume of a 10ML reservoir every day).		
9.2	How is the volume of water consumed calculated or derived?		
a	Metering is undertaken at all key distribution nodes (entry to DMAs) and at the consumer's end for all categories of consumers. Billing records and databases clearly reveal regular reading of meters and, therefore, the total quantum of water billed to consumers in the given time period (month/bi-monthly).		
b	The quantum of water sold is based on the metered quantity for bulk and commercial consumers. For households, ferrule size (the size of the distribution pipe outlet at the consumer end) of each consumer connection as well as the hours of supply are known, to compute the quantum of water sold.		
c	Meters are installed for a select category of consumers, such as commercial and bulk consumers. For other categories of consumers, such as domestic consumers, the number of such consumers and the average consumption per consumer are considered, to arrive at the quantum of water sold.		
d	Very few meters have been installed in the distribution system and at the consumer end. The quantity of water sold to the category of consumers to whom bills are raised is estimated on the basis of assumed average consumption in that category and the number of consumers in that category.		
9.3	How is the number of connections or customers calculated?		
a	Billing records and databases clearly identify consumers with metres (against a specific meter serial number). Billing processes reveal regular reading of meters and meter readings are the basis for charging consumers. Records on standposts are available. Databases of water connections and meters are complete and spatially referenced with a GIS database. There is a mechanism to identify faulty meters and repair meters. Processes for installation of new water connections, installation of meters and generation of water bills based on this are interlinked, and the data systems enable such continuity of data flow regarding these.		
b	Database/ records reveal the list of consumers that have meters installed in their water connections. However, there are no clear data on functioning of metres, and no linkage with the billing system that may or may not use metered quantity as the basis for billing.		
c	Meters are installed for only certain categories of consumers. It is assumed all consumers of these categories have meters installed which are functional and used as the basis for billing. Records do no reveal the exact number of connections which are metered. Water is charged on the basis of average readings for the consumer category (e.g. kL/connection/year) or on the basis of past trends in most cases.		
d	A few meters have been installed. All installed meters are assumed to be functional and used as the basis for billing water charges.		
9.4	How is the population derived?		
a	The population served is known with reasonable accuracy. Any expansion of municipal limits and other significant factors are measured and factored into the current population computation. The floating and/or seasonal population is estimated with reasonable accuracy.		
b	The population served is calculated on the basis of census figures less than 5 years old, extrapolated to current levels. Reliable estimates of the floating population are not available.		
c	The population served is calculated on the basis of past census figures more than 5 years old, extrapolated to current levels. Reliable estimates of the floating population are not available.		
9.5	Where is the financial information sourced from?		
a	Highest/preferred level In case of multi-function agencies such as municipal corporations, the of reliability (A) budget heads related to water and sanitation are clearly separated. Cost allocation standards for common costs are in place. An accrual based double entry accounting system is practiced. Accounting standards are comparable to commercial accounting standards with clear guidelines for recognition of income and expenditure. Accounting and budgeting manuals are in place and are adhered to. Financial statements have full disclosure and are audited regularly and on time.		
b	Budget heads related to water and sanitation are segregated. Key costs related to water and sanitation are identifiable, although complete segregation is not practiced (for example, electricity costs for water supply services are not segregated from overall electricity costs of the ULB). Key income and expenditure are recognised based on accrual principles. Disclosures are complete and are timely.		
c	There is no segregation of budget heads related to water supply services and sanitation from the rest of the functions of the agency. A cash-based accounting system is practiced. There are no clear systems for reporting unpaid expenditure, or revenues that are due. Disclosures and reporting are not timely. Audits have a time lag and are not regular.		

Note: These reliability grades have been adopted from the following key sources

Handbook of Service Level Benchmarking, Ministry of Urban Development Government of India

Guidelines for Audit and Review Strategic Asset Management Plan

PWWA BENCHMARKING PROJECT

SECTION 10 - UTILITY COMMENTS

SECONDARY DATA (TO SUPPORT DATA ANALYSIS)

10.1	**Please list your current 5 problems/challenges to manage and operate your utility**
a	
b	
c	
d	
e	
10.2	**Please list your top 5 problems areas in the foreseeable future**
a	
b	
c	
d	
e	
10.3	**Please list the top 5 areas where you believe PWWA can assist you in addressing these problem areas**
a	
b	
c	
d	
e	

PWWA BENCHMARKING PROJECT -

SECTION 11 - MAINTENANCE (SPECIAL SUBJECT)

PRIMARY DATA (REQUIRED)

Maintenance Plan & Budget		Units	Total / Overall	Utility comments
11.1	Do you have a maintenance plan in your utility?	yes/no		
11.2	What is the annual budget allocated for Maintenance?	$/annum		
11.3	How would you judge the level of maintenance of your Utility?	good/average/poor		
Preventative Maintenance				
11.4	Provide frequency of routine maintenance activities on:			
(a)	raw water intakes	frequency/annum		
(b)	pumping stations	frequency/annum		
(c)	chlorination units	frequency/annum		
(d)	reservoirs	frequency/annum		
(e)	pipelines	frequency/annum		
(f)	fire hydrants	frequency/annum		
(g)	service connections	frequency/annum		
(h)	sewer piplines	frequency/annum		
(i)	sewage treatment	frequency/annum		
11.4	Do you register number of leak repairs?	yes/no		
11.5	Do you have an up-to-date asset data base?	yes/no		
11.6	Do you have a meter replacement programme?	yes/no		
Corrective Maintenance				
11.7	Do you register number of leak repairs?	yes/no		
11.8	If yes how many repairs you have made in the past year?	no/annum		
11.9	Do you register blockages in your sewer network?	yes/no		
11.10	If yes how many repairs you have made in the past year?	no/annum		
Risk of Climate Change				
11.11	Has your utility considered the risk of climate change and natural disasters in the design and/or maintenance of your long term assets	yes/no		
11.12	Has your utility ever approached your government or a development partner for support in assessing and/or planning for the risks of climate change or disaster risk management?	yes/no		

Guidance notes to accompany data questionnaire

Introduction/Instructions

Data questionnaire submission instructions

The questionnaire has been emailed to you as an electronic Microsoft Excel file. At this stage you have three (3) options for completing it (OPTION A is preferred):

- **OPTION A** – Complete the electronic version (in Excel) and email it to the PWWA Project Officer, Mrs Fiona MacKenzie (fiona@pwwa.ws), and to Mr Latu Kupa (latu@kew.com.ws) (PWWA Executive Director). Please send copies to the Regional Benchmarking Consultant in Apia, Samoa - Mr Ernest Betham (ernest.betham@gmail.com) and the International Benchmarking Consultant Mr Albert Thiadens (thiad019@planet.nl) to ensure effective data back up and prompt responses; OR
- **OPTION B** – Complete by hard copy and scan and email as per option A.
- **OPTION C** – Complete by hard copy and fax (or mail) to Latu Kupa, the Executive Director of Pacific Water and Wastes Association at the following contacts: Fax : +685 28885 or Mail: PWWA, PO Box 848, Apia, Samoa.

PLEASE COMPLETE THE QUESTIONNAIRE BY 20th SEPTEMBER 2013. IF YOU HAVE DIFFICULTIES OR QUESTIONS, OR SIMPLY WOULD LIKE TO DISCUSS, PLEASE CONTACT ERNEST BETHAM AND WE WILL HELP YOU COMPLETE THIS QUESTIONNAIRE WITH THE MOST ACCURATE DATA POSSIBLE. EMAIL: ernest.betham@gmail.com, PHONE: work+(685)24337 or mobile +(685)7773501 or +685(7523501). ALTERNATIVELY, CONTACT ALBERT THIADENS ON thiad019@planet.nl

PLEASE ENSURE YOU COMPLETE THE CHECKLIST ON THE FINAL PAGE AND RETURN IT WITH YOUR QUESTIONNAIRE

Data questionnaire contents

The data questionnaire comprises 11 separate questionnaire worksheets for each data category required. Question categories: 1. Contacts and Utility; 2. Schemes and Assets; 3. Volumes; 4. Customers; 5. Service Levels; 6. Health and Environment; 7. Staffing; 8. Financial; 9. Data Reliability; 10. Utility Comments; and 11. Maintenance.

Reliability grades for key data

Worksheet Questionnaire 9 Data Reliability contains some indicators to assist you in assessing the reliability of the data used to complete the questionnaires. Please tick the data source for each data reliability indicator on worksheet 9 for each section.

Reporting period

All data needs to be reported using a consistent reporting period for your utility. Because financial data is reported in a financial year, and much of the planning around utility operations occurs in parallel with budgeting, this benchmarking exercise will adopt a financial year as a standard reporting period. You will be asked in Section 8 (Financial) to state the start months of your financial year. When reporting all other data (e.g., volumes, water quality sampling, connections, etc), please ensure you adopt this standard financial year as your reporting period.

Guidance on Sections and Key Questions

Section 1 – Utility Contact Details and Utility Information

This section should be self-explanatory. Please provide details of the CEO and nominated benchmarking contact person in your organisation. Answer some simple questions to give an understanding of the type of water business you manage and the type of water and sewerage services you provide.

Section 2 – Schemes and Assets

You may not have all the required data available. For those estimate to the best of your knowledge. This year we left out the questions on the details of your assets as we consider that these data have not been considerably changed since last year.

Section 3 – Information on Volumes of Water and Sewage

Answer the questions relating to water and sewage volumes to the best of your ability. These questions are amongst the most critical as they underpeg many performance indicator calculations. Answer them and comment in the far right-hand column to give us the information to calculate various indicators later. Some guidance on the most critical data follows:

Question 3.1 – Volume of water produced

The volume of water produced can be calculated using the following methods (decreasing order of reliability):

- records from bulk flow meters on the outlets of water treatment plants, bores, and reservoirs where available (depending on the reliability of the flow meters);
- flow records through weirs/flumes at water treatment plants;
- sale of bulk water to your utility (from another utility);
- bore pump run hours x flow capacity (e.g., you know the pump capacity is 10 L/s and the pump usually operates for 12 hours per day, which equates to 10 L/s x 3600 seconds/hour x 12 hours = 432,000 L or 0.43 ML/day or 158 ML/annum); and
- rate of filling of reservoirs (e.g., you know the volume of a reservoir such as 10 ML, and you know that it takes around 12 hours to fill it, that equates to 230 L/s).

Similar methods can be used for volume of treated water and untreated water.

Question 3.4 – Volume of billed authorised consumption

The volume of water 'consumed' (following international definitions) can be calculated using the following methods (decreasing order of reliability):

- For utilities with 100% metering (e.g., WaterPNG, Eda Ranu (PNG), Tonga, ASPA) – the billed authorised consumption will be the sum of the metered volume (for operating meters) plus estimates of non-operating meter flows (e.g. errors/broken/not read).
- For utilities with partial metering – the billed authorised consumption will be the addition of:
  - sum of metered volume (for operating meters); and
  - estimate of all others based on unit consumption from billed meters (e.g., if typical metered household consumption is 0.5kL/day and you have 1,000 connections which are not metered or the meter is not functioning, then the billed unmetered consumption will be 0.5 kL/connection/day x 1,000 connections = 500 kL/day).
- For utilities with no or limited metering – the metered component of the billed authorised consumption will be close to zero. The larger part of this will be the billed unmetered consumption. Means of calculating this will include:
  - adopting unit or household rates from previous donor funded studies (ADB? JICA? WB? Other?) or pilot studies; and
  - adopting the assumed household rate from your tariff policy.

Question 3.6 – Unbilled authorised consumption

Please estimate any authorised consumption (i.e., the customer has authorisation from the utility to take the water) which is not billed to customers. In some countries, this is 'free water' and can include:

- free water for villages/communities/government institutions/schools where negotiated in the past.
- other public activities such as fire fighting and training, flushing of mains and sewers (including for water quality sampling), street cleaning, watering of municipal gardens, public fountains, building water, etc.

Question 3.8 – Volume of sewage collected

Similar to Question 3.1 (volume of water produced), there are methods for calculating the flow rate of sewage collected, which include:

- records from bulk flow meters on the inlet to sewage treatment plants outlets, which obviously depends on the age and the reliability of the flow meters;
- pump runs hours x flow capacity of major sewage pumping stations transferring flow to the STP;
- number of sewage connections x an assumed unit loading rate; and
- ratio of sewage to household water consumption in areas where this ratio can be calculated, then applied across the board to all connections.

Question 3.9 – Volume of sewage treated (to varying standards)

Further to knowing the volume of sewage collected, it is also useful to know the volume of sewage treated to varying standards. Similar methods and reliability grades will apply to this question, however, please use the definition for primary treatment below to guide your calculation.

Typical primary sewage treatment processes may include clarification (with or without chemical treatment, to accomplish solid-liquid separation) or grease removal. Any sand filtration, disinfection, polishing steps, activated sludge processes, anaerobic + aerobic processes, biological filters and lagoons (aerated, facultative, maturation or polishing) are considered secondary processes and should be included in the category 'secondary or better'.

Question 3.10 – Capacity of sewage treatment facilities

This should relate to the rated design capacity of sewage treatment plants during typical operating conditions (not wet weather). Lower reliability grades will relate to facilities with unknown capacities.

Question 3.11 – Dry and wet weather flows

Similar to other volume estimates in the previous questions, flows can be calculated differently and the reliability grade should reflect this. It is likely that the reliability grade for wet weather flows will be lower due to the low frequency of such events and records.

Section 4 – Customer Information

Similar to Section 3, these questions will be critical to the benchmarking exercise and underpeg many of the comparisons. Some guidance follows:

Question 4.1 – Total number of connections to the network

This refers to the number of active direct water connections at year-end. All active connections should be counted – residential, non-residential, but exclude inactive connections to vacant buildings.

Question 4.2 – Average population served per connection

To calculate in 4.3 the total population your utility serves, provide the average number of persons served by either a direct residential connection, a public stand post, or a tanker-supplied reservoir.

Question 4.4 – Population served by water supply

This question relates to the number of people your water utility serves who live in its jurisdiction. This figure can be derived differently, so adopt the most accurate method for your supply area. Assess the population, under the utility's responsibility, with access to water through house connections, yard taps, and public water points (either with a direct service connection or within 200m of a stand post). Exclude any people outside the utility's area of responsibility who are served (e.g., people who come from outside to the utility's water points). Derive population figures from

- census data;
- statistics office;
- previous planning or demographics studies; or
- GIS – billing/water supply zones laid over census data.

Question 4.5 – Number of meters

This question relates to the total number of meters installed within the network (those operating and those that are not). Active meters means the number of operational meters (i.e., functioning) on active properties (i.e., exclude inactive connections to vacant buildings). Ideally, the information on the number of these meters should come from a billing database, customer database, or metering database.

Questions 4.6, 4.7, and 4.8 – Connections and populations for sewerage
Similar to the previous questions on connections and populations for water, these two questions relate to sewerage and similar methods can be used to derive these numbers.

Questions 4.9 to 4.16 – About customer complaints
These questions are qualitative and intended to guide our understanding of your focus on customer service. Answer them as best you can.

Section 5 – Service Levels

Questions 5.1 to 5.2 – Intermittent supply
Question 5.1 requires an estimate of the number of customers receiving intermittent supply under normal operating conditions. This excludes customers who receive intermittent supply during specific failure or emergency periods.

Question 5.2 relates to the average hours of pressurised supply per day. Assess this at a water supply zone level, and exclude hours of supply where the pressure is less than the minimum standards for pipe water supply.

Question 5.4 – Main breaks
Not all utilities will be able to report this number. The purpose is to report the number of breaks in potable and non-potable water mains, as a proportion of the total length of such mains that the water utility services. It partially indicates customer service and the condition of the water main network. The quoted number should be the number of main breaks, bursts, and leaks in all diameter water distribution and reticulation mains for the reporting period. Breaks exclude those in the property service (mains to meter connection) and weeps or seepages associated with above ground mains that can be fixed without shutting down the main.

Question 5.5 – Total energy usage
If possible, state the total ener your utility consumed for the reporting period in producing and transmitting water and collecting and treating sewage. If possible, break this down to water and sewerage (5.12) as separate categories. Typically, this information should be available on energy bills or invoices and may be collated to an overall utility level. In some cases where your energy is not provided from electricity please indicate the amount of fuels (diesel) you have used.

Question 5.6 – Total energy cost
State the total cost of energy your utility consumed for the reporting period in producing and transmitting water and collecting and treating sewage. If possible, break this down to water and sewerage as separate categories. This information should be available on energy bills and may be easier to access than the energy usage figures.

Question 5.7 – Energy source
This question aims to understand the predominant energy types provided by Pacific energy service providers and for water utilities. It is unlikely that your energy bill will have this type of information; instead it is more likely to be general information available for your country. Answer this question as best you can. Typical centralised energy sources throughout the pacific may include:

- Solar power
- Hydropower
- Wind power
- Natural gas (LNG)
- Diesel-fired generation
- Bio-fuels
- Coal based power

Questions 5.8 and 5.9 – Sewer overflows
The number of overflows may partially indicate the capacity and condition of the sewerage network, as an indication of how effectively the network is being managed and may also be used to compare customer service.

You should include the number of occurrences in the reporting year when untreated sewage spills or discharges and escapes from the sewerage system (pumping stations, pipes, maintenance holes, or designed overflow structures) to the external environment, regardless of whether they are reported to an environmental regulator. Overflows are those caused by system faults originating in the system under the water utility's responsibility.

Section 6 – Health and Environment

This section focuses on a critical water and wastewater management objective – to improve health and environmental outcomes. Answer the questions relating to water and sewage volumes as best you can. . These questions are amongst the most critical as they will underpeg many of the benchmarking calculations. Answering these questions as best you can and providing comments in the far right hand column will provide us with the information to calculate various indicators at a later stage and to design future indicators.

Some guidance on the most critical data follows:

Question 6.10 is particularly your opportunity to provide feedback on your greater water quality challenges.

Questions 6.11 and 6.12 – Focus on microbiological monitoring

Pathogens are by far the most common and widespread health risk associated with drinking water, and therefore should be our early focus. Chemical parameters will be the focus of future benchmarking exercises. Microbiological monitoring refers to *E. coli* or *Thermotolerant coliform* monitoring of water delivered to customers. Ideally, this should be monitoring across the network, not only at a treatment facility outlet.

It is recognised that *E. coli* monitoring will likely occur across a number of schemes regardless of any treatment, in particular chlorination. This section therefore relates to treated and untreated schemes.

Typically, the microbiological tests will be plate counts for total or faecal coliforms. Typical targets for coliform counts should be zero per 100ml; however, in setting a target 'pass rate', your utility may make provide for sampling errors (expect 0 counts per 100ml 90% of the time).

Questions 6.13 and 6.14 – Water quality compliance – residual chlorine

Following on from the previous questions, questions 6.13 and 6.14 focus on the effectiveness of the chlorination at the treatment facility and its longevity in the network. Similar to the microbiological questions, Question 6.13 requires you to state how many residual chlorine samples are to be taken under your own sampling regime. Question 6.14 then requires you to state the 'pass mark' (minimum 0.2mg/l residual chlorine within the network).

Ideally, the data required should be stored in a water quality sampling and results database. The following affect data reliability:

- sampling only at treatment plant outlet vs. sampling at random locations throughout the network;
- flushing sampling points;
- recording results in a centralised database; and
- Ensuring accreditation and independence of the sampling laboratory.

It is recognised that operational monitoring of residual chlorine at the WTP will be more frequent than the surveillance monitoring undertaken in the network. Focus your answers on the surveillance monitoring the water service provider undertakes at the WTP and throughout the network; not the monitoring your regulator undertakes.

Questions 6.15 to 6.20 – Sewerage and environmental discharges – Compliance

Similar to the previous questions on drinking water quality compliance, these questions relate to sewage treatment compliance. The previous guidance for drinking water quality also relates to these questions.

Section 7 – Human Resource Utilisation and Development

Answer the questions relating to human resources utilisation and development as best you can. Answering these questions and commenting in the far right hand column will give us the information to calculate various indicators later and to design future indicators. However, this is not intended to be a detailed human resources (HR) analysis. Other factors, including job satisfaction, training effectiveness, and motivation will influence human resource development. Some guidance on the most critical data follows:

Question 7.1 – Total number of staff

This question refers to the total number of staff working on water and wastewater services at the utility. Report using full time equivalent staff numbers (FTEs), which will include full-time staff plus long-term casuals at year-end (at the end of the reporting period).

Do note the following guidance when including casuals: if you have one casual worker who works an average of 20 hours weekly and your standard week is 40 hours weekly, then that person is a 0.5 FTE. These 'casual' FTEs should be added to the full-time staff to calculate the total FTE.

Questions 7.2 and 7.3 – Staff turnover

Include the total of the number of employees who resign for whatever reason, or retire, plus the number of employees terminated for performance reasons. Employees lost due to reductions in force (RIF) will not be included in this calculation (change in retirement age causing large groups of people to return, corporatisation activities making staff redundant).

Questions 7.8 to 7.15– Staff training

These questions relate to the type and amount of training for the utility staff as well as the identified training needs.

Section 8 – Financial

Question 8.1 – Reporting period/Financial year

State the start month of your financial year. The most recently available previous financial year information must underpin all your data reporting.

Question 8.3 – Financial statements

Separately attach a copy of your financial statements from the most recent financial year completed. If your organisation has separate financial reporting, provide the entire set of financial statements comprising:

- income statement, statement of financial performance, or profit and loss statement;
- balance sheet or statement of financial position;
- statement of cash flows; and
- notes to accounts.

If your organisation has no separate financial statements (government departments), summarize the previous financial year's actual expenses and revenues.

Questions 8.4 to 8.5 – Total operating (recurrent) costs

This question affects different financial indicators and therefore it is critical that the definition is well understood. This figure should include all operational expenses, but exclude depreciation and financing charges (interest expense on external borrowings). In this context, by operational we mean 'OPERATING YOUR BUSINESS,' not 'OPERATING YOUR ASSETS'. The distinction is that the cost of operating your business *must include labor, overheads, and indirect and/or administration costs*. These recurrent operating costs (operations, maintenance and administration – OMA) should include at least the following:

- water resource access charge, land charges, or resource rent tax;
- purchases of raw, treated, or recycled water;
- charges for bulk treatment and transfer of sewerage to other treatment utilities;
- salaries and wages (including direct operating staff, and non-direct staff including management and corporate);
- overheads on salaries and wages;
- materials, chemicals, energy;
- other government charges, which may include land tax, debits tax, stamp duties, and council rates; and
- indirect costs should be apportioned to water and sewerage services.

Operating costs should EXCLUDE the following: (see note below)

- depreciation;
- interest and financing costs – interest expense on external borrowings;
- any impairment write-downs of assets to recoverable amounts;

- write-offs retired or scrapped assets; and
- written down value of assets sold.

Question 8.5 asks you to provide specific cost components of the total operating (recurrent) costs such as:

- energy;
- purchases of raw water;
- chemical costs;
- maintenance costs such as repairs, preventative maintenance, etc;
- total labour costs;
- overhead costs (administration, communication, ICT, advertising, corporate costs etc.);
- annual depreciation; and
- interest expense or interest costs on external borrowings.

Question 8.6 (a) to (d) – Total operating revenue

The question requires you to provide the total operating revenue and then itemise this revenue using billing of water and wastewater services, other operational revenues (connection fees, well abstraction fees, and reconnection fees), subsidies, and community service obligations. For subsidies and grants,only include grants for operational costs, not capital grant components.

Question 8.7 – Cash income

The cash income is the revenue collected for bills raised during the year (tally the cash that was collected during the year from invoicing or billing of water related revenue? This should ideally exclude collection of arrears, as including arrears will skew the performance reflected.

Questions 8.10 to 8.12 – Affordability issues

At Question 8.10, please insert the charge for a standard new domestic connection. We will collect GNI/GDP data from centralised sources (World Bank) and calculate the ratio.

At Question 8.11, please attach the details of your tariff policy for residential and non-residential customers.

Section 9 – Data reliability

To assess the reliability of some key data for the indicators we include this section with cross-referencing questions.

Section 10 – Utility comments

This section enables you to indicate the main issues and challenges to operate and manage your utility in the current and future situations. It also allows you to indicate the PWWA services you may need when addressing these problem areas.

Section 11 – Maintenance

As a special topic to this year's benchmarking we have include a maintenance section. It allows you to indicate your utility's present maintenance performance level, and the company's position on climate change or disaster risk management.

Checklist for Data Questionnaire Completion

		Comments / areas requiring assistance
1. Have you nominated a key contact for benchmarking in the Questionnaire in *Section 1 - Contacts and Utility* and provided contact details?	☐	
2. Have you answered the questions in *Sections 1 through to 11,* relevant to your business, to	☐	

the best of your ability? Please be sure to make notes in the column provided to clarify your answers or request assistance.		
3. Have you answered all questions in *Section 9 – Data Reliability* regarding sources of data and data reliability?	☐	
4. Have you included a copy of your latest audited financial statements? If no such information is available, use the previous year's actual vs. budget costs and revenues.	☐	
5. Have you completed the final *Questionnaire 10* by summarizing the key challenges for your organisation from your own perspective?	☐	

Appendix E: Benchmarking indicator definitions

Refer IB-Net	PWWA No.	Indicator	Units	Definition
	KRA1 - Production			
3.2[2]	V1	Volume of water produced - total produced from sources and treatment	kL/connection/day	Total annual water supplied to the distribution system (including purchased water, if any) expressed in kL/connection/day
	V1b	Volume of water produced – in litres per capita per day	L/capita/day	
4.2[3]	V2	Volume of water sold (i.e. billed) - through meters or estimated unmetered	kL/connection/day	Total annual water sold (both metered and unmetered) expressed in kL/connection/day
	V2b	Volume of water sold per capita	L/capita/day	
	V3	Volume of sewage produced - total	kL/connection/day	Total annual sewage collected (treated and untreated) expressed in kL/connection/day
	V3b	Volume of sewage produced – per capital	L/capita/day	
	KRA2 - Technical Performance			
1.1	O1	Water supply coverage	% of population	Population with access to water services (either with direct service connection or within reach of a public water point) as a percentage of the total population under utility's nominal responsibility
15.1	O2	Continuity of water supply service (hours available)	hours/day	Average hours of service per day for water supply, under normal operating conditions
6.3	O3	Non-revenue water (kL/connection/day)	kL/connection/day	The difference between the volume of water produced and the volume of water for which customers are actually billed (i.e. annual figures for V1 minus V2)
	O3b	Non-revenue water (% of water produced)	%	The NRW =
	O3c	Non-revenue water (kL/km/day)	kL per km of mains per day	
2.1	O4	Sewerage coverage	% of population	Population with sewerage services (direct service connection) as a percentage of the total population under utility's notional responsibility.
	KRA3 - Health and Environment			
15.4	HE1	Drinking water quality compliance - residual chlorine	% compliance	The percentage of samples tested for residual chlorine that passes the relevant standard. Chlorination is generally applied to safeguard the water quality in the distribution network Utilities are required to monitor the residual chlorine within the network
	HE1a	Percentage of customers on treated water	% treated	The percentage of water produced that is treated, which means full treatment of surface water and at least chlorination of water produced from boreholes
-	HE2	Drinking water quality compliance - microbiological	% compliance	The percentage of samples tested for E. coli that passes the relevant standard Most countries apply the EPA World Health Organization standards
17.1	HE3	% of sewage produced which is treated to at least primary standard	% of sewage	Proportion of collected sewage that receives at least primary treatment, i.e., involving settlement with the intention of removing solids, but not biological treatment Both lagoon and mechanical treatment can be included, where appropriate
	KRA4 - Human Resources			
12.2	HR1	Water and sewerage business staff/ 1000 connections	number of FTE/1000 conn	Total number of full time equivalent staff expressed as per thousand connections
	HR2	Training days (no days/year)	days/FTE/year	Total number of training days (both internal and externally provided) per full-time equivalent staff member per year

[2] IB-Net uses m^3/connection/month, although this unit can be easily converted to kL/connection/day. The unit adopted of kL/connection/day is ~~considered~~ more tangible for~~to~~ most utility operators.
[3] Similar to the footnote above, IB-Net uses m^3/connection/month and calls this indicator 'water consumption', although it is the same indicator. Water sold is a more accurate indicator name than water consumed.

Refer IB-Net	PWWA No.	Indicator	Units	Definition
	HR3	Average cost of staff (total labour cost / no of staff/GNI)	$/FTE/GNI PPP	Total labour cost divided by number of full time equivalent staff, a percentage of Gross National Income (based on Purchasing Power Parity (PPP)) per capita
	KRA5 - Customer Service			
7.1	CM1	Meter coverage rate for water supply customers (for all water meters)	% of customers	Total number of connections with operating meter/ total number of connections, expressed in percentage
16.1[4]	CM2	Customer complaints / 1000 connections	number/1000 conn	Total number of complaints received (regardless of whether they were addressed) per 1,000 connections
	CM3	Affordability - new connection	% GNI PPP per capita	Affordability of a typical new residential connection (size to be agreed) as a percentage of Gross National Income (based on Purchasing Power Parity (PPP)) per capita
19.2[5]	CM4	Affordability – average bill	% GNI PPP per capita	Affordability of an average annual water bill per person (excluding wastewater) as a percentage of Gross National Income (based on Purchasing Power Parity (PPP)) per capita
	CM4b	Affordability – 6kL/month/connection	% GNI PPP per capita	Affordability of 6kL monthly water bill per person (excluding wastewater) as a percentage of Gross National Income (based on Purchasing Power Parity (PPP)) per capita
	KRA6 - Financial Sustainability			
24.1[6]	F1	Operating cost recovery ratio (excluding depreciation)	%	The operating cost recovery ratio is defined as the ratio between operating costs (excluding depreciation and debt servicing) and the operating revenues excluding subsidies from water and sewerage sales
23.2	F2	Collection ratio - actual cash income vs. billed revenue	%	Cash income / Billed revenue as a %
23.1	F3	Accounts receivable (debtor days)	days	(Year-end accounts receivable/Total annual operating revenues) * 365
	OV1	**Overall Efficiency Indicator**	**%**	**(1-NRW) x Collection Ratio.** The Pacific benchmark is set at 70% based on approximately 95% collection ratio and 25% non-revenue water
	OV2	**Overall Performance Indicator**	**%**	For each key result area (KRA) the normalised scoring of the indicators are calculated to an average score per KRA Subsequently these KRA scores are then normalised to calculate the combined overall score

[4] IB-Net uses total number of complaints per year expressed as a percentage of the total number of connections. Where number of connections are known this can be easily converted. Complaints per 1,000 connections are a measure more readily used in the water sector in developed countries.

[5] IB-Net uses the affordability of monthly water bill for a household consuming 6m^3 of water per month (Section 8.6 clarifies the reason for adopting an average bill instead of 6m^3/month).

[6] Depreciation is excluded due to the inconsistencies in approaches and accuracy of calculated depreciation.

Appendix F: Benchmarking throughout the world

List of other benchmarking initiatives for comparison:

Country/ Region	Org.	Year	Doc. Type	Document Name
Australia	NSW	2012	Report	State of New South Wales 2010-11 NSW Benchmarking Report
	WSAA	2009-10	Reports	National Performance Report 2009-10 Definitions Handbook
			Reports	National Performance Report 2009-10
			Data	National Performance Report 2009-10 data
	QLD Gov	2008-09	Data	Comparative information QLD local government 2008-09
New Zealand	Water NZ	2009-10	Report	National Performance Review Report 2009-10
Europe	EBC	2011	Report	European Benchmarking Co-operation 2011 Water and Wastewater Benchmark - Learning from International Best Practices
Netherlands		2009	Report	Reflections on Performance 2009
USA	AWWA	2010	Report	2010 Water and Wastewater Rate Survey
South East Asia	ADB	2004	Report	SEAWUN Benchmarking Report 2003
Pacific	ADB/ Castalia	2005	Report	Enhancing Effective Regulation of Water and Energy Infrastructure and Utility Services (Small Island Countries Component) - Interim Pacific Report
	ADB	2005	Report	Performance Benchmarking for Pacific Power and Water Utilities
	PWWA	2010	Data	PWWA preliminary benchmarking
Africa	WSP / WOP	2009	Report	Water Operator's Partnership - Africa Utility Performance Assessment
Worldwide	World Bank	ongoing	Data on internet	IB-NET is a benchmarking tool developed by the World Bank Water and Sanitation Program.

There are numerous water utility benchmarking activities throughout the world as one-off or ongoing programs. The findings of this benchmarking initiative have been compared with the range of indicators in the studies listed in the Table above, where appropriate for each indicator. PWWA set benchmarks based on the 2011 benchmarking results that reflect targeted values for the indicators; PWWA may adapt them from time to time.

Comparisons in the Pacific water utilities are complemented by evaluations against results from previous initiatives from the Pacific and with other jurisdictions. For example, comparisons against Australian and New Zealand utilities could illustrate best practice for larger water and wastewater utilities; comparisons with other small island states or developing country utilities will also provide best practice comparisons and possibly interim targets for medium or small utilities.

Appendix G: Benchmarking workshop in Rarotonga.

The 2013 benchmarking workshop on 11-12 November 2013 in Rarotonga, Cook Islands presented the findings from the benchmarking results and engaged Pacific water utilities in analyzing their benchmarking scores, training needs analysis, and action planning.

Participants from 14 Pacific water utilities participated including representatives from PRIF Coordination Office, PWWA, SPC-AGTD, SPREP, ADB, and the benchmarking consultants.

The international benchmarking specialist led the workshop with the regional financial expert's support.

The workshop began with a presentation of the overall results of the benchmarking indicators. Participants then divided into groups representing large, medium, and small utilities. The group sessions discussed results for each utility in more detail. It was also an opportunity for the utilities to review the findings of their key result areas (KRAs) based on the data submitted. This was followed by a plenary session with selected utilities (Solomon Islands Water Authority, Fiji Water Authority, and Tonga Water Board) presenting the 2013 KRA results.

Day 2 considered the training needs analysis survey with PCO stressing the need to identify any gaps in the utilities and their training needs. Participants then discussed the action plans for 2013 and watched a short video demonstration of IB-Net.

The benchmarking workshop was interactive and utilities discussed the group sessions results in the plenary sessions.

A. Group Sessions Results Day 1 – KRAs for 2013 and Utility Profiles

The utilities considered the following when discussing KRAs:

1. *What actions have you taken to improve your benchmarking results since the last year?*
2. *Describe how you use benchmarking as a management tool to monitor and evaluate your utility's performance.*
3. *What opportunities do you see for cooperation among regional? Since last year have you engaged in any mutual cooperation arrangements with other regional utilities?*
4. *What PWWA support do you require for benchmarking/performance improvement?*

A summary of the responses follows:

1 Actions to improve benchmarking results

- PWWA prepared 'Utility Profile Reports' that profiled each utility. This profiling would assist utilities to target key areas for improvement and should continue. Unfortunately, not all small utilities received these reports for 2012.
- It was agreed that, together with the profile report, a brief version of the benchmarking KPI could be introduced that would allow utilities to use them regularly to better monitor progress.
- There is a need for an improved link to various monitoring agencies like EPA and water quality monitoring.
- Improved data capture or data recording systems
- Better meter coverage
- Improved non-revenue water and human resource capabilities/capacities

2 How to use benchmarking as a management tool to monitor and evaluate utility performance

- The benchmarking KPI is a useful document for utilities' boards of directors to support donor bid requests for proposals. However, as an operations improvement tool, the information may be lost in the bulk of the KPI's (hence PWWA's utility profiles to streamline the information specific to each utility).
- Learning experience and for utility comparisons

3 Opportunities for cooperation among utilities in the region

- The small utilities agreed that the KPI could be redefined or a specific set of KPI's would better suit the smaller utility situations.
- Cooperation could be enhanced by comparing a 'light version' of the 'reworked' KPI's amongst the smaller utilities together with a regular meeting of the small utilities (as was done last year with the FSM utilities meeting in Yap).
- Chuuk and Pohnpei have already benefited from good cooperation with each other over the past year (as a result of last year's Yap visit).
- Some twinning arrangements have also occurred with Australia-based water utilities and some of the larger water utilities.
- Guam could become a mentor to the water utilities in the Micronesian area given its close proximity.

4 What support do you require from PWWA for benchmarking/performance improvement?

- Continued benchmarking sessions
- PWWA collective report/newsletter every few months/quarterly
- Support for visits to other utilities
- Consistency in data collection

Selected Utility Presentation

Solomon Islands Water Authority

Richard Austin, CEO of Solomon Water presented an overview of the Solomon Islands Water Authority and its progress since the previous year and the current infrastructure developments that concern water. Before 2011 the utility was technically insolvent, but the 2011-2013 Recovery and Action Plan halted the decline. With support from PRIF and AusAid, the action plan focused on security and reliability of water supply, financial strength, and improved customer service. With JICA grant aid and technical cooperation the 2015-2020 strategic plan focuses on improving infrastructure. This is expected to lead to increased water supply, improved coverage, and reduced NRW.

Some of the key improvements in the Solomon Islands Water Authority KRAs were:

- For population coverage:
  - The 24-hour daily water supply increased from 24 to 41% of the population
  - Honiara population with more than 14 hours daily supply increased from 51 to 71%
  - Honiara population with more than 12 hours supply increased from 80 to 94%
  - Only 6% of the population has less than 8 hours supply a day
  - Expectations for the next year are that population receiving 24-hour supply will increase from the current 41% to 75-80% with the commissioning of the Kongulai Pumping Station.
- Operating profits have improved from losses in 2010 and 2011 to profits in 2012 and expected profits also for 2013.

A difficult KRA:

- Non-revenue water increasing from 54% in 2012 to 59% in 2013
  - It appears that the increase in the statistic is a result primarily of better statistics and confirmation of numbers from the field.

Fiji Water Authority

Mr Opetatia Rafai, CEO of the Water Authority of Fiji, presented the Utitily Profile of Fiji as follows:

Water Authority of Fiji

PWWA Benchmarking 2013
Cook Islands - 11th to 15th November 2013

WAF PROFILE

Content

1. WAF Profile
2. PWWA 2013 - Volumes
3. PWWA 2013 – Schemes /Assets
4. PWWA 2013 - Customers
5. PWWA 2013 – Tariff Structure
6. PWWA 2013 - Financial
7. PWWA 2013 – Benchmarking Results

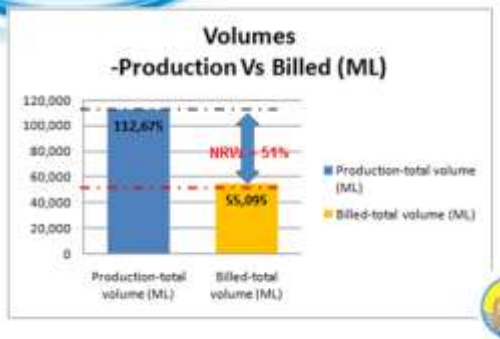
PWWA 2013 – WAF
Introduction

- Water Authority of Fiji (WAF or Water Authority) was established by the Government of Fiji to provide efficient and effective water and wastewater services in an environmentally sound and sustainable manner.
- The WAF Promulgation 2007 was effected for this purpose.
- 1 January 2010 – commenced operations as a Commercial Statutory Authority (CSA) under the ambit of the Public Enterprise Act
- WAF took over the responsibilities, functions and operations previously carried out by the Water & Sewerage Department (WSD).

PWWA 2013 – WAF
Introduction

- WAF is responsible for providing access to quality drinking water and waste water services to the whole of Fiji
- **Our Vision Statement** – The effective and efficient delivery of quality drinking water and wastewater services in accordance with the World Health Organisation guidelines.
- **Our Mission Statement** – The Water Authority of Fiji is committed to operating as an independent, efficient, effective and financially viable water supply and waste water service provider delivering agreed levels of service to the people of Fiji.

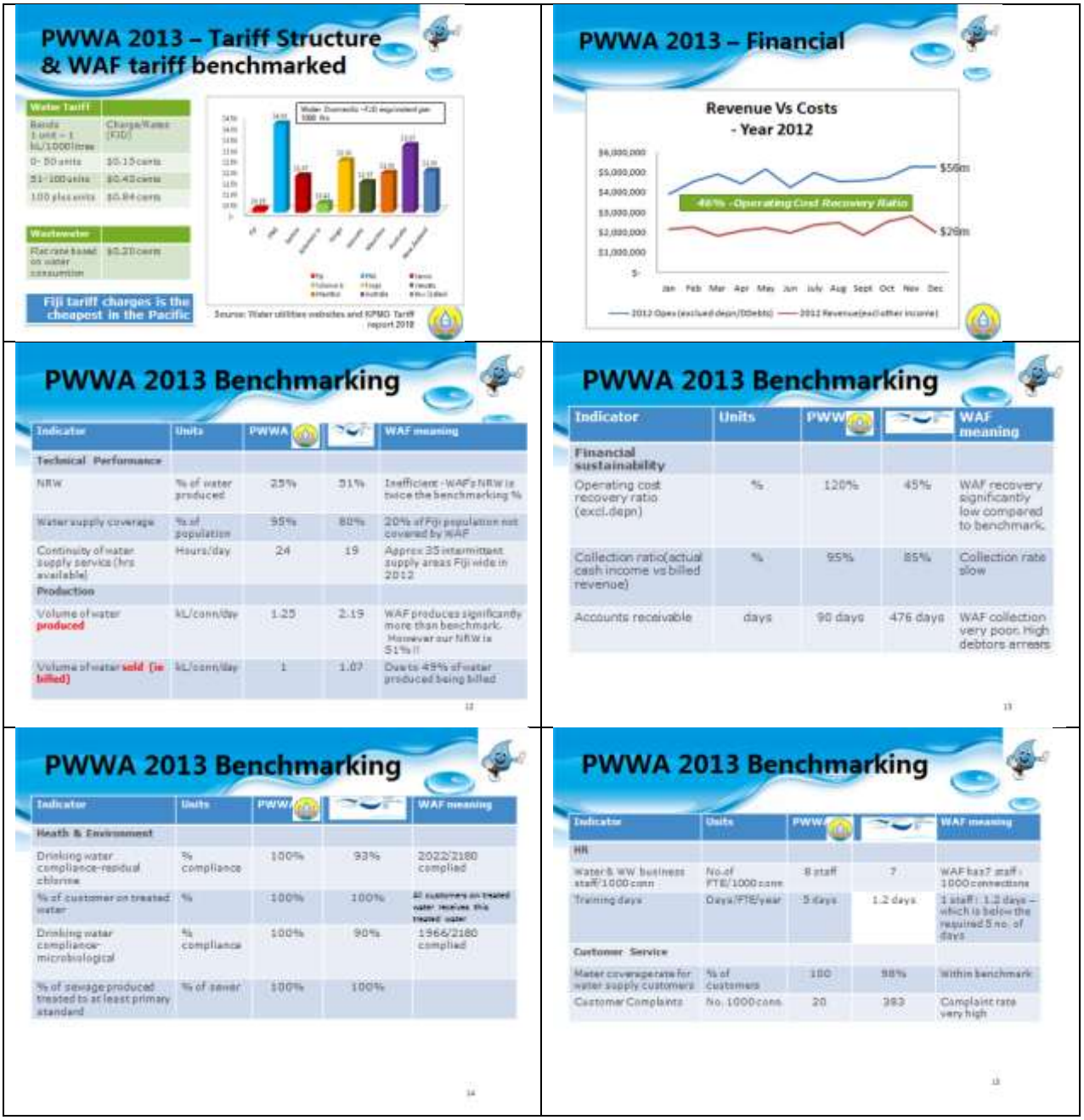
PWWA 2013 –Volumes
Volumes (Mega litres)



PWWA 2013 – Schemes & Assets

PWWA 2013 – Customers
-active customers

PWWA 2013 – Customers
No. Of Complaints



B. Group Sessions Results Day 2 – Training Needs Analysis and 2013 Action Plans

Training Needs Analysis

As part of the 2013 benchmarking survey for the Pacific water and wastewater utilities a training needs assessment survey was distributed to all utilities to advise on their respective training needs.

The survey was divided into the following primary categories:

i. Information on whether the utility has a training needs assessment program and its effectivity
ii. Specific identification of the training needs for the following sections within each utility:
    i. Technical management and operations
    ii. Financial management/Accounting and Customer care management
    iii. Human resources
iii. Identification of cross-cutting topics for wider professional development
iv. Identification of valuable training courses over the last 12-18 months
v. Identification of training providers that water utilities use

Day 2 commenced with PCO introducing the training needs analysis questionnaire and the purpose for its inclusion in the benchmarking workshop. Breakout groups then completed the training needs analysis.

The main areas of the training needs analysis survey focused on three important areas for identifying training needs –

i. Technical management and operations
ii. Financial management/Accounting and customer care management
iii. Human resources

Utilities indicated that the technical management and operations area require 'a lot of training' as follows:

a) *Water resources management* – Nauru Utilities Corporation, Samoa IWSA, Samoa Water Authority, Kosrae Department of Transportation and Infrastructure;

b) *Water Plant operations and maintenance* – American Samoa Power Authority, Nauru Utilities Corporation, Samoa IWSA, Samoa Water Authority, Kosrae Department of Transportation and Infrastructure;

c) *Water Quality Control* – Chuuk Public Utilities Corporation, Nauru Utilities Corporation, Eda Ranu PNG, Samoa IWSA, Samoa Water Authority

d) *Network operations and maintenance* – All Utilities indicated that that 'a lot of training' was required.

e) *Inventory asset management (GIS*) - Nauru Utilities Corporation, Commonwealth Utilities Corporation of Saipan, Eda Ranu PNG, Tonga Water Board, Samoa IWSA, Samoa Water Authority.

f) *Non revenue water management/Leak detection techniques* – All utilities indicated that a lot of training was required with the exception of Eda Ranu PNG and and Kosrae Department of Transportation and Infrastructure

g) *Meter Management* - American Samoa Power Authority, Commonwealth Utilities Corporation of Saipan, Samoa IWSA, Samoa Water Authority, Kosrae Department of Transportation and Infrastructure;

h) *Sewerage network management* - American Samoa Power Authority, Eda Ranu PNG, Samoa IWSA, Samoa Water Authority,

i) *Sewerage treatment plant management* - Eda Ranu PNG, Samoa IWSA, Samoa Water Authority

j) *Effluent quality control* - Eda Ranu PNG, Samoa IWSA

k) *Engineering skills* - American Samoa Power Authority, Chuuk Public Utilities Corporation, Nauru Utilities Corporation, Eda Ranu PNG, Tonga Water Board, Samoa IWSA, Samoa Water Authority, Water Authority Fiji,

l) *Contract and Project Management* - Eda Ranu PNG, Tonga Water Board, Samoa IWSA, Samoa Water Authority

m) *Disaster recovery planning* - , Commonwealth Utilities Corporation of Saipan, Eda Ranu PNG, Tonga Water Board, Samoa IWSA, Samoa Water Authority

IB-Net Demonstration

The 2nd day of the benchmarking workshop concluded with a short demonstration of the PWWA data for 2012 on IB-Net. The Utilities were very positive with moving forward with the IB-Net demonstration and supported the PWWA Executive in continuing the discussions with IB-Net.

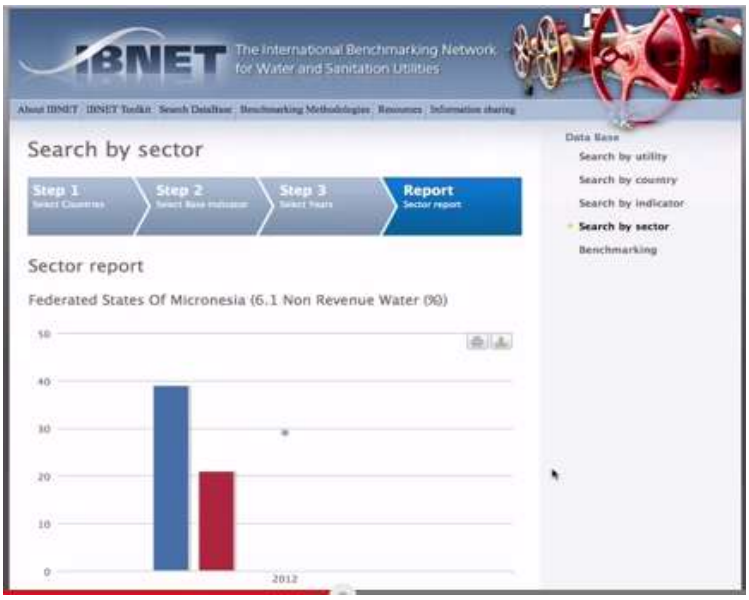


Table F.1: List of Participants Workshop in Cook Islands 11th-12th November 2013

No.	Title	First Name	Last Name	Organisation	Job Title
1	Mr	Opetaia	Ravai	Water Authority Fiji	CEO
2	Mr	Ta'inau	Titimaea	Samoa Water Authority	General Manager
3	Ms	Eiko	Fuimaono	Samoa Water Authority	Sector Coordination Unit
4	Mr	Richard	Austin	Solomon Islands Water	General Manager
5	Mr	Ray	Andresen	Solomon Islands Water	Operations Manager
6	Ms	Susan	Makabo	Solomon Islands Water	
7	Mr	Saimone	Helu	Tonga Water Board	CEO
8	Mr	Pita	Moala	Tonga Water Board	
9	Ms	Sausautinu	Kolo	Tonga Water Board	Finance Manager
10	Mr	Sulutumu	Milo	Independent Water Scheme Samoa	President
11	Mr	Alailima	Nu'uali'itia	Independent Water Scheme Samoa	
12	Mr	Philippe	Molager	UNELCO - Vanuatu	Technical Director Electricity and Water Supply
13	Mr	Ghislain	Kaltack	UNELCO - Vanuatu	Water Supply Network Services
14	Mr	Raka	Taviri	Water PNG	Chief Oper. Officer and Acting CE-MD
15	Mr	Jonathan	Maino	Eda Ranu	Manager Networks
16	Mr	Dick	Nihara	Eda Ranu	General Manager Operations
17	Mr	Fifaia	Matainaho	Eda Ranu	Chief Operations Officer
18	Mr	Henry	Mokono	Eda Ranu	General Manager
19	Mr	Leslie	Hoffman	Eda Ranu	Director
20	Mr	Imbu	Palya	WaterPNG	Assistant General Manager
21	Mr	Joe Russell	Agavi	Water PNG	Senior Manager
22	Mr	Raka	Taviri	WaterPNG	Acting Chief Executive Officer
23	Mr	Itienang	Timona	Public Utilities Board-Kiribati	Water Engineering Manager
24	Mr	Kevin	Rouatu	Public Utilities Board-Kiribati	Chief Executive Officer

No.	Title	First Name	Last Name	Organisation	Job Title
25	Mr	Tokaata	Niata	Public Utilities Board-Kiribati	Board Member
26	Ms	Donye	Numa	MOIP Cook Islands	CEO
27	Mr	Adrian	Teotahi	Ministry of Infrastructure and Planning Cook Islands	Operations Manager Water Works/Civil Works Division
28	Mr	Paul	Howell	Chuuk Public Utilities Corporation	Water/Wastewater Manager
29	Mr	Julian	Reimers	Kwajalein Atoll Joint Utility Resources (KAJUR)	
30	Mr	Majina	Jacklick	Kwajalein Atoll Joint Utility Resources (KAJUR)	
31	Mr	Romeo	Alfred	Kwajalein Atoll Joint Utility Resources KAJUR	CEO
32	Mr	Halston	deBrum	Majuro Water and Sewer Compnay	Operations Manager
33	Mr	Joseph	Batol	Majuro Water and Sewer Compnay	General Manager
34	Mr	Bradley	Henry	Pohnpei Utility Coprporation	AGM Water/Sewer
35	Mr	Marcelino	Aktuka	Pohnpei Utilities Corporation	CEO
36	Mr	Ampelosa	Tehulu	Public Works-Tuvalu	CEO
37	Ms	Lianta	Viliam	Nauru Utilities Authority	Personal Assistant to Hon. Shadlog Bernicke
38	Mr	Nixon	Toremana	Nauru Utilities Authority	General Manager Water and Civil Works
39	Hon	Shadlog	Bernicke	Nauru Utilities Authority	Minister of Utilities
40	Mr	Utu	Abe Malae	American Samoa Power Authority (ASPA)	CEO
41	Ms	Danielle	Maliga-Meleah	American Samoa Power Authority (ASPA)	Water Quality Supervisor
42	Ms	Fa'ipaua	Mareko	American Samoa Power Authority (ASPA)	Wastewater Manager
43	Ms	Nancy	Tinitali-Mauga	American Samoa Power Authority (ASPA)	Materials Management Manager
44	Ms	Susana	Faiivae	American Samoa Power Authority (ASPA)	Chief Financial Officer
45	Ms	Frances	Brown	Water Sector Co-ordination Unit MNRE	Water Sector Co-ordinator
46	Mr	Paulo	Seuseu	Ministry of Health	Principal Sanitation Officer
47	Mr	Malaki	Iakopo	Water Sector Co-ordination Unit MNRE	
48	Mr	Lameko	Tesimale	Ministry of Health	Principal Health Care
49	Mr	Billy	Imar	Papua New Guinea	Independent Consultant
50	Mr	Latu	Kupa	Pacific Water and Wastes Association Secretariat	Executive Director
51	Mrs	Kisa	Kupa	Pacific Water and Wastes Association Secretariat	
52	Ms	Laumua	Leavai	Ministry of Womens, Community and Social Development	
53		Peni	Leavai	Secretariat Pacific Regional Environment Programme - SPREP	
54	Mr	Ernest	Betham	PWWA consultant	Consultant
55	Mr	Albert	Thiadens	PWWA consultant team leader	Consultant Team Leader
56	Mr	Kamal	Khatri	SOPAC	Program Officer
57	Mr	Jan	Overbeek	Pacific Infrastructure Advisory Center (PCO)	Deputy Manager
58	Mr	Niels	Van Dijk	Asian Development Bank	

Table F.2: Program PWWA Benchmarking Workshop Cook Islands 11th and 12th November 2013

DAY 1	Start time	End time	Details	By
11-Nov	8:30:00 AM	9:00:00 AM	**Registration**	
	9:00:00 AM	9:15:00 AM	Welcome and recall last year benchmarking 2012	Chairman
	9:15:00 AM	10:30:00 AM	Overall performance 2013	AT/EB
	10:30:00 AM	10:45:00 AM	**Morning tea**	
	10:45:00 AM	12:30:00 PM	**Group Session - KRA Results for 2013**	
			Group 1 (small utilities)	EB
			Group 2 (medium utilities)	Latu
			Group 3 (large utilities)	AT
	12:30:00 PM	2:00:00 PM	**LUNCH**	
	2:00:00 PM	3:00:00 PM	**Plenary Session: Presentation results group session 2013 KRA**	
			Group 1 (small utilities)	Group Nominee
		15 mins each	Group 2 (medium utilities)	Group Nominee
			Group 3 (large utilities)	Group Nominee
	3:00:00 PM	3:15:00 PM	**Afternoon tea**	
	3:15:00 PM	4:30:00 PM	**Plenary session: Presentation Utility Profiles:**	
			Utility Profile Fiji	FIJI
		25 mins each	Utility Profile Tonga	Tonga
			Utility Profile Solomon Islands	Solomons
		4:30:00 PM	**END OF THE 1ST DAY**	
	5:00:00 PM	6:00:00 PM	**PWWA Board Meeting**	

DAY 2	Start time	End time	Details	By
12-Nov	8:30:00 AM	9:00:00 AM	**Training Needs Analysis Introduction**	JW/Latu
	9:00:00 AM	10:15:00 AM	**Group Session on Training Needs Analysis**	
			Complete/discuss TNA questionnaires	
			Group 1 (small Utilities)	EB
			Group 2 (medium Utilities)	Latu
			Group 3 (large utilities)	AT
	10:15:00 AM	10:30:00 AM	**Morning Tea**	
	10:30:00 AM	11:30:00 AM	**Plenary Session: Presentation results group session Training Needs**	
			Group 1 (small Utilities)	Group Nominee
		15 mins each	Group 2 (medium Utiities)	Group Nominee
			Group 3 (large utilities)	Group Nominee
	11:30:00 AM	12:30:00 PM	**Group session - Complete 2013 Action Plans based on Training**	
			Needs and results of 2013 Benchmarking	
			Group 1 (small Utilities)	EB
		20 mins each	Group 2 (medium Utilities)	Latu
			Group 3 (large utilities)	AT
	12:30:00 PM	1:30:00 PM	**LUNCH**	
	1:30:00 PM	2:30:00 PM	**Plenary Session: presentation of Updated Actions Plans (2013)**	
			Group 1 (small Utilities)	Group Nominee
		20 mins each	Group 2 (medium Utilities)	Group Nominee
			Group 3 (large utilities)	Group Nominee
	2:30:00 PM	3:30:00 PM	**Future directions with Benchmarking**	Latu
			including demo IB NET	
	3:30:00 PM	3:45:00 PM	**Work shop evaluation**	AT/EB
	3:45:00 PM	3:50:00 PM	**Work shop close**	Chairman
	3:50:00 PM	4:00:00 PM	**Afternoon tea**	
	4:00:00 PM	6:00:00 PM	**SITE VISIT**	
	6:00:00 PM	6:45:00 PM	**Free time**	
	6:45:00 PM	9:00:00 PM	**PRIF/PWWA Benchmarking Dinner for Workshop Participants**	

Appendix H: Action plans

In addition to the action planning at the Rarotonga workshop, some utilities also completed an action plan that focused on the top three priority areas for their attention in the coming year. A summary of these plans based on the utilities' priorities can be broadly categorised as follows:

- Improve non-revenue water by improving billing and leak detection.
- Improve drinking water quality and laboratory standards.
- Improve asset management systems/databases.
- Improve staff development.
- Improve customer service levels.
- Improve sanitation services.

Some of the utilities also indicated their achievements from 2012 action plans:

1. American Samoa (ASPA)

PRIORITY 1	Reduce Non Revenue Water (NRW) to a Reasonable Amount by 2014
Objective	Reduce production by 20% x 12 MGD = 3.6 MGD at present production rate
Measure	ASPA already budgeted $2 million for "Water Accountability" including leak detection and repairs. Hire water loss consultant from Australia (same one helping SWA); divide distribution system into DMA; install inline meters including clamp on types that do not impede flow; outsource routine leak repairs; update and check accuracy of as-built drawings; exercise and replace valves; and upgrade SCADA for water, wastewater, and power (company referred by EPC in Samoa). NB: a corollary to Priority 1 is reducing infiltration and inflow in the sewer collection system. About 50% of the Tafuna Wastewater Treatment Plant is I & I; 80% at the Utulei plant.
Target	Reduce NRW from 60% to 40% by 31 October 2014 (2nd phase).
PRIORITY 2	Water Quality Compliance
Objective	Meet Safe Drinking Water Act mandate for drinking water quality; protect public health
Measure	• Drill at least 5 new (producing) wells. • Abandon properly at least 6 groundwater under the influence of surface water (GUDI) wells. • Rehabilitate Vaipito Microfilatration plant (70%); budget already in place.
Target	Lift Boil Water Notice (BWN) by 31 December 2014.
PRIORITY 3	Water Supply Coverage
Objective	Connect the remaining villages on Tutuila island to the government water system
Measure	Complete the Fagalii-Malota-Fagamalo water distribution system – project already budgeted; contractor already at 90% completion; funding in place; remaining families are the highest elevations of the Bay area.
Target	Increase from 90% to 98% water supply coverage by 28 February 2014.

2. Vanuatu (UNELCO) ACTION PLAN 2014

PRIORITY 1	Survey the water protection Zone 2 and Zone 3.
PRIORITY 2	Employ one or two staff.
PRIORITY 3	Improving customer service.

3. Nauru Utilities Corporation

PRIORITY 1	Asset Management and Auditing	ACHIEVED IN 2013
Objective	Evaluate current status of NUC water department assets and estimate costs. Inspect all assets and estimate depreciating costs. Determine conditional assessment of all assets. Enable asset replacement plans to be prepared. Enable accurate budgeting for maintenance. Submit to cabinet for approval and donor funding.	Asset registry assessment done by ADB. Budget allocation for asset review.
Measure	Inspect all assets and estimate depreciating costs. Determine conditional assessment of all assets.	
Target	Enable asset replacement plans to be prepared. Enable accurate budgeting for maintenance. Submit to cabinet for approval and donor funding.	
PRIORITY 2	**Metering of bulk storage tanks**	
Objective	To determine NRW and other losses that will assist water management. Install meters to measure water produced and delivered. Record all data and put into database. Determine NRW and address losses. Improve billing requirements.	We have water at the production end but not at the distribution end.
Measure	Install meters to measure water produced and delivered. Record all data and add to database.	
Target	To determine NRW and address losses. Improve billing requirements.	
PRIORITY 3	**Data base**	
Objective	Collect and record data on daily. Create database to accurately record data daily. Improve budgeting of water operational costs. Consult other governments for planning.	Data project delayed due to upgrading IT and MYOB systems in NUC.
Measure	Collect and record data on daily basis. Create data based to accurately record data	
Target	Improve water management by budgeting water operational costs and consulting other governments for planning.	

Nauru ACTION PLAN 2014

PRIORITY 1	UPGRADING OF INFRASTRUCTURE and REPLACEMENT OF ASSETS.
Objective	• Construct new reverse osmosis shed • Decommission and relocate existing plants • Decommission old water delivery trucks and replace with new • Increase water production and storage capacity
Measure	• Number of reverse osmosis breakdowns • Number of water delivery truck break downs • Cost of maintenance due to breakdowns • Current dilapidated state of RO units
Target	To be achieved 2013-4014
PRIORITY 2	TRAINING & CAPACITY BUILDING
Objective	• Improve asset maintenance • Sustain equipment reliability • Improve water quality • Health and safety at work
Measure	• Lack of capacity within staff to implement proper maintenance work • Lack of proper healthy and safety manuals and measures • Unreliability of current RO units for making water; require staff to implement proper maintenance diagnosis
Target	• To be achieved in 2013-2014
PRIORITY 3	IMPROVE CUSTOMER SERVICES
Objective	• Increase the quantity of deliveries to customers • Provide water deliver service on time to meet customer demand • Monitor and reduce complaints by providing an effective and efficient service

Measure	• Number of water complaints • Sort water complaints
Target	To be achieved in 2013-2014

4. Water Authority Fiji

PRIORITY 1	**Maximise utilisation of supplied water**	**Achieved by November 2013**
Objective	Reduction of NRW/ produced water vs. billed consumption/ five per cent per annum	• Getting base data connect – bulk meters, flow meters • Constant water models • Hunter water
Measure	Produced water vs. billed consumption	
Target	Five per cent per annum	
PRIORITY 2	**Improve effluent quality in STPs/ Upgrade STPs/ BOD, TSS/ Meet best practice standards**	
Objective	Upgrade STPs	• Achieved. 3 IWSs achieved o-ecoli • Testing twice a year for all IWSs • 4 DWSPS endorsed and under implementation • 4 in draft form to be installed/endorsed.
Measure	BOD, TSS	
Target	Meet best practice standards	
PRIORITY 3	**Reduce energy bill/ Improve efficiency of pumps/ Previous energy bill compared to current energy bill/10 per cent per annum**	
Objective	Improve efficiency of pumps.	Saved 100,000 FJD/month • 239 electrical accounts • Commercial/maximum demand-FEA Consistent supply of water supply (35 areas don't receive)
Measure	Previous energy bill compared to current energy bill.	
Target	10 per cent per annum.	

5. Samoa (IWSA)

PRIORITY 1	**Quality of Water**	**Achieved in 2013**
Objective	To have sustainable water resources	Achieved. Installed 9 bulk meters for 9 IWS as part of upgrade works
Measure	Water Flow Meters	
Target	Improve infrastructure	
PRIORITY 2	**Quality of Water**	
Objective	To have safe drinking water	• Achieved. 3 IWSs achieved o-ecoli • Tests carried out twice a year for all IWSs • 4 DWSPS endorsed and under implementation • 4 in draft form to be installed/endorsed.
Measure	Water quality tests	
Target	Implement DWSP and enforce	
PRIORITY 3	**Sanitation**	**Achieved in 2013**
Objective	To find what the current sanitation situation is	Completed sanitation survey for 6 IWS
Measure	Sanitation survey	
Target	To complete sanitation survey	

IWSA ACTION PLAN 2014

PRIORITY 1	Improve water infrastructure
Objective	Increase water use efficiency
Measure	Bulk and household meters installed
Target	Two IWS upgraded with bulk meters installed
PRIORITY 2	Improve drinking water quality
Objective	To ensure clean drinking water
Measure	Quarterly tests per year for all schemes Implementation of DWSPs. Note DWSPs include catchment management and protection.
Target	Minimum of 6 IWS comply with 10 e-coli/100 ml tiered scale designed especially for IWS and endorsement and implementation of additional 4 DWSPs Note: the Samoa National Drinking Water Quality Standards 2008 is also used, however IWSs will never comply due to non-treatment including disinfection
PRIORITY 3	Improve sanitation
Objective	Situational analysis for all IWS
Measure	Sanitation survey
Target	Additional 6 schemes to be surveyed

6. SAIPAN (CUC)

PRIORITY 1	Reduce MRIV and energy cost; eliminate flat rate customers.
Objective	To reduce NRIV for a more efficient system. By reducing NRIV you can reduce pumping time on wells for savings on energy usage.
Measure	• Well production meter • Billing records: no. of customers, metered, non-metered, etc • Power meter readings on all water facilities • Leak detection program • Replacement of non-working water meters • Efficient billing system
Target	• Reduce NRIV by 5% • Reduce energy cost by 3% • To be 100% metered
PRIORITY 2	Complete service areas (TSA)/Pressure zones
Objective	By establishing TSA there is a better system with a more reliable pressure. Associate water meters with a TSA for better accountability of the supply and demand.
Measure	• Coordinates or GPS readings on all metered customers and include on the GIS • Establish HGL for each TSA • Hydraulic modelling program
Target	• Complete 2 TSA • Complete HGL profile for each TSA • Hire a full time GIS operator • Purchase and operate a complete hydraulic modelling program

PRIORITY 3	Operational and Management Recommendation on System Operation
Objective	Operations to work with engineering on operational issues and challenges.
Measure	• Weekly coordination meetings between operations and engineering • Involve operations more in design planning • Familiarise personnel with the changes in the system when new projects are completed
Target	• A more efficient water system operation • A simpler way to operate the system