



Diagnostics of Pacific Water and Wastewater Association Water Utilities

SDG-6 PROFILE OF SAMOA
AND SAMOA WATER AUTHORITY



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The currency of Samoa is the Samoa Tala (ST). The exchange rates for January 2022 are:

- Samoan Tala: (ST): 1 Tala = \$0.37
- Samoan Tala: (ST): 1 Tala = A\$0.52



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LIST OF ABBREVIATIONS

GESI	Gender Equality and Social Inclusion
HRM	Human resources management
IWSA	Independent Water Scheme Association
JMP	Joint Monitoring Program of UNICEF/WHO
NRW	Non-revenue water
O&M	Operation and maintenance
PRIF	Pacific Region Infrastructure Facility
PWWA	Pacific Water and Wastewater Association
SDG	Sustainable Development Goal
SWA	Samoa Water Authority
SWOT	Strength, Weakness, Opportunity, and Threat
TA	Technical assistance
ToR	Terms of reference
WaSH	Water, Sanitation and Hygiene
WHO	World Health Organization
WSS	Water Supply and Sanitation

1 INTRODUCTION

1.1 Introduction

This report is part of a study called “Diagnostics of Pacific Water and Wastewater Association Water Utilities” and has the objective to assess progress, formulate recommendations, propose measures, and develop tools to assist Pacific Island Countries, water utilities, and Pacific Water and Wastewater Association (PWWA) in achieving United Nations Sustainable Development Goal 6 (SDG-6), i.e., universal access to safe water and sanitation.

To assess progress and evaluate the contribution of water utilities in achieving SDG-6, a diagnostic framework has been developed, which is described in section 1.2 below. The framework has been applied and tested in five countries and five PWWA member utilities with the following purpose:

- i) assess the status of SDG-6 achievement in the countries concerned;
- ii) assess the current contribution and potential of water utilities in realizing universal access to safe Water Supply and Sanitation (WSS) in their country; and
- iii) formulate strategies and plans for enhancing the contribution of water utilities toward achieving SDG 6.

In the current report, the diagnostic framework is applied for Samoa and the Samoa Water Authority¹ (SWA). Based on the outcome of the diagnostic analysis, a Strategic Action Plan was formulated in collaboration with SWA to enhance its contribution to achieving SDG-6.

1.2 SDG-6 Diagnostic Analysis of PWWA Utilities

The diagnostic framework assumes that the contribution of a utility to universal access to safe WSS in a country is determined by various internal factors, including its performance, available resources, and level of service delivery, and by external factors such as the topography, demography, natural environment, socioeconomic conditions, sector policies and the institutional and regulatory environment. Also, the performance of other WSS organizations in a country will play a role. A schematic presentation of the internal and external factors is presented in Figure 1.1.

Step 1 – Carry out the diagnostic analysis

For each factor in the framework, indicators have been developed that help understand the key issues and constraints. Where possible, the indicators have been quantified and data have been collected from available reports and databases, including the IBNET/PWWA Benchmarking database, the Joint Monitoring Program (JMP) of UNICEF/WHO, and data available from the utilities and governments. A list of indicators is attached as Annex 1 to this report. The diagnostic analysis is presented in chapters 2 and 3 of this report.

¹ Besides SWA, there is another water utility in Samoa called the Independent Water Supply Association (IWSA), which currently supplies water to about 15% of the population. The government has recently recommended that SWA takes over operations of IWSA.

Figure 1.1: Diagnostic Framework for SDG-6 Achievement



SDG = United Nations Sustainable Development Goal, WSS = water supply and sanitation.

Note: Light blue circles refer to so-called “internal” factors, and dark blue circles refer to “external” factors.

Source: Authors.

Step 2 - SWOT Analysis

To obtain a better understanding of the potential contribution of a utility to increasing universal access to safe WSS, a Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis has been carried out. The SWOT analysis is often used by organizations entering new markets or starting new activities. Likewise, the SWOT analysis in this case is used to assess how Pacific Water Utilities can enhance their contribution to universal access to safe WSS in their country.

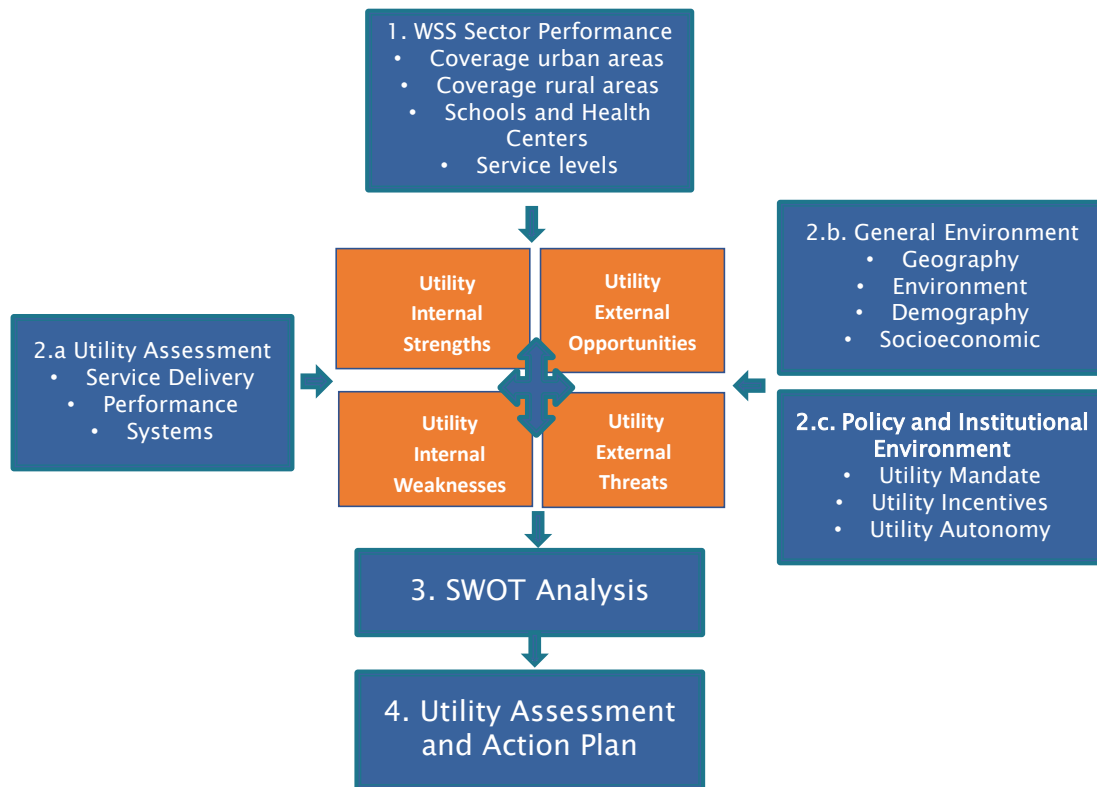
The SWOT analysis for SWA is described in Chapter 4 of this report. In the SWOT analysis, the internal strengths and weaknesses of the utility are identified to assess its potential to (contribute to) achieving universal access to safe WSS as well as the external opportunities and threats.

Step 3 – Prepare an SDG-6 Action Plan

Following the SWOT Analysis, a Working Group within SWA and the consultants have conducted various remote meetings to validate the data, carry out the SWOT analysis and subsequently formulate a strategic action plan for SWA to enhance its contribution to SDG-6 achievement in Samoa. The Action Plan is presented in Chapter 6 of the report.

The various steps in the Diagnostic Framework are schematically presented in Figure 1.2.

Figure 1.2 Flow Diagram of SDG-6 Diagnostic Analysis for PWWA Utilities



PWWA = Pacific Water and Wastewater Association, WSS = water supply and sanitation.
Source: Authors.

The methodology of the diagnostic analysis, as presented above, has been applied to Samoa and the Samoa Water Authority. Data and information were collected from available reports and databases, including the PWWA/IBNET database, the JMP, and data available from SWA. The data in the report were collected and validated by consultants in close collaboration with an SWA Working Group, consisting of:

- Fuimaono Dominic Schwalger Chief Executive Officer (Managing Director) SWA
- Tafeamaalii Philip Kerlake Head Technical Project Coordination & Asset Management
- Namulauulu Irasa Mauala Head Urban Operations and Maintenance Division
- Alvin Margraff Head Commercial Division
- Maposua Fetu Osooso Head of Savai'i Operations and Maintenance Division
- Savelio Imo Head Rural Operations & Maintenance Division
- Ruby Sheck Head Corporate Management Division
- John Mauli Head Communications Information Technology Division
- Desmond Tauati Internal Auditor
- Sharon Lesa Acting Manager Wastewater Division
- Mele Betham Legal Consultant

2 SAMOA COUNTRY AND UTILITY CHARACTERISTICS

2.1 Samoa

Samoa with its capital Apia is situated in the Central South Pacific Ocean. The country consists of two main islands, Savai'i, and Upolu, two smaller inhabited islands (Manono and Apolima) and various small uninhabited islands. The population of Samoa is approximately 199,000.²

2.2 The Samoa Water Authority

SWA is the national service provider of drinking water. About 89%³ of Samoa's population receives water from SWA (approximately 19,000 connections). Most of the remaining population receives water from independent village water schemes (Village Water Committees) supported by the IWSA. Samoa has recently recommended that SWA will become responsible for the future operation of the IWSA schemes. A few households collect rainwater. SWA is a public trading body (state-owned enterprise) under applicable governing legislation.

SWA manages seven conventional slow-sand filter water treatment plants located at Malololelei, Alaoa, Fuluasou (2), Tapatapao, Vailima and Vailoa Palauli in Savaii and five rapid-sand filtration package treatment plants located at key rural centers.

The Authority also manages one wastewater treatment plant located at Sogi that serves approximately 122 commercial customers within the central business district of Apia including the Tupua Tamasese Meaole National Hospital.

In 2019, SWA produced some 25.4 million m³ of drinking water.⁴ Water is supplied through a piped network of about 1,298 km. Non-Revenue Water amounted to 47%.⁵ SWA treats around 2 million liters of wastewater on a monthly basis (average 0.6 million liters per day) through 7.6 km of pressure sewerage main.

In FY 2019/20, SWA collected approximately 210,240 m³ of wastewater through 6 km of sewerage mains. Of all water produced by SWA, only 31% is actually billed to its customers.

According to SWA's Annual Report 2019-2020, total operating costs (excluding depreciation) amounted to \$9.0 million (or ST22.8 million) of which about \$8.96 million (or ST22.7 million) was recovered from customers whilst the remainder was supplemented from the government budget. The average revenue from water and wastewater was around \$0.31 per m³ (or ST0.79 per m³).⁶

2.3 Samoa WSS Sector Performance in Achieving SDG-6

"Improved access to water and sanitation" has quantitative and qualitative aspects and is currently monitored by the JMP. The status of achieving universal access to water, sanitation and hygiene is presented in Table 2.1.

² Samoa Bureau of Statistics, 2020.

³ PWWA benchmarking data 2020.

⁴ Source: PWWA Benchmarking Report 2020.

⁵ Source: PWWA Benchmarking Report 2020.

⁶ Source: PWWA Benchmarking Report 2020.

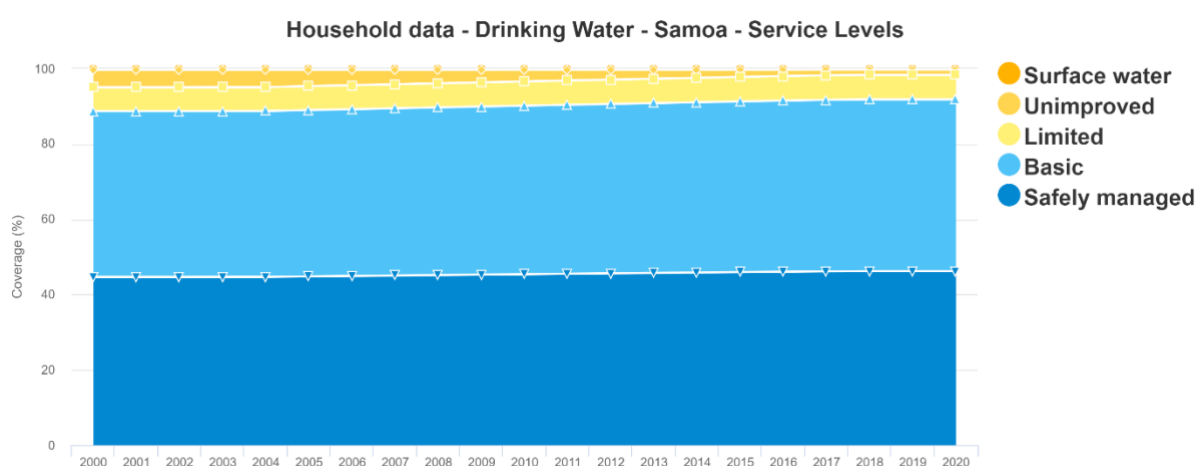
Table 2.1: Samoa Access to Water and Sanitation (% of total population)

Samoa	Drinking water			Sanitation			Hygiene		
	National	Rural*	Urban*	National	Rural	Urban	National	Rural	Urban
	2017	2017	2017	2017	2017	2017	2017	2017	2017
Safely managed	59	-	-	48	51	38	-	-	-
Basic service	39	97	100	50	47	61	-	-	-
Limited service	1	1	0	0	0	0	-	-	-
Unimproved	2	2	0	2	2	1	-	-	-
No service	0	0	0	0	0	0	-	-	-

Source: WHO/UNICEF JMP 2019.

Samoa scores very well on universal access to safe WSS services. Based on the latest WHO/UNICEF JMP report of 2017, about 98% of the Samoan population has access to safely managed or basic service level WSS services. In urban areas, there is 100% access to safe water supply and 99% access to safe sanitation. In rural areas there is 97% access to safe water supply and 98% access to safe sanitation. Only a small number of households, most likely living in remote areas or on outer islands, do not have access to safe WSS (Figure 2.1).

Figure 2.1: Access to Safe Water Supply (% of total population)



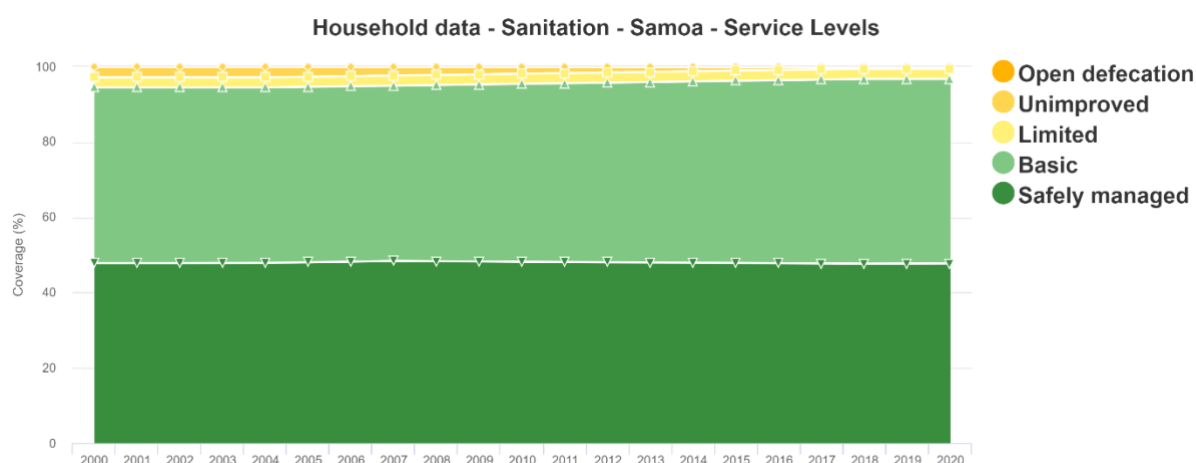
Source: WHO/UNICEF Joint Monitoring Program 2017: <https://washdata.org>

The trend over the past 20 years in access to safe Water Supply is presented above and access has gradually increased over the past 20 years from about 90% in the year 2000 to about 98% in 2020.

Drinking water in Samoa is largely supplied by SWA (about 85% of the population) and the remaining households are supplied by IWSA, which supports community-operated water supply schemes in several villages. The Cabinet in Samoa has recently recommended that SWA takes over responsibilities for supplying water from independent village schemes; therefore, it may become the single provider of drinking water to almost 100% of the population.

Also access to safe sanitation has been steadily increasing from about 95% in the year 2000 to its current level of about 98%. This trend is presented in Figure 2.2 below.

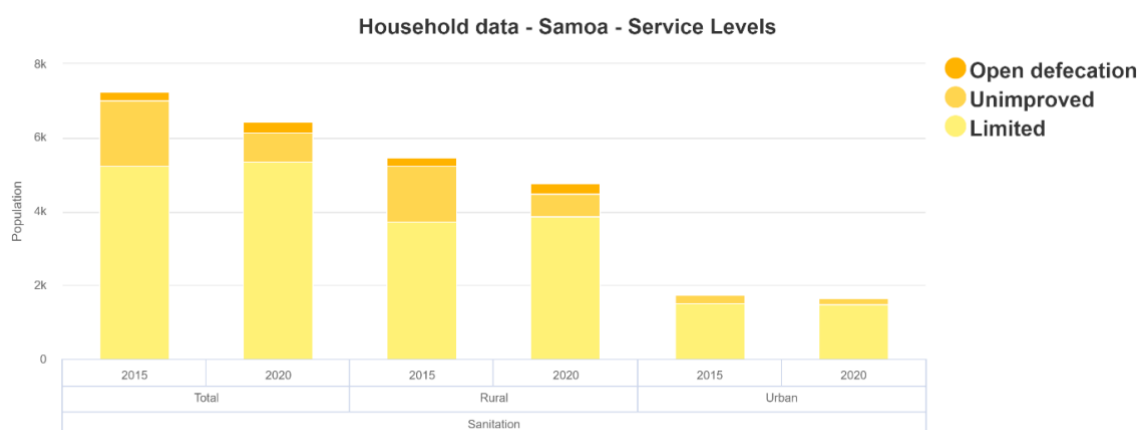
Figure 2.2: Samoa – Access to Safe Sanitation (% of total population)



Source: WHO/UNICEF Joint Monitoring Program 2017: <https://washdata.org>

The above trend for sanitation is confirmed by data about the number of households which lack access to safe sanitation services, as is shown in Table 2.2 below. This number has slightly decreased over the past 5 years, both in rural and urban areas, from about 7,200 persons in 2015 to about 6,400 persons in the year 2020.

Table 2.2: Samoa – Number of Households Lacking Access to Safe Sanitation Services



Source: WHO/UNICEF Joint Monitoring Program 2017: <https://washdata.org>

Most private houses in Samoa have a septic tank with standards set by the National Building Code 199241.⁷ The Ministry of Works is responsible for monitoring the building code. According to the National WASH Baseline Survey (2015), 96% of household sanitation facilities use flush toilets with septic tanks. Most of the septic tanks are thought to be of older design, many without floor slabs, and consequently discharge directly to the water table. The monitoring of groundwater quality is limited to measurements of e. coli and total coliforms, and the results indicate the impact of septic tanks on groundwater quality is significant and a potential health hazard. Currently there are no national effluent standards; however, it was proposed to develop these in 2016.

⁷ Samoa (draft) National Building Code 2017.

3 ASSESSMENT OF SAMOA WATER AUTHORITY

3.1 Assessment of SWA Internal Systems

3.1.1 Level of Service Delivery

SWA, within its current mandate and service area, significantly contributes to realizing access to safe WSS services in Samoa. To assess whether there is scope to extend its services, it is important to first assess SWA's current performance (Table 3.1).

Table 3.1: SWA Key Data on Service Delivery

Performance Area	Key Performance Indicators	Unit	2018	2019	2020
Inclusiveness	Drinking Water Coverage in service area	%	81	88	89
	Sanitation Service Coverage in service area	%	8	7	21
Water Supply Service Levels	Continuity of service	hours/day	24	24	24
	Customers with discontinuous supply	%	0	0	0
	Average total water consumption	l/p/d	212	206	210
	Residential Water Consumption	l/p/d	160	155	160
	% of annual required number of residual chlorine tests taken	%	100	100	100
Wastewater Service Levels	Compliance of tests	%	99	90	81
	Availability of on-site sanitation services	descriptive	Except for small sewerage system SWA is not mandated to provide sanitation services.		
	Wastewater and Fecal Sludge Quality passing primary and secondary level of treatment	%	100	100	100
Responsiveness to customers	Is there a customer charter and has the charter been made known?	Descriptive	SWA has a Service Charter and is in the process of finalizing changes to Customer Satisfaction material including rolling out a Customer Satisfaction survey.		
	Nr. of complaints /1,000 connections	Number	SWA centralized management of Customer Complaints since 2015. In its Annual Report 1019/20 it is reported that all wastewater complaints have been handled within 24 hours and all its water supply complaints have been handled within 3 days.		

Source: IBNET/PWWA Benchmarking System 2020.

SWA has continued to increase water supply coverage within its service area, partly due to the recommended takeover of the water supply of IWSA villages. Four additional villages have applied to SWA for water supply; therefore, its service area is likely to further increase.⁸

⁸ Source: SWA Corporate Plan 2021-24.

In all its service area, SWA maintains sufficient pressure in its distribution system to ensure continuity of service for its customers.

Regarding water quality, SWA is testing residual chlorine in all its water supply systems in accordance with the Samoa National Drinking Water Standards (SNDWS, 2016). While in FY2019/2020, only 81% of tests complied with the Samoan drinking water standards, which is too low and a point of concern, the following year FY2020/2021 recorded 90% compliance rate, i.e., evidence of improvement. SWA has increased the frequency of field monitoring and testing by 68% from FY17/18 for all SWA water supply systems in accordance with the Samoa National Drinking Water Standards (SNDWS, 2016).

Average total water consumption amounts to 210 liters per capita per day. This appears high but is biased by high commercial and industrial use. Average residential water consumption is 160 liters per capita per day, which is somewhat higher as the Pacific Benchmark (150 lcd) set by PWWA.

Sewerage coverage is limited to commercial properties in Apia’s CBD. Most properties in Samoa are serviced by a septic tank, pit latrine or similar system. It is likely that many of the septic tanks are poorly constructed and only infrequently desludged, which may result in groundwater contamination and community health issues.

Wastewater secondary treatment: 100%: SWA operates a secondary treatment plant for the 122 customers it services. The actual degree of treatment and the fate of biosolids is not reported (ideally the biosolids would be processed with the septage). A feasibility study is being carried out to increase coverage of the sewerage system.

With regard to customer complaints, these are addressed through service orders which are tracked and reported as divisional key performance indicators on a monthly basis to ensure accountability and transparency (Table 3.2).

Table 3.2 Year To Date Service Order Report 07/20–06/21

Count of SO#				Grand Total
	COMPLIANT	NON-COMPLIANT	PENDING	
INTERNAL S/O^a	72.31%	27.59%	0.10%	100.00%
AMU	4.35%	95.65%	0.00%	100.00%
COMMERCIAL	74.07%	25.83%	0.10%	100.00%
LEGAL	75.40%	24.60%	0.00%	100.00%
RURAL	37.23%	62.52%	0.25%	100.00%
SAVAI’I	94.69%	5.31%	0.00%	100.00%
URBAN	58.71%	41.12%	0.17%	100.00%
COMPLAINT S/O^b	60.59%	39.37%	0.04%	100.00%
COMMERCIAL	43.82%	56.10%	0.08%	100.00%
RURAL	45.66%	54.28%	0.06%	100.00%
SAVAI’I	91.19%	8.78%	0.03%	100.00%
URBAN	62.20%	37.78%	0.02%	100.00%
WASTEWATER	99.56%	0.44%	0.00%	100.00%
Grand Total	65.28%	34.66%	0.06%	100.00%

Notes:

^a Internal Service Orders cover service efficiency processes and may not involve direct customer interaction.

^b These Service Orders have direct customer interaction (i.e., complaints). Source: Service Order Report 20/21.

These service orders not only articulate customer complaints through defined categories (such as no water, burst pipes, water quality, bill disputes, etc.) but also cover service efficiency processes (such as new connections, reconnections and meter maintenance, etc.). These also identify and inform process improvements for service delivery. In its Annual Report 2019/2020, the utility reports that it has achieved its objectives regarding following up of complaints. SWA also has a Service Charter 2020 where timeframes are prescribed for the utility to address and remedy all complaints as well as to complete processes.

3.1.2 Utility Performance

The ability and willingness of utilities to improve access to WSS in a country will also depend on how efficient they are in terms of performance. This includes financial, technical, commercial, human resources management (HRM) and organizational performance. A utility which is not able to cover its own operational expenditures and must rely on government subsidies for any investments is not likely to invest or operate outside of its own service areas. Likewise, a utility with a high level of leakage or water theft may first want to reduce the level of non-revenue water before it invests in additional production capacity.

Key data on performance of SWA are available from the PWWA benchmarking system and are presented in Table 3.3.

Table 3.3: Utility Performance

Performance Area	Key Performance Indicators	Score	2018	2019	2020
Commercial	Collection Rate	%	70	78	79
	Water sold that is metered	%	100	100	97
Technical	Non-Revenue Water	%	51	48	47
	Electricity costs as % of operational costs	%	13	12	12
Financial	Operating Cost Recovery Ratio	%	127	129	128
HRM	Staff per 1,000 connections	FTE	5.3	4.6	4.6
Organization & Strategy	Aggregate Performance Ratio (AGPAR)	AGPAR score	5	5	5

HRM = human resources management, FTE = full-time equivalent.

Note:

^a AGPAR Score is an overall performance ratio measuring WSS coverage, NRW, collection period, revenues in relation to GNI and Operating Costs Coverage. The maximum score is 10.

Source =

- **Collection ratio: 79%** The collection ratio continues to increase but is still relatively low. The collection ratio has been an historical problem for the SWA and the cause is not very clear from the annual reports. A collection ratio of 90% should be achievable. Measures are implemented to collect long-term water debts with weekly special disconnections involving all SWA staff aside from the normal daily disconnection program. Consultants have been informed by SWA that the collection rate has improved in 2021, but no figures have been made available so far.
- **Water meter coverage: 97%**, which is very good. It is not clear why this indicator dropped with 3% in 2020, but some customers are now paying a flat rate.
- **Non-revenue water: 47%**: NRW is high but has come down steadily during the past years. The reported data show that NRW has fallen from 70% in 2013, which is a commendable achievement. A typical economic limit for NRW (and the Pacific Benchmark set by PWWA) is 25%, meaning that some 25% the production and distribution cost of water is still being wasted. The actual production and distribution costs are not available but an estimate from the income statement suggests these are likely to be in the order of \$1.2 million per year. Hence there is a potential savings of \$300,000 per year, which would justify a considerable investment in an effective NRW

reduction program. SWA is trying to minimize NRW through ongoing pressure management and leak detection around the Alaoa system in conjunction with analysis conducted by non-revenue experts on other priority areas. Furthermore, SWA is establishing District Metered Areas for different water networks for flow and pressure contribution and analysis of leak detection and NRW. Within the 5-year period from 2014–2019, there has been a positive trend towards the decline of NRW - rural (11%), urban (30%), Savai'i (40%) through relocation of pipes and meters, replacement works for old and deteriorated pipelines, fixtures and customer connections, utilization of new machinery and equipment to identify burst pipes, and lead time to repair pipes, thereby reducing significant water losses, replacing all sources and storage inlets and outlets, and the introducing and installing pressure reducing valves and isolation valves.

- The 2019 Operating Cost Recovery ratio of SWA is 129%. This means that SWA's operating revenue exceeds its operating costs by 29%. This would allow SWA to cover the costs of operation and maintenance and the costs of replacement of part of its assets. The average depreciation rate, however, is low and less than the existing renewal rate. This means that the SWA is not collecting sufficient revenue to replace its assets over time. In recent years, it appears that the increase in operational costs has been higher than the increase in revenues, which is a point of attention.

3.1.2.1 *The staff-connection ratio of SWA is about five full-time equivalent (FTE) staff per 1,000 connections. This ratio has come down from about 12.5 FTE/1,000 connections in 2011 and is below the Pacific Benchmark set by PWWA.*

- The AGPAR Score is relatively low, due to a low sewerage coverage and a high NRW.

In summary, SWA is showing a reasonable performance, which could be further improved by,

- a. further reducing costs and increasing production capacity by reducing NRW, and
- b. increasing revenues and cost recovery by improving collection efficiency.

3.1.3 Maturity of Utility Systems

In addition to service delivery and performance, it is important to assess the maturity of utility systems and available resources to cope with possible extension of services. Important indicators are:

- capacity utilization of production and distribution systems and the state of utility assets
- the resilience of systems against natural disasters and the effects of climate change
- the existence of a transparent financial accounting, management and reporting system and the borrowing capacity of a utility
- the level of innovation as reflected in the use of advanced technology and billing systems
- the ability of a utility to recruit and train capable staff and its relations with customers
- progress in gender policies and the percentage of female employees working in the utility

Data for SWA are available from the benchmarking reports, as well as from the Annual Reports and are presented in Table 3.4.

Table 3.4: Maturity of SWA Systems

Performance Area	Key Performance Indicators	Unit	
Technical Systems	Water production capacity used	%	Not available
	Sewerage capacity used	%	The annual report 2019/20 reports that the current sewerage treatment plant operates at 57% of its capacity. The plan only serves the business area of Apia and has 122 connections.
	Power Supply Reliability	descriptive	Samoa has been hit by cyclones at least 6 times over the past 30 years. During and after each cyclone, there

Performance Area	Key Performance Indicators	Unit	
			were several sometimes quite long power outages. It is important for SWA to have a business continuity plan for such occasions.
	Monitoring of pressure and quantities in networks	descriptive	SWA is implementing SCADA ⁹ systems to monitor operations in real time and 97% of connections are metered.
Financial	Borrowing Capacity: debt to equity ratio	%	The debt-to-equity ratio has risen from 0.79 in 2013 to 1.76 in 2017 to 1.92 in 2019. A desirable upper limit is 1.0 and a maximum upper limit is 2.0 and it appears that the Samoa Water Authority is reaching its borrowing capacity unless it has an injection of funds.
Transparency	Timely and accurate financial reporting available and accessible for public	descriptive	Samoa's annual reports, including annual financial statements, are published on the internet and available to the public. The latest annual report is for FY 2019/2020. SWA's annual reports have progressively improved over time, and the report's structure follows the guidelines and standards issued by the government.
HRM	Training policy and implementation	descriptive	<p>SWA stimulates the professional development of its employees through training and/or assessments conducted in-house</p> <ul style="list-style-type: none"> • In FY2018/19, 61 employees undertook training both international and locally (15 international, 46 local) varying from technical to operations and various soft skills (call center) as well as in-house technical training (report writing). Furthermore, the authority conducted in house written examinations for employees to gauge capacity, identify training needs and to encourage understanding and appreciation of the complexities for each division and profession. • In FY2017/18, 65 employees took up training on an international level as well as locally (29 international, 26 locally) varying from technical and operations to records management and various soft skills.
	Gender equality and social inclusivity policies in place. ^a	descriptive	SWA's workforce consists of 76% male and 24% female staff. However, gender balance is evident at management level (60% female, 40% male). Gender composition at the Authority is not a cause for concern nor is it a source of conflict within the Authority. There is no reporting of any discrimination based on gender, and there is salary parity for all positions.
Organization & Strategy	Strategy Document	descriptive	The SWA Corporate Plan 2021-2024 is available from the SWA Website and progress is reported in the Annual Reports.
	Organization Charts	descriptive	SWA's Organization Structure is clear and appears adequate.

⁹ SCADA = Supervisory Control and Data Acquisition

Performance Area	Key Performance Indicators	Unit	
Innovation	Use of advanced technology	descriptive	SWA has implemented SCADA for most of its larger systems and is in process of also monitoring smaller systems by SCADA. SWA also makes use of GIS systems.
	Use of advanced billing systems	descriptive	SWA has e-bill capacity having recently launched e-water access where customers can directly access and calculate their bills online including payment histories, statements. Bills can be paid through the internet (online banking), by phone (digital mobile application) and by making automatic bank transfers.
Resilience	Technical resilience	descriptive	During past years Samoa has escaped the worst cyclones but has nevertheless been hit with six cyclones with wind speeds of over 150 km/h. These would be rated as Category 3 cyclones (there are four categories). Cyclone design standards are available for buildings such as water and wastewater treatment plants and pump stations. Different requirements apply to different wind speeds. Allowing for climate change it would seem prudent for Samoa to design its water infrastructure to a Category 4 design standard. Whether this is the case is not known.
	Organizational resilience	descriptive	SWA has a Business Continuity Plan in place.

SWA = Samoa Water Authority, HRM = human resources management.

Note:

^a The types of policies in place for flexible work arrangements, i.e., maternity/paternity leave, family leave, etc.

Source: Authors.

3.2 General Environment

3.2.1 Geographic and Environmental Conditions

The climate of Samoa is dominated by south-easterly winds and the South Pacific Convergence Zone, and is the warm, wet and humid tropical rainforest type. Annual rainfall is reasonably distributed throughout the year, giving rise to a reliable supply of water from rivers and good sources of groundwater in many parts of the country.

Table 3.5 provides a short summary of the geographic conditions, the available water resources, and the extreme weather events in Samoa.

Table 3.5: Geographic and Environmental Factors

Performance Area	Indicators	Assessment
Topographic conditions	Topography	<p>The topography of Samoa is rugged and mountainous, with about 40% of Upolu and 50% of Savai'i characterized by steep slopes descending from volcanic crests. The interior of both main islands is still covered with montane forests, and, in the case of the highest altitudes on Savaii, cloud forest. These areas also contain volcanic peaks with the Upolu crestal ridge rising to 1,100 m. Savai'i has more and younger volcanic cones, with the highest peak reaching 1,848 m at Mt. Silisili. West Savai'i and northwest Upolu are characterized by uniform terrain and gentler slopes.</p>
Water Resources	Availability Type	<p>Surface water (65%) and groundwater (35%) are used for water supply.</p> <p>The older volcanic terrain in the eastern half of Upolu and the eastern half of Savai'i are the most weathered and eroded, and the resulting clay cover results in effectively impermeable strata with rapid run-off from the steep catchments (up to 92%), with significant sediment loads in peak flow periods.</p> <p>Conversely, the younger volcanics of the Mulifanua, Lefaga, Puapua, and historical Aopo lava flows have little or no soil cover and allow the infiltration of nearly all rainfall. These lavas are also highly permeable, with former lava tubes enabling rapid groundwater flow to the sea. Coastal springs exist along northwest Upolu and much of Savaii, coinciding with the distribution of the younger volcanics, and were historically used for water supply. Ironically, the rainfall is greatest in the southeast of each island over the surface water catchments, resulting in common flooding, especially in Apia, and at its lowest in the northwest of each island in the groundwater provinces, resulting in saline intrusion and up-coning, especially in northwest Savai'i.</p> <p>Catchment sizes of streams are small, and slope gradients steep, resulting in rapid responses to rainfall events and low flows in dry periods. The catchments south of Apia are known to have caused severe flooding. Low flows in these streams are significant enough to cause problems for the urban Apia water supply system. Sediment erosion is the most visible surface water pollutant within the catchments.</p> <p>Groundwater is generally exploited below the 50 m ground level contour height, partly because of the coastal location of communities historically reliant upon coastal freshwater springs, and partly because of the expense of deeper drilling. Some households on Falealupo Peninsula and in remote areas make use of rainwater harvesting.</p>

		<p>Water use besides piped water supply: the largest commercial activities are the brewery and several bottled water companies. There is no irrigation for agriculture in Samoa. Surface water is also used for several micro-power stations.</p> <p>Competition for water resources appears for the Fuluasou and Vaisigano water catchments around Apia, where both public water supply and energy supply are provided by the same river systems. Some water resources are unavailable to SWA due to control by source villages, which are supplied by own independent village schemes.</p>
Extreme weather events	Occurrence Severity	<p>There have been 21 cyclones in the South Pacific since 1990, seven of which have struck Samoa causing widespread damage, including to water supply systems, leading to contaminated water. A statistical analysis of these cyclones has not revealed any significant trends. It is expected that Samoa will experience a cyclone approximately every 3 years on average. Future impacts of climate change also include sea level rise and more king tides and an increase in cyclonic activity, with cyclones having higher wind speeds, carrying more water, and being more destructive.</p>

Source: SOPAC 2007 - Samoa National IWRM Diagnostic Report; The Climate Council, <https://www.climatecouncil.org.au/about/> (accessed 24 March 2021).

Related to climate change and extreme weather events is a continuing inland relocation drift, as there is a tendency of people to settle further inland in more remote rural areas where the Authority has no infrastructure. This requires long-term planning and increased funding, especially in areas where proximate water sources are scarce, to ensure sustainable and economically viable solutions.¹⁰

3.2.2 Socioeconomic and Demographic Conditions

The level of economic development and issues like income distribution will determine the ability of the population to pay for safe WSS services and will determine the financial resources available to the government, the utility and/or private sector institutions for financing WSS infrastructure, and its dependence on external resources (Table 3.6).

Table 3.6: Socioeconomic and Demographic Indicators

Performance Area	Indicators	Assessment
Economic Development	Per capita GDP	\$4,067 (2020)
Socioeconomic development	Per capita GNI	\$4,050 (2020)
Affordability of 6 m ³ water	% of per capita GNI	0.06% (\$22.95/ \$4,050)
Urban population	% Population in urban areas	18% (2020)
Rural Population	% Population in rural areas	82% (2020)
Outer Island Population	% Population in outer islands	< 0.5%
Population density	Nr of persons/km ²	71

GDP = gross domestic product, GNI = gross national income.

Source: <https://data.worldbank.org>

¹⁰ SWA Annual Report 2019-2020.

Water Tariffs

In 2019, Samoa experienced a measles outbreak followed by the global COVID-19 pandemic. Economic activities came to a near halt. SWA applies a three-tier tariff structure (Table 3.7).

Table 3.7: SWA Tariff Structure for Domestic Use (per 1 November 2021)

Step	Monthly Consumption	ST	\$
1	0–15 m ³	0.61	0.23
2	15–40 m ³	1.34	0.51
3	>40 m ³	1.74	0.67

SWA = Samoa Water Authority, ST = Samoan tala. Source: www.swa.gov.ws

The average household with a size of 6.7 persons and an average consumption of 160 l/c/d would use some 32.6 m³ per month, and its average bill would amount to ST32.7 or \$12.50 per month. This would be about 1% of the average GNI.

Based on the above, it appears that water tariffs in Samoa are very affordable. It can also be concluded that, even though commercial tariffs are higher than domestic ones, in the long term, current tariffs will not allow SWA to operate on a financially sustainable basis, as it is not able to pay for the full replacement of its assets.

Demography

Some 82% of the population of Samoa live in rural areas with a low network density (24 connections per km²), with relatively high operational costs. Most people live in coastal areas, which are vulnerable to extreme weather events such as cyclones, king tides, and tsunamis. There is a tendency among the population to move to higher grounds, which in turn are more difficult for SWA to supply.

3.3 The Policy and Institutional Environment

3.3.1 Government WSS Policies

Government policies and strategies have a profound effect on the functioning of the WSS sector (Table 3.8).

Table 3.8: Government WSS-Related Policies

Performance Area	Indicators	Assessment
Policy/Strategy	Approved Water Sector Policy in place	The following policy documents are relevant: <ul style="list-style-type: none"> Water and Sanitation Sector Plan 2016–2020 Samoa Natural Environment Plan 2017–2021 An important development in this respect is the recent recommendation of the government that SWA will take over the operations of the IWSA. This will considerably extend SWA's service area and make it responsible for supplying water to the whole population of Samoa.
Gender issues	Specific Policy for women and underprivileged groups	SWA has 76% male and 24% female staff. However, at management level the gender balance is evident (60% female, 40% male). Gender composition at the Authority is not a cause for concern nor is it a source of conflict. There is no reporting of discrimination based on gender, and there is salary parity for all positions.

Performance Area	Indicators	Assessment
Funding (gap)	Utility access to financial resources	As mentioned earlier in this report, it appears that SWA is reaching its borrowing capacity unless it has an injection of funds. It is not clear to what extent SWA has access to additional resources if the need would arise.
Human Resources	Availability and use of WSS training facilities	The professional development of its staff is a stated objective of SWA. For this SWA has access to vocational training centers in Samoa. In addition, SWA staff regularly attend training courses in the region.
Monitoring	Monitoring System in place and producing regular and reliable reporting	An SWA Corporate Plan is in place and SWA is reporting progress against this plan in its Annual Reports. The Ministry of Health and the Ministry of Natural Resources and Environment are setting and monitoring water and environmental quality standards and reporting about this. The Water Sector objectives are part of the National Strategy for the Development of Samoa; “Access to clean water and sanitation” sustained with six major objectives which made up the Water Plan. SWA is responsible for six of the eight Intermediate Outcomes and 29 of the 42 priority actions set out in the Water Supply Logical Framework.

IWSA = Independent Water Schemes Association, SWA = Samoa Water Authority, WSS = water supply and sanitation. Source: Authors

3.3.2 Institutional and Regulatory Framework

Samoa is a unitary parliamentary democracy with 11 administrative divisions. Overall, the institutional and regulatory framework in which SWA operates is well balanced and provides for a reasonable level of autonomy for the Board and management of SWA to operate the utility in an efficient and effective manner. It does not allow SWA to operate on a full cost recovery basis, which puts the responsibility for investment and the long-term financial sustainability of the utility with the government (Table 3.9).

Table 3.9: Summary of Institutional and Regulatory Framework

Performance Area	Indicators	Assessment
Service Standards	Existence, responsiveness, and predictability of service standards	<ul style="list-style-type: none"> SWA is obliged to produce and distribute water in accordance with the Samoa National Drinking Water Standards (SNDWS, 2016). SWA’s level of service is not published on SWA’s website. However, progress on its corporate plan and performance is documented in its Annual Reports
Service area	Mandate for water supply Mandate for sanitation	<ul style="list-style-type: none"> Based on the SWA Act 2003, SWA has the mandate and obligation to supply water to the people of Samoa throughout the country. The government may direct SWA to undertake new developments. The government has recommended that SWA takes over the water supply in the area covered by IWSA. At least four villages have indicated they are interested to be supplied by SWA. SWA is responsible for operating a small sewerage system for mostly commercial customers in Apia. SWA has no mandate for onsite sanitation.

Performance Area	Indicators	Assessment
Sector Regulation	Existence, responsiveness, and predictability of regulatory system	<ul style="list-style-type: none"> SWA is subject to the Samoa Water Authority Act 2003 and the Public Bodies (Performance and Accountability) Act of 2001. Community Service Obligations exist pursuant to the Public Bodies (Performance and Accountability) Act 2001. The social obligation is to the community to fund electricity for boreholes and land compensation and rural leases.
Tariff Setting	Reliability, transparency, and effectiveness of tariff setting system	<ul style="list-style-type: none"> Tariff arrangements are regulated in the SWA Act of 2003 as well as the Public Bodies Act 2001. Based on the Act, the Board of SWA may set water tariffs to meet its operating costs and will inform the Minister about any changes. SWA prepares annual budgets which need to be approved by the Ministry of Public Enterprises. Water tariff increases are considered a political issue and therefore will give rise to debate.
Institutional Framework	Clarity of responsibilities and level of overlap	<ul style="list-style-type: none"> SWA is increasingly becoming responsible for water supply for the whole of Samoa and operates in accordance with the SWA Act and Samoa Water and Environmental Standards.
Level of Utility Autonomy	Formal and actual level of autonomy of utility management	<ul style="list-style-type: none"> SWA is a state-owned enterprise. It is governed by a Board consisting of seven members, two of which are appointed <i>ex officio</i> by the Ministry of Health and the Ministry of Natural Resources, respectively. The other members are from the private sector. There appears to be a reasonable level of independence and transparent monitoring and reporting.

IWSA = Independent Water Schemes Association, SWA = Samoa Water Authority.

Source: Authors

3.4 Summary of the Diagnostic Analysis

To summarize the results of the diagnostic analysis use is made of a spider diagram,¹¹ which depicts the scores of the various factors which jointly determine SWA's contribution to achieving SDG-6. The spider diagram is based on scores for each of the internal and external factors as presented in Table 3.10.

¹¹ The use of a spider diagram for this purpose was suggested by officials of Department of Foreign Affairs and Trade (Australia) in the review of the draft Interim Report of the project.

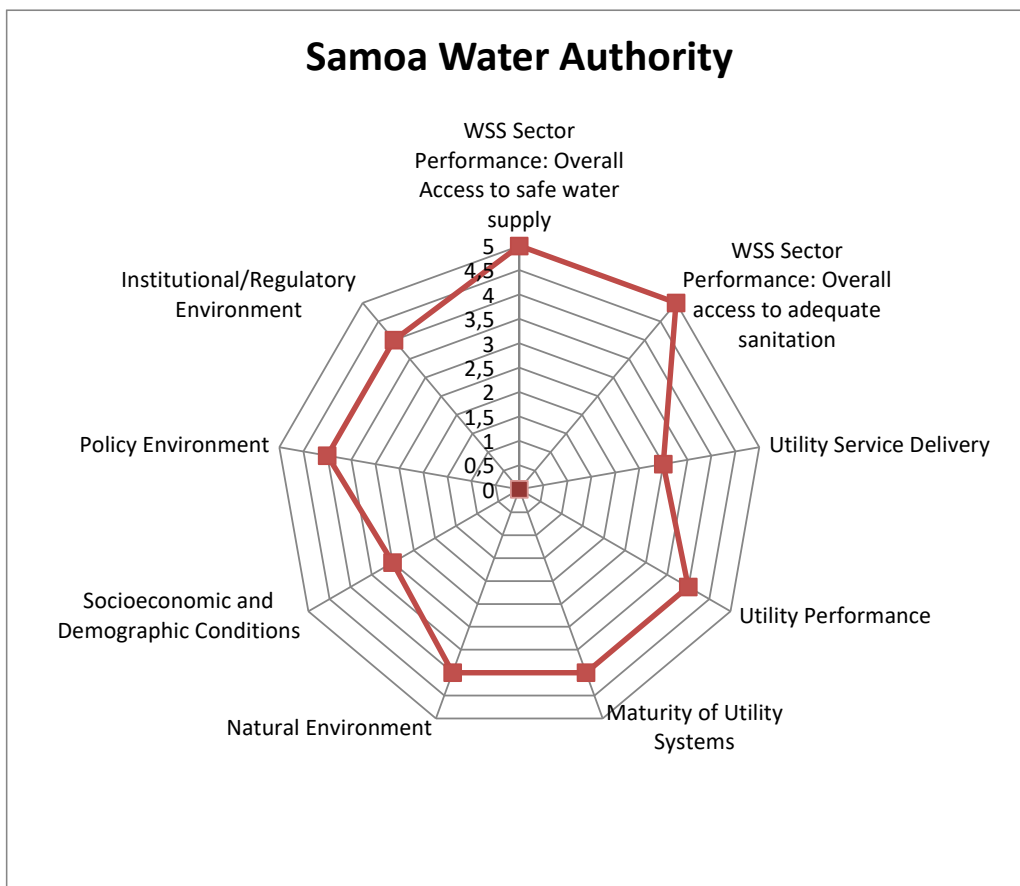
Table 3.10: Summary of Diagnostic Analysis

Nr	Indicator	Score	Remarks
1	WSS Sector Performance: Overall Access to safe Water Supply	5	JMP
2	WSS Sector Performance: Overall access to adequate sanitation	5	JMP
3	Utility Service Delivery	3	Service Level : average of Continuity 5, Water Quality 3, water consumption 5, SWA Water Coverage 4, SWA Sewerage Coverage 1
4	Utility Performance	4	SDG 6 Assessment: average of NRW 2, Staff ratio 5, operational cost ratio 4, metering ratio 5 and collection ratio 3
5	Maturity of Utility Systems	4	Technical Systems 4, Financial Systems 4, Organization, 5, Innovation 4, Resilience 3
6	Natural Environment	4	Topography 5, water resources 5, Extreme weather events 3
7	Socioeconomic and Demographic Conditions	3	GNI 3, Demography 3
8	Policy Environment	4	Policy 5, Access to finance 3, Access to training 4
9	Institutional/Regulatory Environment	4	Population in Mandate 5, Tariff system 4

JMP = Joint Management Programme, SWA = Samoa Water Authority.
Source: Authors

The scores vary between 1 and 5 for each of the factors, where 1 is a very poor or low score and 5 is a very good or high score. The results are presented in the spider diagram in Figure 3.1 and the ranking table of the scores is attached as Annex 2 to this report.

Figure 3.1: Summary of Diagnostic Assessment



WSS = water supply and sanitation. Source: Authors

Access to safe water supply:	High with 98% access to basic or safely managed water supply
Access to safe sanitation:	High with 98% access to basic or safely managed sanitation
SWA Service Level:	High coverage for water supply in service area, low coverage on sewerage in service area, good continuity, and water consumption but relatively low on water quality.
SWA Performance	Relatively poor but improving performance on NRW, good performance on operational cost recovery; strong performance on organization, HRM, metering, but still low performance in collection of bills.
SWA System Maturity	Limited spare capacity for water supply but still some capacity left for sewerage; strong in organizational and HRM systems and financial transparency, weak debt to equity ratio, average resilience, and good innovation
Natural Environment	Topography relatively easy to manage, relatively abundant in water resources and regular extreme weather events.
Demography and Economy	Larger part of the population lives in rural areas, with relatively low population density; Incomes and GNI are at a reasonable level and water rates are affordable.
Policy Environment	Clear policies, limited access for SWA to financial resources (apart from development partners) and good access to training institutions.
Regulatory Environment	Regulatory environment is clear; SWA's service area will grow to include the IWSA area; water tariffs are well regulated, resulting in very affordable tariffs for customers but limited long-term financial sustainability for SWA.

4 SWOT ANALYSIS

After having analyzed the various factors, the key (internal) Strengths and Weaknesses and the key (external) Opportunities and Threats in relation with enhancing access to safe WSS (SDG-6) have been put in Table 4.1.

Table 4.1: SWA SWOT

<p>Strengths</p> <ul style="list-style-type: none"> • SWA has been able to maintain relatively high service levels • Operational cost recovery ratio is 1.3, which allows SWA to replace short term assets but is too low to finance larger investments. 	<p>Weaknesses/constraints</p> <ul style="list-style-type: none"> • Low coverage for sewerage • Poor water quality in selected areas, especially after rain • NRW improving but still high • Collection Ratio improving but still low • SWA depends on government and development partners to finance investments and its borrowing capacity is limited
<p>Opportunities</p> <ul style="list-style-type: none"> • The Government has recommended that SWA takes over operations from IWSA • Civil Society Organization mechanism is in place and has been successfully applied in the past • Ongoing feasibility study for improving wastewater management around Apia by expanding sewerage system and improving septic tanks 	<p>Threats</p> <ul style="list-style-type: none"> • Regular cyclones cause power outages and damage infrastructure • Many customers live in coastal areas: some areas become inundated with salt water and location causes vulnerability to extreme weather events and causing people to move inland.

IWSA = Independent Water Scheme Association, SWA = Samoa Water Authority, NRW = non-revenue water
 SWOT = Strengths, Weaknesses, Opportunities, and Threats.

Source: Authors.

Conclusions from SWOT Analysis

Water Supply: Over the past decade, SWA has been able to maintain reasonably high service standards, although water quality remains an issue in some areas. These need to be resolved and SWA should continue to work on reducing its NRW and in this way create additional production capacity and reduce costs. It is also necessary to prepare disaster recovery and business continuity plans for dealing with extreme weather events.

The recommendation of the Cabinet for SWA to take over operations from IWSA provides an opportunity to improve service standards to all people living in Samoa. This will need investment in rehabilitation and extension of infrastructure. Creating a ring main around the islands may improve the reliability of water supply, make it more resilient to the effects of extreme weather and climate change, improve water quality, and make it easier for SWA to supply inland customers. Further study is needed to assess whether this is technically possible and to identify the most cost-effective solution.

Sanitation: Coverage of SWA's sewerage network is very low. The ongoing feasibility study for sewerage and sanitation in the Vaisigano river floodplain will provide more information about the feasibility of the options to expand SWA's sewerage system, especially in and around Apia. For rural areas, due to the low population density, the solution for improving sanitation most probably

lies in improving the management and quality of on-site sanitation facilities in cooperation with house owners. SWA could support this work through the Water Sector Coordination Committee.

Finance:

SWA can further strengthen its financial performance by improving collection efficiency and by reducing its operational costs (NRW) and there also appears to be scope for gradually increasing water tariffs. Additional investments are needed for both water supply and sewerage. Partly these could be financed by civil society organizations agreements. SWA's borrowing capacity could be improved by requesting a capital injection from the government or from third parties. Improved financial performance of SWA would make it more self-reliant and avoid being a burden to the government and taxpayers.

5 SWA SDG-6 ACTION PLAN

5.1 Introduction

After having completed the SWOT analysis, SWA management, with support of consultants, have formulated recommendations and measures to accelerate universal access to safe WSS as follows:

- expand its services by making use of opportunities and strengths
- defend itself against threats by making use of its strengths
- improve on its weaknesses and in this way make use of external opportunities
- withdraw where external threats match with the internal weaknesses.

Carrying out the SWOT analysis has helped SWA to identify the key strengths and weaknesses that need to be addressed in the Action Plan.

5.2 Action Plan

SWA's Action Plan to enhance universal access to water and sanitation in Samoa consists of the following components: i) extend SWA's supply area to also cover the villages currently covered by IWSA, ii) enhance sewerage services in Apia and the surrounding area, iii) develop and eventually implement a masterplan for water supply and sanitation in Samoa, iv) build capacity for SWA staff. Each of the components is described in more detail below.

5.2.1 Extension of SWA's service area to IWSA villages

Until recently, IWSA supported the supply of water in 54 villages by operating 28 water supply schemes, serving a total population of 27,236. A list of villages is presented in Annex 3.

The previous Cabinet issued a directive that all IWSA schemes were to be included in SWA's service area. The new government has slightly rephrased the directive and recommends that in the long run SWA is expected to extend its supply area to also cover the IWSA villages.

Following requests from three individual villages, parts of these water supply schemes are currently being transferred to SWA and related works are ongoing. Four additional villages have expressed their interest to be supplied by SWA. Surveys for capital costs for these villages are ongoing and this activity is to be included in next year's budget.

In some villages, there is hesitation to join SWA because of the costs involved and the payments for water. Therefore, it is important that the initiative for a transfer comes from the villages. The ideal approach is that there is village buy-in to come on board; otherwise it will be a very difficult and lengthy process for any works to roll out in that district.

If a village under IWSA requests to join SWA, it is advised to provide letter and signature of the village for confirmation. SWA will undertake investigations and prepare a design on how the village may be connected to an existing SWA system, or if new boreholes are required to be drilled. Once the technical solution for water supply is confirmed, the village is informed, and consultations are undertaken to identify areas where land is required for boreholes or tank location or areas on roadsides for pipe laying.

Under the new government, either the Ministry of Women, Community and Social Development (the main ministry that communicates government programs to villages through the traditional settings) or SWA will reach out to villages to convince/promote the concept of better WSS services and supply at reasonable cost if they join and become a part of the SWA managed systems. For those areas and villages that are favorable and supportive, investigations and designs will be carried out to determine the required works and budgets. Once these funds are approved by the Cabinet, the project will be implemented.

In the long run, it is important that WSS levels in SWA schemes continue to be high with no disruptions during flooding or drought and recovery from cyclones, etc. This will encourage IWSA villages to request to become SWA-managed systems, based on word of mouth and good reputation. An additional justification is that all infrastructure services, such as roads, electricity, and water, are under government control to ensure that the service can be made available to everyone in a sustainable manner and provide the maintenance and operations to ensure water is provided according to the drinking water standards.

5.2.2 Apia drainage, sewerage and sanitation improvement

Currently sanitation and wastewater is addressed in the Apia central business district using three main approaches: i) Reticulated pressure sewer system for 122 business and large government buildings owned and operated by the SWA; ii) on-site septic systems (septic tank and soak pit) used by residential properties and small businesses; and iii) wastewater (includes greywater, wastewater from industries and domestic animals) from business and residential properties: soak pit via grease trap, discharge directly to streams, and discharge into Lands Transport Authority stormwater network (illegally).

The limited available land area and poor natural vegetation growth in the Apia central business district poses a problem for on-site septic systems to ensure adequate soakage is achieved. Rapid urban development has meant that many landowners have covered a large part of their property with buildings and concrete infrastructure, limiting the availability of land to locate soakage fields or pits. As a result, many households in the central business district are left with poorly operating systems due to inadequate soakage, which is also exacerbated by high ground water and flooding, yet are unable to connect to the SWA pressure system. A common problem faced by the Planning for Urban Management Office (PUMA) office as the national regulator for developments is the discharge of wastewater from domestic pig farms in the urban area, including those located on higher altitudes and slopes.

In recent years, Samoa has been heavily impacted by increasing severe tropical storms. Given the topography of the country, these extreme events result in significant river discharge that results in flooding of lowland areas. Recent tropical events such as Cyclone Evan have caused floods resulting in serious health impacts and significant damage to both public and private assets. The resulting damages have been estimated at \$200 million.

To mitigate the above situation, the Government of Samoa has, with financial support of the Green Climate Fund, commissioned a feasibility study to strengthen the adaptive capacity, and reduce exposure to extreme weather events of vulnerable communities, infrastructure, and the built environment in the Vaisigano River Catchment Area and to modernize and climate-proof domestic

sewerage and wastewater systems by developing improvements to onsite septic tank installations and evaluating the potential to connect individual houses to the SWA Wastewater Network.

The results of the feasibility study are expected in the second quarter of 2022. Based on the recommendations, the government and SWA intend to further develop the sewerage system in Apia and connect the maximum number of customers to its sewerage system.

5.2.3 Samoa Masterplan for Water and Sanitation

SWA manages five conventional slow-sand filter water treatment plants located at Malololelei, Alaoa, Fuluasou (2), and Vailoa Palauli in Savai'i, and five new rapid-sand filtration package treatment plants located at key rural centers. In 2019, SWA produced some 25.4 million m³ of drinking water.¹² Water is supplied through a piped network of about 1,298 km. NRW amounted to 47%.

SWA faces several long-term problems in relation with its water supply systems. First, some wells located in coastal areas show signs of increasing salinity levels and the changes in climate and rainfall result in increased turbidity and related water quality and water treatment issues.

In addition to this, because of extreme weather events, there exists a continuing inland relocation drift as there is a tendency of people to settle further inland in more remote rural areas where the Authority has no water supply infrastructure. This issue requires long-term planning (and increased funding especially in areas where proximate water sources are scarce) to ensure sustainable and economically viable solutions.¹³

Thirdly, there is the issue of expanding SWA's service area to incorporate the 54 villages which are currently supplied by IWSA. The 28 water supply systems which currently supply these villages are scattered over the two islands and need to be integrated in SWA's current production and distribution system.

To deal with the water quality and relocation issues, and the extension of its service area, SWA considers the option of developing ring-mains around the two main islands. In this way it would be easier to control and manage water quality and to serve customers living in locations at a higher altitude.

In addition to water supply, there is the issue of sanitation in small villages and rural areas. As mentioned above, 82% of the population lives in rural areas and is dispersed over a relatively large area of land. For water supply this translates into a network density of 24 connections per 1,000 meters. For sewerage, this would be similar, and it would therefore most likely be very expensive to introduce sewerage in rural areas.

In Samoa, 98% of the households have access to adequate sanitation facilities. Houses, in most cases, have septic tanks and soak pits or pit latrines, which, however, often do not meet the standards of the National Building Code and leak wastewater directly into the groundwater. SWA as the supplier of

¹² Source: PWWA Benchmarking Report 2020.

¹³ Source: SWA Annual Report 2019-2020.

water to the houses, is interested to help its customers in managing their wastewater streams. As this activity is not in the current mandate of SWA, this activity needs to be undertaken with other stakeholders, such as the Ministry of Works and the Ministry of Environment.

To develop water supply and sewerage systems in a structured and sustainable manner and to deal with the above issues, SWA is planning to develop a long-term Water and Sanitation Master Plan for Samoa for the next 20–30 years. The ToR for such a masterplan still needs to be developed.

5.2.4 Capacity building

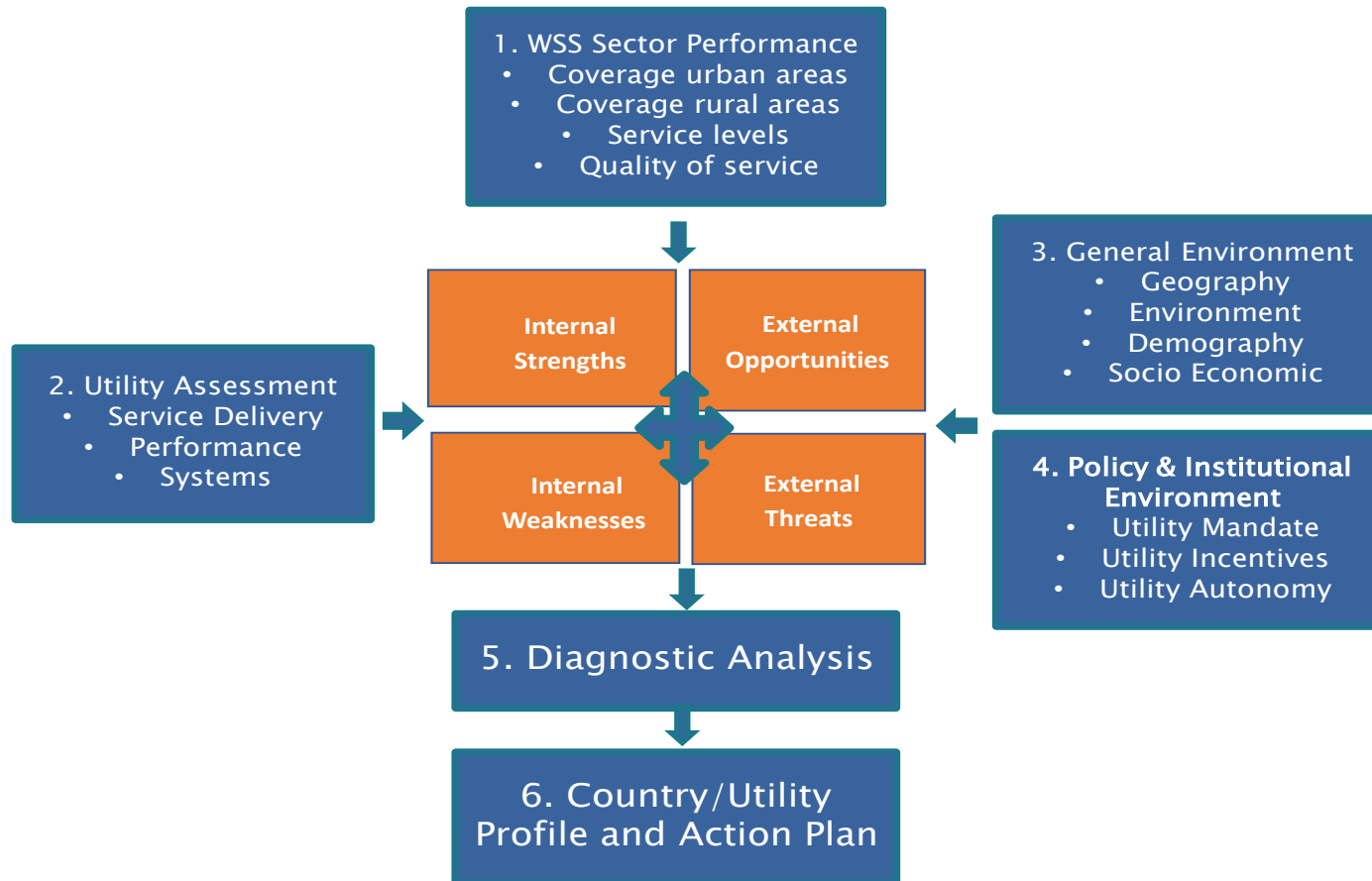
A key requirement for SWA to further develop and enhance universal access to water and sewerage services in Samoa and improve services to customers is to maintain and further develop the capacity of the organization and its staff. In this respect, SWA has identified key training needs for various target groups within the organization (Table 5.1).

Table 5.1 SWA Training Needs

Training Needs	Target Group
Asset Management	Engineers/Managers
Contract Management	Engineers/Managers
Project Management	Engineers/Managers
Performance Management (of staff)	Engineers/Team Leaders
Procurement	Engineers/Managers
O&M Water Distribution Networks	Engineers/Technicians
O&M Water Treatment Plants	Engineers/Technicians
Risk Management/ Business Continuity Plans	Management
GIS (Map Info)	Engineers
Inventory management	Accounts/Stores
Pressure Management	Engineers/Team Leaders
Planning and design for Water and Wastewater system	Engineers
Non Revenue water management	Engineers/Team Leaders/Technicians
Financial management	Management
Strategic Planning and management	Management
SCADA Instrumentation	Operations staff
SMART Meters Scoping/Trial visit	Management/Operations
Quality Assurance/Risk Management	Management,Operations
Water Safety Planning	Engineers/Team Leaders
Groundwater exploration and abstraction	Engineers
Alternative water treatment technologies (such as desalination, RO)	Engineers
Water Governance Capacity (Water Security)	Management
Climate Risk and Resilience Planning (Water Security)	Management/Engineers

Appendix 1 – Diagnostic Framework Key Indicators

Diagnostic Framework



Performance Area	Key Performance Indicators ^b	Data Source	Score
Overall WSS Sector Performance			
Water Supply	Overall Coverage (urban/rural) *	JMP	%
	Contribution Water Utilities	Utility/JMP	%
	Contribution Other Sector Organizations	Govt/JMP	%
	Service Levels*	Utility/JMP	1 safely managed 2 basic level 2 limited 4 unimproved 5 no
Sanitation	Overall Coverage (urban/rural) *	JMP	%
	Contribution Water Utilities	Utility/JMP	%
	Contribution Other Sector Organizations	Govt/JMP	%
	Service Levels*	Utility/JMP	1 safely managed 2 basic level 2 limited 4 unimproved 5 no
	Proportion of household wastewater safely treated	UN/Habitat monitoring data	%
	Coverage and Service Levels in Schools and Health Facilities	JMP	1 safely managed 2 basic level 2 limited 4 unimproved 5 no
Gender Equality and Social Inclusion (GESI)	Minimum standards for mainstreaming GESI	JMP, Government	Descriptive
Utility Service Level			
Inclusiveness	Drinking Water Coverage in service area*	Benchmarking	%
	Sanitation Service Coverage in service area*	Benchmarking	%
Water Supply	Continuity of service*	Benchmarking	hours/day
	Continuity (customers with discontinuous supply)	Benchmarking	%

Performance Area	Key Performance Indicators ^b	Data Source	Score
	Quantity of water supply (residential consumption) *	Benchmarking	l/p/d
	Nr of microbiological tests taken per year	Benchmarking	No
	Percentage of non-compliant tests*	Benchmarking	%
Wastewater	Availability of on-site sanitation services	Utility	descriptive
	Wastewater and Faecal Sludge Quality passing primary and secondary level of treatment		%
Responsiveness to customers	Is there a customer charter and has the charter been made known?	Benchmarking	Descriptive
	Nr. of complaints /1,000 connections	Benchmarking	Number
Utility Performance			
Technical	Non-Revenue Water *	Benchmarking	%
	Energy Efficiency (Energy costs as % of operational costs)	Benchmarking/ Utility	%
Financial	EBITDA Margin (% of Revenues)	Benchmarking	%
	Operating Cost Recovery Ratio*	Benchmarking	%
HRM	Staff per 1,000 connections*	Benchmarking	Number FTE
Organization & Strategy	Aggregate Performance Ratio (AGPAR)	Benchmarking	AGPAR score
Commercial	Metering Ratio*	Benchmarking	%
	Collection Ratio*	Benchmarking	%
Maturity of Utility Systems			
Technical Systems	% Water production capacity used *	Utility	%
	% Sewerage capacity used *	Utility	%
	Power Supply Reliability *	Utility	descriptive
	Monitoring of pressure and quantities in networks *	Utility	descriptive
Financial Systems	Borrowing Capacity: debt to equity ratio *	Benchmarking System, Utility	%
	Timely and accurate financial reporting available and accessible for public *	Utility/Govt	descriptive
Organization	Training policy and implementation: number of employees undergoing training disaggregated per category and gender	Utility	descriptive
	Gender equality and social inclusivity policies in place* ^c	PWWA Benchmarking Report 2020/Utility	descriptive
	Strategy Document *	Utility	descriptive
	Organization Charts *	Utility	descriptive

Performance Area	Key Performance Indicators ^b	Data Source	Score
Innovation	Use of advanced technology *	Use of electromagnetic flowmeters, smart meters, SCADA and GIS	descriptive
	Use of advanced billing systems *	Payment by bank, automatic transfer, annual meter readings, etc.	descriptive
(Climate) Resilience	Technical resilience *	Construction, spare storage capacity, backup generators, IT backup systems.	descriptive
	Organizational resilience *	Use of emergency plans, data, emergency drills, design standards, etc.	descriptive
Natural Environment			
Topographic conditions	Type of landscape *	Utility/Govt	Accessibility
Water Resources	Availability and type *	Utility	Descriptive
Extreme weather events	Occurrence and severity *		Descriptive
Socio Economic Conditions and Demography			
Socio-economic development	Per capita GNI *	ADB/WB	GNI/capita
Affordability of 6m ³ water	% of per capita GNI	Benchmarking	%
Urban population	% Population in urban areas *	UN population data	%
Rural Population	% Population in rural areas *	UN population data	%
Outer Island Population	% Population in outer islands	UN population data	%
Population density	Nr of persons/km ²	UN population data	Number
WSS Policy Environment			
Policy/Strategy	Approved Water Sector Policy in place *	Utility/Govt	Descriptive
Gender issues	Specific Policy for women and underprivileged groups	Govt/Utility	Descriptive
Funding (gap)	Utility access to financial resources *	Utility/Govt	Descriptive
Human Resources	Availability and use of WSS training facilities *	Utility/Govt	Descriptive
Monitoring	Monitoring System in place and producing regular and reliable reporting *	Utility/Govt	Descriptive

Performance Area	Key Performance Indicators ^b	Data Source	Score
Institutional and Regulatory Environment			
Service area of the Utility	% of total population within Utility mandate*	Utility/Govt	%
	% of urban population within Utility mandate*	Utility/Govt	%
	% of rural population within utility mandate*	Utility/Govt	%
Sector Regulation (including quality standards)	Existence, responsiveness, and predictability of regulatory system	Utility/Govt/Regulator	descriptive
Tariff Setting	Reliability, transparency, and effectiveness of tariff setting system *	Utility/Govt/Regulator	descriptive
Institutional Framework	Clarity of responsibilities and level of overlap	Utility/Govt	descriptive
Level of Utility Autonomy	Formal and actual level of autonomy of utility management	Utility/Govt	descriptive

Notes:

^a The table in Appendix 2 presents the key indicators that have been identified to assess the status of the various performance areas. During the study, data have been collected on a number of these indicators to assess progress on SDG-6 in the various countries. However, it has not been possible to find data for all indicators. The results of the assessments are presented in the spider diagrams in Figure 3.5. The indicators for which no data were available have not been used in the spider diagrams.

^b Those indicators marked with an (*) have been used in developing the spider diagrams in chapter 3 of this report.

^c The types of policies in place for flexible work arrangements; maternity/paternity leave, medical leave, family leave, part-time employment, flexible core hours, rules and/or regulations to prevent sexual harassment, gender targets for share of female employees, separate toilets for men/women/gender neutral/unisex at all sites, menstrual hygiene management facilities, childcare facilities, lactation rooms, etc.

Source: Authors.

Appendix 2: Spider Diagram Scoring Table (Figure 3.1) ^a

Remarks	Scores				
	Strong-5	4	3	2	1 – Weak
Overall WSS Sector Performance					
Country wide access to safe water (safely managed and basic service level)	100%–95%	95%–85%	85%–75%	75%–50%	50%–0%
Country wide access to safe Sanitation (safely managed and basic service level)	100%–95%	95%–85%	85%–75%	75%–50%	50%–0%
Utility Service Levels					
Water Coverage Service Area	100%–95%	95%–85%	85%–75%	75%–50%	50%–0%
Sewerage Coverage Service Area	100%–95%	95%–85%	85%–75%	75%–50%	50%–0%
Continuity of service	24 hours	23 hours	22 hours	21 hours	≤20 hours
Drinking Water Quality	100%	95%–100%	90%–95%	85%–90%	≤80%
Drinking Water consumption	175–150lcd	125–150lcd	100–125lcd	75–100lcd	<75lcd
Utility Performance					
Non–Revenue Water	<25%	25%–35%	35%–45%	45%–55%	>55%
Staff Ratio	<5	5–7	7–9	9–11	>11
Operational Cost Ratio	>150%	125%–150%	100%–125%	75%–100%	<75%
Metering Ratio	100%–95%	95%–85%	85%–75%	75%–50%	50%–0%
Collection Ratio	100%–95%	95%–85%	85%–75%	75%–50%	50%–0%
Maturity of Utility Systems					
Technical Systems	Ample excess capacity in water/sewage capacity available, reliable power and adequate monitoring in place	Some excess capacity in water and sewerage systems, reliable power most of the time and most of system monitored.	Water/sewage systems operate at full capacity, regular power outages and about 75% of system is monitored.	Water/sewage systems lack capacity during peak hours, regular power outages and about 50% of system is monitored.	Water/sewage systems lack capacity to meet demand, power outages do occur often and about 50% of system is monitored.

Remarks	Scores				
	Strong-5	4	3	2	1 – Weak
Financial Systems	Regular and timely Annual Reports with the audited financial statements are prepared and accessible for the public. Debt to equity ratio < 1	Annual Reports with the audited financial statements are prepared with 1–2 years delay and accessible for the public. Debt to equity ratio 1–1.5	Annual Reports with the audited financial statements are prepared with > 2 years delay and not accessible for the public. Debt to equity ratio 1.5–2	Annual Reports with financial statements are prepared but audits are >2 years delayed and not accessible for the public. Debt to equity ratio 2 or more.	Annual Reports are not regularly prepared and not accessible to the public. Debt to equity ratio >2
Organization	Strategy document, organization structure, training policy and gender policy all available, implemented and monitored.	Strategy, organization structure, training policy and gender policy available, but only partly implemented and monitored.	Strategy, organization structure, training policy and gender policy all available, but no clear implementation or monitoring	Strategy, organization structure, training and gender policy only partly available, without clear implementation or monitoring	Strategy, organization structure, training and gender policy are mostly lacking.
Innovation	SCADA fully implemented throughout WSS systems; Smart meters installed for all customers, various payment methods in place	SCADA only partly implemented; smart meters partly installed, various payment methods in place	SCADA installed but not yet operational; Smart meters being piloted, some payment methods in place	Plans for SCADA and smart meters but not yet implemented, limited payment methods in place	SCADA not implemented; no smart meters installed, only cash payment methods in place
Resilience	Utility infrastructure is resilient against extreme events. Resilience plan in place and being implemented.	Utility infrastructure is being made resilient against extreme events. Resilience plan in place but not implemented.	Utility infrastructure is only partly resilient against extreme events. Resilience plan in place but not implemented.	Utility infrastructure is not resilient against extreme events. Resilience plan in place but not implemented.	Utility infrastructure is not resilient against extreme events. No resilience plan in place.
Natural Environment					
Topography	Easy access to towns and villages	Ease of access to towns and villages is moderate	100 to 200 islands. Ease of access to towns and villages is moderate to difficult	200 to 1000 islands. Access to towns and villages is difficult	Above 1000 islands. Access to towns and villages is very difficult

Remarks	Scores				
	Strong-5	4	3	2	1 – Weak
Water Resources	good water resources available for all of the country with excess to meet demand	good water resources available for ALL of the country but does not meet the demand	good water resources available for SOME of the country and these areas exceeds the demand	good water resources available for SOME of the country but does not meet the demand	poor water resources available for most of the country.
Exposure to extreme weather events	Extreme weather events do not normally occur	Extreme weather events only in rare cases, less than once every 10 years	Extreme weather events occasionally occur: less than once every 5 years	Extreme weather events occur regularly, once every 1–5 years.	Extreme weather events occur often, at least once every year
Socioeconomic Conditions and Demography					
Average GNI per capita	>\$10,000	\$10,000–\$5,000	\$5,000–\$2,000	\$2,000–\$1,000	< \$1,000
Urban Population	> 80%	60–80%	40–60%	20–40%	< 20%
WSS Policy Environment					
Water and Sanitation Policy	Clear WaSH policy in place, implemented and monitored	WaSH policy in place but only partly implemented and monitored due to lack of resources	WaSH Policy in place but not implemented nor monitored	Only parts of a WaSH Policy in place and only partial implementation and monitoring	No WaSH Policy in place
Access to Finance	Policies allow utility to independently generate sufficient revenues and/or borrow sufficient funds for investments	Policies allows utility to generate revenues for most investments and government assists with remaining funding and/or provides access to third party funding	Policies restrict utility in generating sufficient revenues, but government assists with sufficient funding and/or provides access to third party funding	Policies restrict utility in generating sufficient revenues and only partial support for funding from government and development partners	Policies restrict utility in generating sufficient revenues and there is limited support from government and development partners
Access to Training	Wide access to national and regional training programs for training of staff	Wide access to national training programs, moderate access to regional training programs	moderate access to national and regional training programs	moderate access to national training programs and limited access to regional programs	limited access to national and regional training programs
Institutional and Regulatory Environment					

Remarks	Scores				
	Strong-5	4	3	2	1 – Weak
Service Area	Utility has mandate for 85–100% of the population	Utility has mandate for 70–85% of the population	Utility has mandate for 55–70% of the population	Utility has mandate for 40–55% of the population	Utility has mandate for > 40% of the population
Tariff System	Tariff system well regulated, transparent, and implemented with good balance between financial sustainability for the utility and affordability for the public.	Tariff system well regulated, but only partly implemented, but with reasonable outcomes for financial sustainability for the utility and affordability for the public.	Tariff system well regulated, but not implemented with political interference and poor outcomes for either financial sustainability or affordability.	Tariff system not well regulated and implemented without balance between financial sustainability for the utility and affordability for the public.	No regulated tariff system and poor outcomes for either financial sustainability of affordability.

Note:

^a In developing the spider diagrams, use has been made of the list of Indicators presented in Appendix 2. However, as it has not been possible to find sufficient data, not all indicators listed in Appendix 2 have been used in developing the spider diagrams and only those indicators for which data for all countries and utilities were available, have been used.

Source: Authors.



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