



Government of Samoa  
Ministry of Natural Resources and Environment



## National Water and Sanitation Baseline Survey



## Final Report 2015



Funded by the European Union

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## Acronyms

AUA	Apia Urban Area
GoS	Government of Samoa
IWS	Independent Water Schemes
JMP	Joint Monitoring Program
MDGs	Millennium Development Goals
MNRE	Ministry of Natural Resources and Environment
MoU	Memorandum of Understanding
NWBS	National Water and Sanitation Baseline Survey
NWU	North West Upolu
POU	Point of use
PPS	Probability proportional to size
ROU	Rest of Upolu
SAV	Savaii
SBS	Samoa Bureau of Statistics
SWA	Samoa Water
ToR	Terms of Reference
UNICEF	United Nations Children Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WSCU	Water Sector Coordination Unit (of the Ministry of Natural Resources and Environment)

## FOREWORD

I am pleased to present this first ever Baseline Survey Report on Water, Sanitation and Hygiene in the country.

The WASH Baseline Survey is an initiative of the Water and Sanitation Sector which aims to:

1. Gain a better understanding of the water and sanitation situation nationally; and
2. Collect information about Knowledge, Attitude and Practices of the population regarding water use, sanitation status and hygiene behaviour.

The findings of the Baseline Survey will provide water and sanitation professionals such as policy makers and utilities alike with the necessary information to guide policy development and targeted interventions on the ground. Additionally, it provides useful information for monitoring purposes to measure the impacts of interventions in terms of quality and efficiency of water and sanitation services as well as users' general behavior and attitudes towards water use, water conservation, sanitation, hygiene practices and awareness.

As the Sector shifts to evidence based policy and planning, embarking on this exercise has provided critical information and data to verify the actual situation on the ground.

Moreover, the importance of community engagement in planning sector interventions, implementation, monitoring and evaluation cannot be emphasized enough. Obtaining feedback from affected communities on a regular basis will ensure their active engagement and ownership of sector developments. It will also provide a better understanding and insight into existing behavior and attitudes for targeted community outreach programs.

I would like to acknowledge and commend the hard work and support of all Sector Implementing Agencies for this initiative. In particular, I would like to acknowledge and thank the European Union, a trusted development partner of the Sector for its continuing financial support.

The Sector is grateful for the support and expertise of the Samoa Bureau of Statistics (SBS). We would not have been able to conduct the survey without them. I am truly proud of the collaborative spirit shown by the highly competent SBS Team, a sign of the continuing positive networks the Sector has been able to foster and sustain through the sector wide approach.

Lastly, as we anticipate regular surveys of this nature, I would encourage our readers and stakeholders to make use of this Report and share with us your views on how we can improve the scope of future surveys.

Faafetai tele lava,

Seumanutafa Malaki Iakopo

**CHAIRMAN**

**JOINT WATER SECTOR STEERING COMMITTEE**

## EXECUTIVE SUMMARY

### Access to piped water

The results of the National Water and Sanitation Baseline Survey (NWBS) indicate that 91.3% of Samoans have access to a piped water supply.

*Access to piped water supply in Samoa:*

	AUA	NWU	ROU	SAV	Samoa Avg
<b>SWA</b>	92.3	82.1	48.3	68.1	73.2
<b>IWS</b>	5.6	9.9	37.7	21.5	18.1
<b>Total Piped</b>	97.9%	92%	86%	89.6%	91.3%

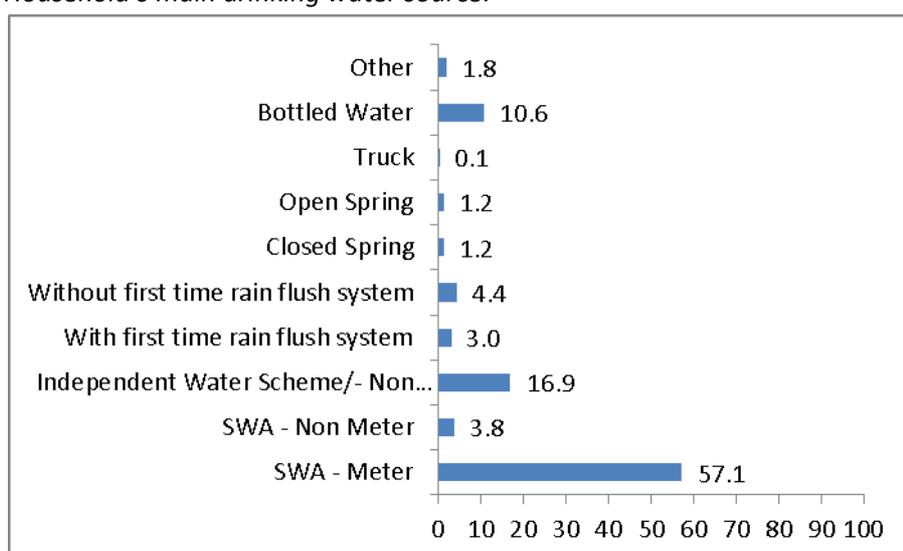
The main supplier of piped water in Samoa is the Samoan Water Authority (SWA) who in total supplies 73.2% of households, while 18.1% of households get their piped water via Independent Water Schemes (IWSs). There is some regional variation with almost complete coverage in the Apia urban area (AUA) at

97.9%. The other regional areas of Samoa (North West Upolu –NWU; Rest of Upolu – ROU; and Savaii - SAV) which can be considered as rural, also have very high rates of access to piped water (refer Table above). Reliance on IWSs is highest in ROU and SAV regions.

### Main drinking water source

For their drinking water needs, most households use SWA (60.9%) or IWS (16.9%) piped water. However a significant proportion of households (i.e. 10.6%) consume bottled water for drinking purposes. Bottled water use (as the main source for drinking purposes) is highest in the Apia urban area.

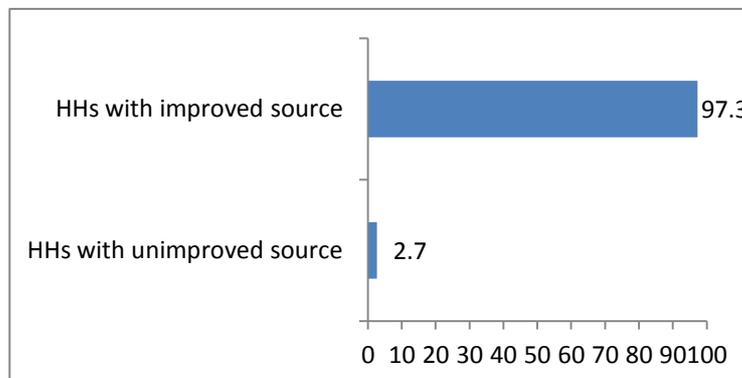
*Household's main drinking water source:*



## Access to an improved water sources

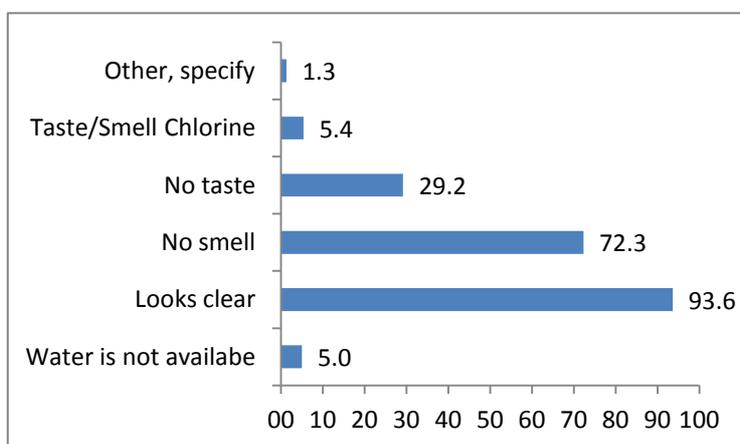
A key internationally used benchmark indicator is the 'percentage of the population that uses an improved drinking water source'<sup>1</sup>. For Samoa, the percentage of the population that uses an improved<sup>2</sup> water source is 97.3%. Disaggregated by Region, the percentages of households that use an improved source are:

- AUA: 97.5%
- NWU: 96.4%
- ROU: 96.6%
- SAV: 98.9%



## Piped Water Quality

For survey purposes piped water quality was assessed based on enumerator's observations of water quality (namely visual appearance, taste and smell) at the time of the interview. The results are therefore highly subjective. No scientific measurements of water quality were undertaken as part of this survey. The intention rather was to assess perceptions of water quality, which are often the main drivers that determine a household's water use habits and preferences.



The results show the water to be visually clear (in 93.6% of cases) and without smell (in 72.3% of cases). Only 29.2% of samples had no taste, implying that 70.8% of samples had some taste. Of concern is that only 5.4% of samples had some chlorine taste or smell. This is a very low figure given that the majority of water provided by SWA is chlorinated, and that SWA is the main supplier of piped

water in Samoa. It should also be noted that the piped water provided by IWS is not chlorinated or treated in any way, and so would not be expected to have any chlorine taste or smell.

<sup>1</sup> Ref WHO/UNICEF Joint Monitoring Program (JMP) for Water Supply and Sanitation. The JMP regularly publishes international tables allowing for international comparison of this (and other) benchmark indicators.

<sup>2</sup> Improved drinking water sources are: piped water on the premises, public taps or standpipes, boreholes, protected dug wells, protected springs or rainwater tanks. Ref WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation

Differences in water quality between SWA water, which is treated, and IWS-supplied water, which is untreated, could be expected (refer table below). This analysis confirms that only 7.2% of the households receiving SWA water had any chlorine taste or smell. As would be expected, none of the households receiving IWS water had any observed chlorine taste or smell.

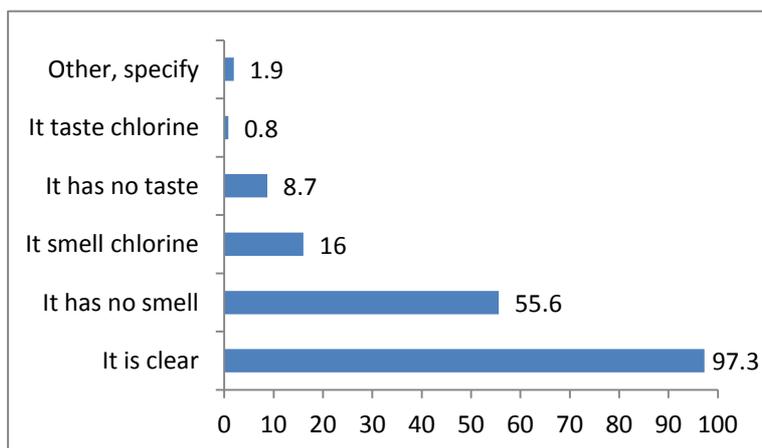
*Observe Water Quality (Results):*

		SWA	IWS
Water is not available	f	37	24
	%	3.9%	9.2%
Looks clear	f	894	234
	%	98.7%	98.3%
No smell	f	671	200
	%	74.1%	84.0%
No taste	f	291	61
	%	32.1%	25.6%
Taste/Smell Chlorine	f	65	0
	%	7.2%	0.0%

**Boiling practice**

The vast majority of respondents (86.9%) regard their water as drinkable without the need for any additional treatment. Respondent’s perception of water quality is strongly associated with water clarity (97.3%). 55.6% of respondent also rated lack of smell as indicative of good water quality. People do not strongly associate chlorine taste or smell with the fact that the water is safe to drink. The results indicate a lack of understanding of the role of chlorination and its importance to guaranteeing safe water

*How do you know the water is drinkable?*



On average 29% of respondents (that have a piped water supply) boil their water before drinking – this practice is highest in AUA where 39% reported (mainly sometimes, not always) boiling their water before drinking. Boiling water is an occasional practice, and is mostly carried out (or triggered by) perceived changes in water quality, such as after heavy rains.

Boiling is also used to get rid of the chlorine smell in water.

**Water tariff**

The results show that piped water customers are largely ignorant of the unit price of water and of their monthly consumption. This lack of knowledge/awareness will have implications for water

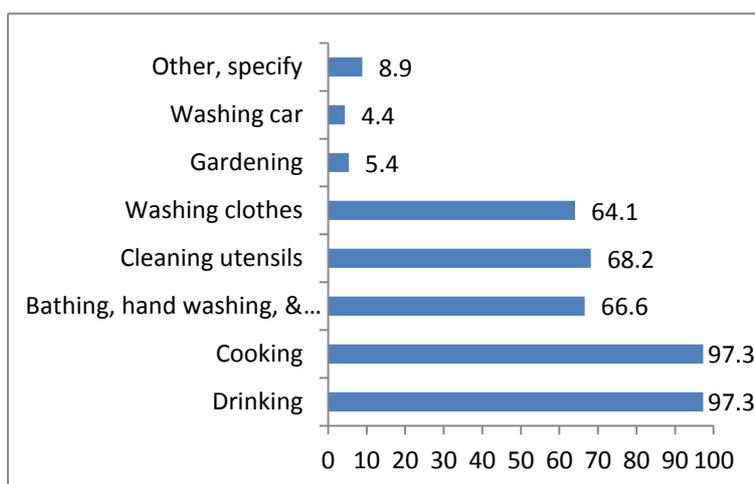
conservation/demand management strategies. However respondents largely (73.9%) trust the accuracy of their water bill, which implies a large measure of trust in the water provider agency.

In terms of the cost of water, almost half of SWA customers (i.e. 47.6%) feel that water is 'somewhat expensive' or 'very expensive', compared to only 10.7% of IWS customers. This reflects the different billing approaches of the two suppliers: SWA charge for water according to usage, which is metered, and; IWS supplies are unmetered and customers pay a monthly flat rate regardless of consumption. 25.3% of IWS customers feel that the price of water is very cheap compared to 2.2% of SWA customers. However IWS customers (94.3%) are as opposed to paying more for an improved water service as are SWA customers (90.4%).

### Rain Water Tank

Although 16.4% of households have access to a rainwater tank less than half (i.e. only 7.4%) of households use this as their main drinking water source. Rainwater is an important water source for more remote rural communities that do not have access to a piped water connection from either SWA or an IWS. Rainwater use is highest in ROU (10.5%) and SAV (13.7%) regions.

#### Rainwater usage:



Rainwater is used for a variety of purposes, and is prioritised for drinking and cooking purposes. Almost half (45.1%) of all rainwater tanks are of 5,000 litre capacity, with the remainder of smaller capacity. The majority of rainwater tanks are of 3,000 or 5,000 litres capacity. Some 43% of the respondents received some assistance in purchasing their tanks.

Rainwater is often the main water source for the more isolated households that lie outside of the SWA and IWS piped networks. Such households are typically representative of the lower socio-economic sector of Samoan society. Rainwater can also be a secondary or supplementary water source for households that do have access to a piped water supply. The vast majority of respondents regard their rainwater as drinkable without the need for any additional treatment.

In terms of reliability of rainwater tanks the results indicate that in almost half (48.2%) of all cases the tanks have insufficient water to meet all of the household needs all year long. 50% of rainwater tanks are effectively dry (i.e. unable to meet all water needs) for 1 to 2 months a year. Almost a third of tanks (32%) run dry for a longer period of 3 to 4 months a year. The results indicate the need for improved design and specification of rainwater tanks based on household water needs, annual rainfall patterns (length of dry spells), usable roof area and availability of alternative water supplies.

## Sanitation

A key internationally used JMP benchmark indicator is the *'percentage of the population that uses an improved latrine'*. For Samoa as a whole, the percentage of the population using an improved latrine (sanitation facility) is 97% based on the survey findings. Since most households in Samoa have access to piped water, the most common type of latrine in use is the flush toilet with septic tank.

The survey results indicate concerns about the structural condition and maintenance of household septic tanks. A very high percentage of respondents (82%) report that their septic tank has never been full. This suggests that either most septic tanks leak or that the householder is unaware when their tank is full. There is a high level of awareness of the need to empty their septic tank, but less understanding about how often this needs to be carried out. The function of a septic tank is also not well understood with only 51% of respondents aware that one of the key functions of a septic tank is to prevent contamination.

## Hygiene Practices

The NWBS used handwashing practice (with soap) at critical times as an indicator of hygiene practice<sup>3</sup>. It is recognized that the three critical times<sup>4</sup> for hand washing with soap are :

- 1) After visiting the toilet,
- 2) Before preparing meals, and
- 3) Before eating.

The survey results reveal that in almost half of cases (about 45%), respondents do not wash their hands at any critical times. Only a quarter, or 24%, reported washing hands at the 3 critical times.

Among the three critical times, using soap for handwashing after visiting the toilet recorded the highest percentage. Overall, around a half of respondents reported washing hands with soap after visiting the toilet. Handwashing with soap before eating was the second most common practices, at 34%. Use of soap at critical times is significantly lower in Savaii compared to the other Regions. The results indicate the need for a campaign aimed at improving hygiene awareness and practices particularly targeting rural areas.

## Solid Waste

Households use one of four methods for disposal of their waste: (i) the available collection service (ii) burying their rubbish (iii) burning their rubbish and (iv) disposing of their rubbish to open land. Of these methods, the collection service is the most improved method (if collection frequency is a

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<sup>3</sup> The NWBS adopted the identical question used by the JMP for monitoring hygiene practice internationally.

<sup>4</sup> Note:for mothers with under-five year age children, there are five critical times for hand washing with soap: 1) After visiting the toilet, 2) After cleaning the child's bottom,3) Before feeding, 4) Before preparing meals, and 5) Before eating.

minimum of twice a week) and should be the preferred method for households. The other disposal methods are harmful to the environment.

The results show that the main and most popular method of disposal is to use the regular collection service provided (71.4% of all households). The second most used method of disposal is to bury the rubbish, practiced by 16.8% of all households. The frequency of the collection service varies from 2 to 3 times a week for most (65.1%) households, to once a week (28.7% of all households). Overall 97% of all households have their rubbish collect at least once a week.

The convenience of the collection service underscores its popularity and would suggest that any non- usage of this service would be due to negative factors related to the standard of service provided, such as irregular or infrequent collection, or inadequate storage capacity at the stand.

### **Sources of Information**

The survey examined which sources were used by householders to get information on health, water and sanitation related issues. The results indicate that TV and radio are the two most popular sources of information for health, water and sanitation related matters. Health providers (and local health facilities) are the third most popular source for information on health related and water related matters. On matters related to sanitation /latrines, other family members are also an important source of information.

The survey results indicate that the three main sources of information (TV, radio and Health Providers) in combination make for an effective approach. Mass media such as TV and radio offer short-term rather than a long lasting impact and are generally unable to provide sufficient detail. TV and radio are therefore more effective at raising awareness, but less effective at getting people to take action. However when TV and/or radio are used in combination with health providers, who can provide more detail and repeat messages, it can result in a highly effective campaign leading to behaviour change.

A significant finding of the survey data is that school teachers play a relatively insignificant role as information sources in health, water and sanitation matters. Raising awareness of the importance of safe water, sanitation, and hygiene practices usually needs to start at schools and therefore teachers (supported by the school curriculum) have an important role as advocates and educators.

## **ACKNOWLEDGEMENT**

The completion of the National Water Sanitation and Hygiene Baseline Survey has been possible as the result of the support of the Samoa Water and Sanitation Sector's Implementing Agencies and its stakeholders as well as the Sector's vibrant collaboration with the Samoa Bureau of Statistics to ensure that the Baseline Survey is a well-informed and a valuable tool for the Government and the people of Samoa.

Lastly, the report also acknowledges the invaluable contribution of village representatives (Sui o Nuu's) for ensuring that the survey was conducted with ease in the villages and with the cooperation of households.

# 1. Introduction

## 1.1 Background

The National Water and Sanitation Baseline Survey (NWBS) is the first water and sanitation survey to be undertaken at the national level in Samoa. The survey aims to present an overview of the status of water, sanitation and hygiene (WASH) in rural and urban areas of Samoa. The survey has collected primary data on a number of key WASH associated indicators related to:

- Water usage from piped and non-piped (rainwater tanks) sources
- Sanitation practice and awareness around septic tank operation and maintenance
- Hygiene knowledge and practices, including incidence of diarrhea
- Solid waste disposal practices
- Level of participation in source protection
- Commonly used information sources

The NWBS will provide accurate, evidence-based sector information that can be used in a variety of ways, including:

- to assess progress towards national goals and targets;
- to target investments in the sector to areas of greatest need
- to focus attention on sector/sub sector performance across the regions of Samoa and to efficiently allocate resources.

Where possible the NWBS uses international standard survey questions<sup>5</sup> and norms in order to ensure that the survey results can also be used for the purpose of international comparisons, and for use in assessing progress towards the achievement of Millennium Development Goal (MDG) targets.

As the NWBS is a baseline survey, it is intended that the survey or elements of it will be repeated at regular intervals in the future to provide a timeline of sector progress and achievements. It is the intention of the Water and Sanitation Sector to incorporate selected Baseline Indicators from the NWBS in the next National Census Survey undertaken by the SBS.

## 1.2 Structure of the report

Section 1 – Introduction provides the background and context to the baseline survey.

Section 2 – Methodology elaborates on the key design aspects of the survey design and implementation, notably the sampling design, training of supervisors and enumerators, the fieldwork, data processing and entry.

The bulk of the report is taken up with presentation and discussion of the critical findings and results of the survey. The data has been grouped into sub categories<sup>6</sup> as follows:

Section 3 - WATER ACCESS & RELATED PRACTICES

Section 4 - PIPED WATER MODULE

Section 5 - RAIN WATER TANK MODULE

Section 6 - GENERAL (POLICY AWARENESS, PERCEPTIONS, COMMUNITY PARTICIPATION)

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<sup>5</sup> Consistent with WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP)

<sup>6</sup> This is consistent with the data sections used in the survey questionnaire.

Section 7 - SANITATION ACCESS & PRACTICES

Section 8 - HYGIENE PRACTICES

Section 9 - INCIDENCE OF DIARRHEA

Section 10 - SOLID WASTE DISPOSAL

Section 11 - SOURCES OF INFORMATION

The complete compendium of survey results is contained in Annex 1.

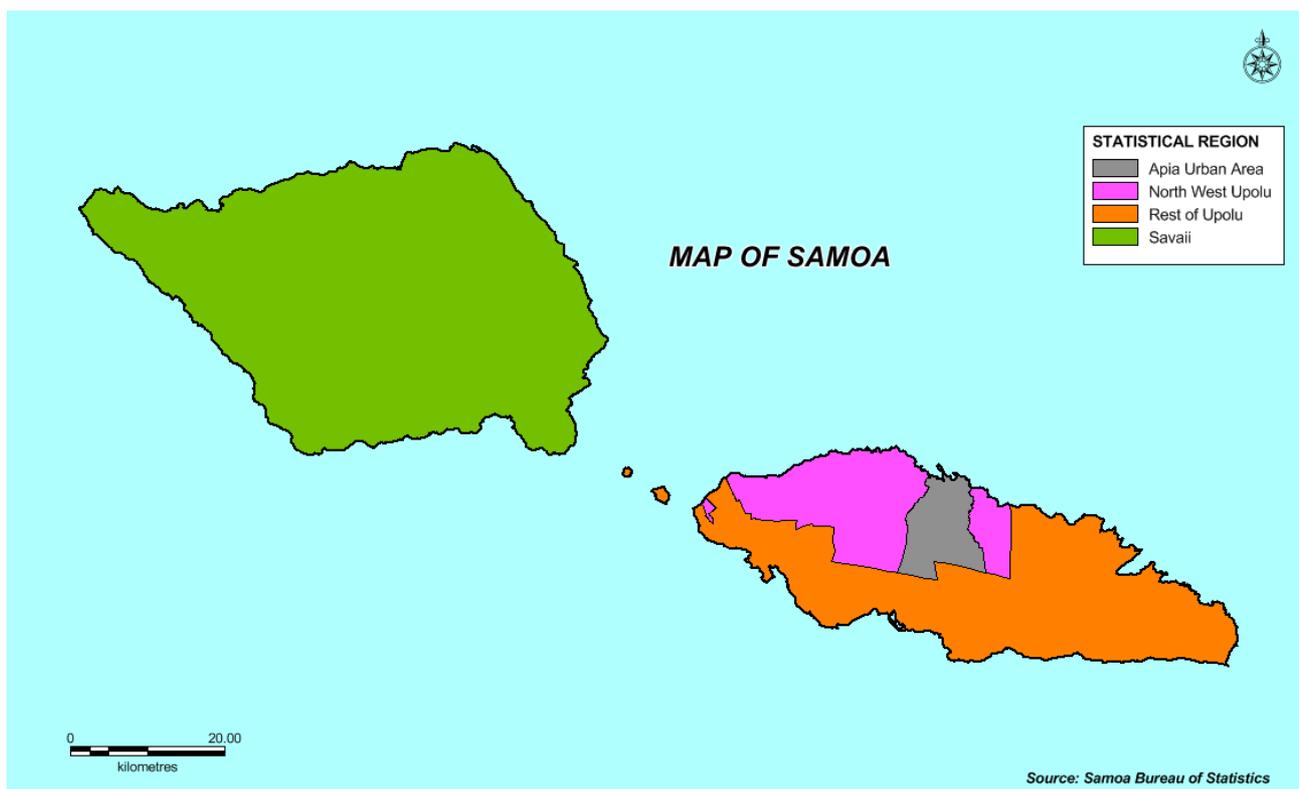
The detailed Terms of Reference (ToR) for the NWBS are contained in Annex 2.

The Survey Questionnaire is contained in Annex 3.

## 2. Methodology

### 2.1 Sampling Design

For statistical<sup>7</sup> purposes, Samoa is divided into four regions (Figure 2) namely Apia Urban Area (AUA), North West Upolu (NWU), Rest of Upolu (ROU) and Savaii (SAV). The first region is located in the urban area, while the remaining three are in the rural areas of Samoa.



**Figure 2: Statistical Regions**

The NWBS adopts a two stage random sampling using SBS- defined clusters or Primary Sampling Units (PSUs), with:

- Confidence Interval/ Precision Level = 3,5%
- Confidence Level = 95%
- Response Rate = 85% assumed
- Design Effect = 1.5
- Population size = 26,205 households
- Sample size = 1,725 households

<sup>7</sup> As used by SBS for all national surveys and has been adopted here to conform to National Census data, etc..

The first stage involved the selection of clusters or primary sampling units using probability proportional to size (PPS) resulting in a total of 208 clusters of which 71 clusters were selected from AUA, 56 in NWU, 40 in ROU and 41 in Savaii. In the second stage of selection, a fixed number of 5 households were selected systematically from the AUA clusters and a fixed number of 10 households were selected from all the rural regions due to the higher transportation costs in those regions. This resulted in a total of 353 selected households in AUA, 558 in NWU, 407 in ROU and 410 in Savaii or 1,728 sample households in total. Any difference in the final numbers (i.e. the 'Actual Households' in Table 2) is due to households which were identified for the survey, but where no respondents were present at the time of the survey visit<sup>8</sup>.

**Table 2: Survey Sampling**

Region	Clusters	Total Households	Actual Households
AUA	71	353	327
NWU	56	558	485
ROU	40	407	350
SAV	41	410	387
<b>Total</b>	<b>208</b>	<b>1,728</b>	<b>1,549</b>

## 2.2 Supervisors and Enumerators

The field survey team consisted of four field supervisors to supervise the four survey regions. This was made up of two supervisors from each of the MNRE and the SBS. Each supervisor was assigned a field team (or enumerators) to manage and to supervise during the field work.

A total of 18 enumerators were hired for the four weeks data collection period, from 27th October – 22nd November 2014. Except for NWU, the field team for each region consisted of one supervisor and four enumerators. In the case of NWU Region, one supervisor and six enumerators were assigned due to the higher number of households to be sampled.

Two of the enumerators (from NWU) were also used to carry out in house edits and coding under the supervision of (two) staff from SBS, over the period 10th November – 19th December 2014.

## 2.3 Training & Questionnaire Finalization

In preparation for the data collection and data entry the SBS held three training sessions in October 2014:

- i. Supervisor training took place on 13th and 14th October, aimed at familiarizing supervisors with the survey questionnaire and survey design in preparation for the survey pre-test prior to actual data collection. Survey questionnaire pre-testing took place on 15th October, with a pre-test sample of 19 respondents/households.

The survey pre-test was followed by a discussion-feedback session on the 16th and 17th October; participants included SBS, (four) survey supervisors, and members of water sector

<sup>8</sup> In such cases where no respondent was available for interview, call back visits were also made.

committee. The aim of the discussion was to resolve issues arising from the pre-test and to propose and agree changes to the survey questionnaire.

- ii. The second training targeted survey enumerators and field supervisors, and took place over the period 21st – 24th October. Training topics included: survey tools and logistics; administrative issues; the role of enumerators and supervisors; field work plan; team allocation; reading and understanding household lists and aerial maps, and; issues arising from the questionnaire after group discussions.
- iii. The third training was on data entry carried out over the 20th and 21st October 2014. The training used the collected data from pre-test event and aimed at ensuring the applicability of the data entry program and database format developed for the survey. The data entry training enabled testing, refinement and discussion of the results of the data entry in order to resolve issues and amend procedures accordingly.

## 2.4 Field Work

A total of four field teams were used for collecting the data during the field work, with each team comprising a supervisor and four enumerators<sup>9</sup>. The field work was conducted over four consecutive weeks from 27th October – 22nd November 2015, with all the four survey regions being enumerated simultaneously. Almost all interviews were conducted in Samoan, with only twelve interviews conducted in English. The average duration per interview was approximately thirty minutes. Each enumerator was encouraged to interview at least four household per day. Enumerators were closely monitored and controlled by their respective supervisor during fieldwork. Supervisors applied spot check to assess the compliance of enumerators to the survey guide, and provided feedback and guidance to enumerators aimed at improved performance. An additional week was scheduled (24th – 28th November) to cater for call backs in cases where further (follow-up) checking was warranted.

## 2.5 Coding/ Editing

A half-day training was conducted to familiarize the four coders (two enumerators from NWU and two staff from SBS) with some internationally standard coding guidelines namely the International Standard Classification of Occupation 2008 (ISCO 08) and to remind them of the necessary skips, edit checks and the relevant sections to be coded. The in-house coding of questionnaires was completed in the six weeks from 10th November – 19th December 2014.

## 2.6 Data Entry/ Data Processing

Four data entry operators were hired for four weeks (17th November – 12th December 2014) to undertake data entry and for one further week (from 15th – December 2014) to undertake double data entry. The NWBS baseline survey used the SBS standard *Census and Survey Processing System (CSPRO 5.0)* and data entry was supervised by the IT Manager from the SBS. Fifty percent of all entered household questionnaires were 'double entered'<sup>10</sup> (comprising every other household from each enumeration area).

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<sup>9</sup> except for NWU (as previously noted) which had six enumerators.

<sup>10</sup> Double entry is a quality control practice whereby the data is entered by two separate individuals. This practice allows for checking for consistency of data entry (ideally there should be a 100% match between the data entered by the two individuals). An unmatched error rate of less than 5% is considered acceptable.

## 3. Result A: Water Access & Related Practices

### 3.1 Available water sources

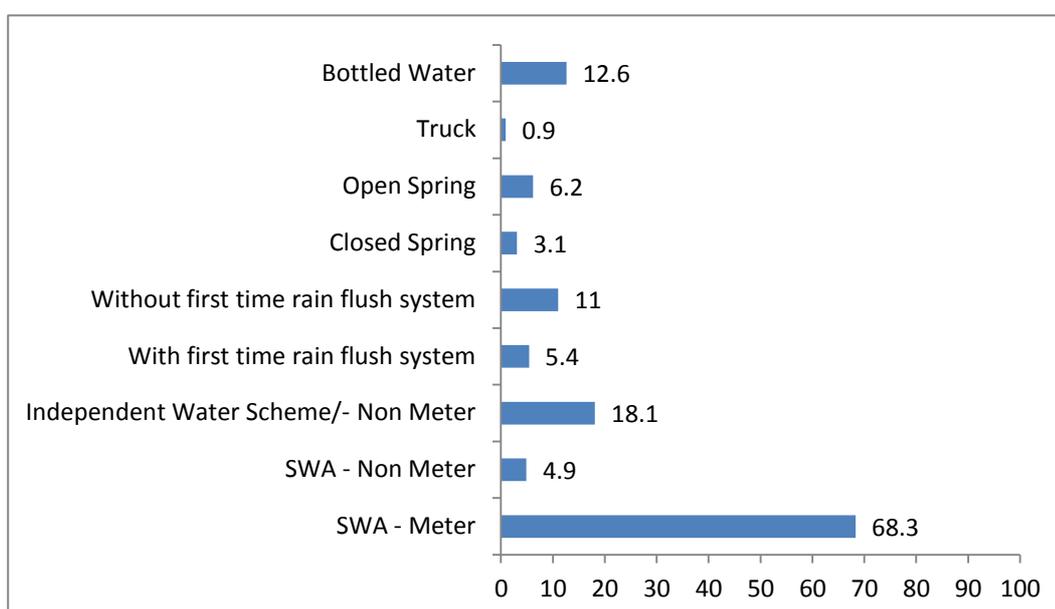
Samoa households use a variety of water sources with the four most commonly used being piped water, rain water tank, spring, and bottled water. However, as shown by the graphic below, by far the most common water source is piped water supplied by the Samoan Water Authority (SWA), and by Independent Water Schemes (IWSs). Piped water usage includes SWA Meter (68.3%), SWA Non Meter (4.9%), and IWS (18.1%). Together the three piped water sources are used by 91.3% of Samoan households.

Apart from piped water, some Samoan households also have access to rain water tanks (with/without first flush devices), spring, and bottled water. These three sources are used by 38% of all households, and hence it is obvious that some households use have more than one water sources. Rain water is used by 16.4% households, followed by bottled water (12.6%) and spring (9.3%).

Survey Question #A1 refers to all the water sources that are being accessed/used by Samoan households.

#### #A1. What water source(s) does your household use?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region.



A key internationally used benchmark indicator is the 'percentage of the population that uses an improved drinking water source'<sup>11</sup>. While all rainwater tanks are considered as 'improved drinking water sources' by the Joint Monitoring Program(JMP)<sup>12</sup>, the survey has categorized rainwater tanks into (i) those with first time rainwater flush systems and (ii) those without first time

<sup>11</sup> Improved drinking water sources are: piped water on the premises, public taps or standpipes, boreholes, protected dug wells, protected springs or rainwater tanks. Ref WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation.

<sup>12</sup> International monitoring program carried out by World Health Organization (WHO) and UNICEF.

rainwater flush systems. Rainwater tanks with a first flush system or device can produce safer water if used properly. In Samoa only 5.4% of households have a rainwater tank with the first flush system whereas 11% of households have tanks without the first flush system.

For springs, two categories are applied, namely (i) open spring and (ii) closed spring. An open spring is regarded as an unimproved water source as it is at risk of being polluted by human and animals. A closed spring is considered as an improved water source as it is protected from contamination by being covered. The results of the survey show (refer graphic above) that slightly more Samoans have open springs (6.2%) than those who have closed spring (3.1%).

The regional variation in water source usage and availability is shown in the Table below.

#### #A1. What water source(s) does your household use (by Region)?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region. Split by region.

		AUA	NWU	ROU	SAV
SWA - Meter	f	270	379	170	237
	%	83.9%	75%	48%	64.8%
SWA - Non Meter	f	27	36	1	12
	%	8.4%	7.1%	0.3%	3.3%
Independent Water Scheme/- Non Meter	f	18	50	134	79
	%	5.6%	9.9%	37.7%	21.5%
With first time rain flush system	f	13	18	14	39
	%	4%	3.6%	3.9%	10.7%
Without first time rain flush system	f	26	35	65	44
	%	8%	6.9%	18.3%	12.0%
Closed Spring	f	12	17	16	3
	%	3.7%	3.4%	4.5%	0.8%
Open Spring	f	34	5	46	12
	%	10.5%	1.0%	13.0%	3.3%
Truck	f	7	3	4	0
	%	2.2%	0.6%	1.1%	0.0%
Bottled Water	f	109	74	6	7
	%	33.7%	14.6%	1.7%	1.9%

The survey results show that access to piped water supply in Samoa is high across all regions. The Table below shows regional variation in access to piped water supply (from SWA or IWS piped system). The results show almost complete piped water coverage in the Apia urban area (97.9%), and relatively high rates of coverage in regional areas of NWU, ROU and SAV (which can be considered as rural areas). The regional variation is less than 12% overall across the four regions, and only 6% across the three rural regions (NWU, ROU, SAV).

#### Access to piped water supply in Samoa

	AUA	NWU	ROU	SAV	Samoa Avg
SWA	92.3	82.1	48.3	68.1	73.2
IWS	5.6	9.9	37.7	21.5	18.1
Total Piped	97.9%	92%	86%	89.6%	91.3%

In summary, the survey results show:

- 91.3% of Samoan households have access to a piped water supply (from either SWA or IWS)
- 73.2% of households use SWA water via either a metered or non-metered piped supply. SWA is by far the largest water provider/water source for households in Samoa.
- 18.1% of households use water from an Independent Water Scheme (IWS) via a piped non-metered supply. IWSs are the second largest provider/source of water for Samoan households. IWSs are typically simple gravity piped systems serving rural communities. All IWSs are un-metered, and provide untreated water albeit from protected spring sources. Use of water from an IWS is highest in ROU (37.7%) and SAV (21.5%) regions.
- 16.4% of households use rainwater (with or without a first flush device). Rainwater use is highest in ROU and SAV regions.
- 12.6% of households use bottled water.
- 9.3% of households use spring water (open or closed/protected springs).

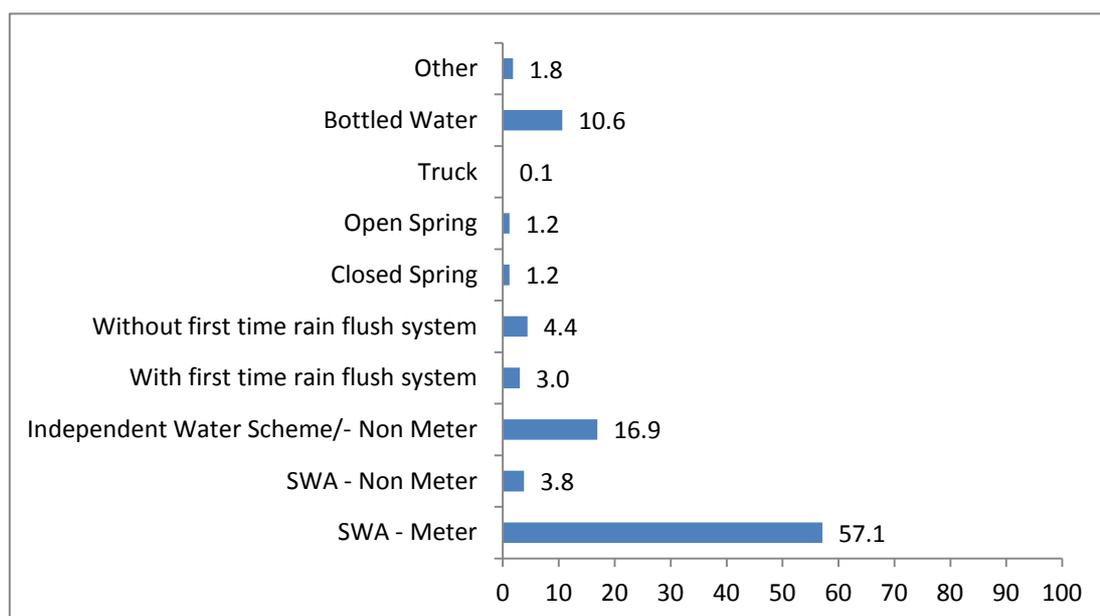
Survey Question #A1 refers to all the water sources that are being used by households. The results show that many households use more than one source of water, and make decisions about water use based on a range of possible factors, such as availability (seasonal), cost, ease of access etc. For instance in the Apia urban area (AUA) access to a SWA piped supply is high (92.3%), however 12% of households have a rainwater tank; 14.4% of households have access to spring sources and 33.7% of households also buy bottled water.

### 3.2 Drinking Water Sources

Survey Question #A3 refers to the main drinking water source used by households. While some households have more than one water source (Question #A1), it is common for a household to have only one drinking water source. Households usually choose the perceived best water available to them for their drinking purposes.

#### #A3. What is the main drinking water source for your household?

N = 1549. Interview. Filter = none. Weight on = region.[JMP]



### #A3. What is the main drinking water source for your household (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

		AUA	NWU	ROU	SAV
SWA - Meter	f	196	316	158	214
	%	60.7%	62.5%	44.6%	58.3%
SWA - Non Meter	f	16	29	1	12
	%	5.0%	5.7%	0.3%	3.3%
Independent Water Scheme/- Non Meter	f	12	42	130	79
	%	3.7%	8.3%	36.7%	21.5%
With first time rain flush system	f	0	7	10	29
	%	0.0%	1.4%	2.8%	7.9%
Without first time rain flush system	f	4	16	27	21
	%	1.2%	3.2%	7.6%	5.7%
Closed Spring	f	1	8	8	1
	%	0.3%	1.6%	2.3%	0.3%
Open Spring	f	6	1	9	2
	%	1.9%	0.2%	2.5%	0.5%
Truck	f	0	0	1	0
	%	0.0%	0.0%	0.3%	0.0%
Bottled Water	f	87	69	6	3
	%	26.9%	13.6%	1.7%	0.8%
Other, specify	f	1	18	4	6
	%	0.3%	3.6%	1.1%	1.6%
Total	f	323	506	354	367
	%	100.0%	100.0%	100.0%	100.0%

Survey Question #A3 refers to the main drinking water source used by households. The findings indicate:

- For their drinking water needs, most households use SWA (60.9%) or IWS (16.9%) piped water. However a significant proportion of households (i.e. 10.6%) consume bottled water for drinking purposes.
- Regionally, bottled water use (as the main source for drinking purposes) is highest in the Apia urban area (at 26.9%) which also has the highest access to SWA piped water. Bottled water use is also high in NWU (at 13.6%) but is significantly lower in ROU (at 1.7%) and SAV (at 0.8%).

### 3.3 Percentage of households with improved water source

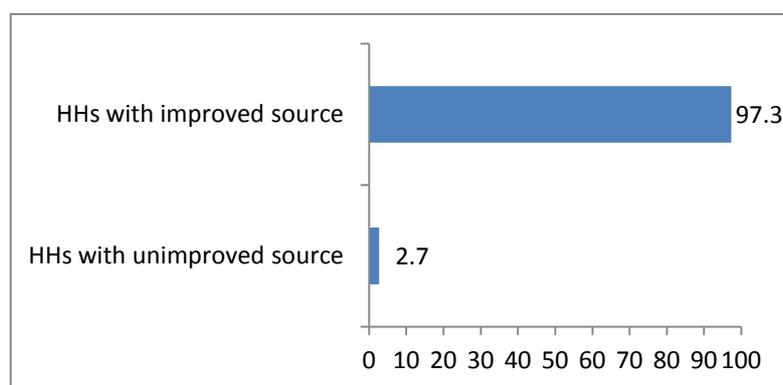
The survey results enable the key JMP reported indicator ‘percentage of the population that uses an improved drinking water source’ to be estimated with some accuracy for Samoa as a whole.

Nationally, the percentage of the population that use an improved water source is 97.3%. Regionally the percentages of households that use an improved source are:

- AUA: 97.5%
- NWU: 96.4%
- ROU: 96.6%
- SAV: 98.9%

#### #A4. HHS Water Source: Improved or Unimproved

N = 1549. Interview. Filter = none. Weight on = region.



	Frequency	Percent
unimproved source	24	1.6
improved source	1496	96.6
other <sup>13</sup>	28	1.8
Total	1549	100

#### #A5. HouseholdsWater Source: Improved or Unimproved (by Region)

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

		AUA	NWU	ROU	SAV
HHs with unimproved source	f	8	18	12	4
	%	2.5%	3.6%	3.4%	1.1%
HHs with improved source	f	315	488	343	362
	%	97.5%	96.4%	96.6%	98.9%
Total	f	323	506	355	366
	%	100.0%	100.0%	100.0%	100.0%

<sup>13</sup>. The 1.8% recorded as ‘other’ in the graphic comprises mainly (i) piped water from neighbour (assessed as improved source) and (ii) rainwater stored in open drums (assessed as unimproved source).

## 4. Result B: Piped Water Module

### 4.1 Water Quality

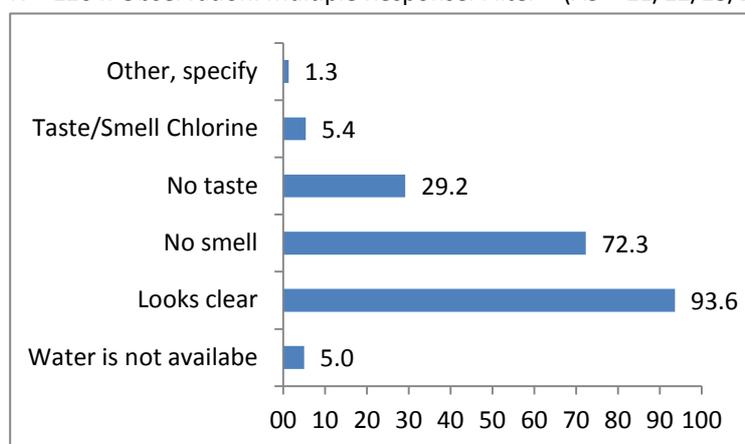
Water quality, as assessed during the survey, relates to the field enumerator's observations of water quality (based on water visual appearance, taste and smell) at the time of the interview, and is therefore highly subjective. The water quality observations relate only to households with a piped water connection to either the SWA or an IWS network (i.e. a sample size of 1,204 households). No scientific measurements<sup>14</sup> of water quality have been carried out as part of this survey, rather the intention is to assess perceptions of water quality, which are often the main drivers that determine a household's water use habits and preferences.

There are significant differences between the two main piped water providers in Samoa:

- SWA is a state owned enterprise and responsible for the delivery of water for nearly three quarters of all households in Samoa. SWA water sources include streams, springs and boreholes. With the exception of the bore water sources, all SWA provided water is treated however currently not all treated water is chlorinated.
- IWSs are community managed piped-gravity schemes, fed from spring sources. All IWS-provided water is untreated.

#### #B1. Observe Water Quality, open the tap, check the water

N = 1204. Observation. Multiple Response. Filter = (A3 = 11/12/13/14). Weight on = region.



#### #B1. Observe Water Quality, open the tap, check the water (by Region)

N = 1204. Observation. Multiple Response. Filter = (A3 = 11/12/13/14). Weight on = region. Split by region

	AUA	NWU	ROU	SAV
Water is not available	4.0	4.4	4.2	7.5
Looks clear	97.7	99.2	97.1	100.0
No smell	74.4	58.4	85.6	91.5
No taste	28.4	38.9	26.4	26.2
Taste/Smell Chlorine	9.3	10.8	1.8	0.4
Other, specify	1.4	0.3	4.0	

<sup>14</sup> In Samoa, the key water quality parameters are routinely measured and reported on by both SWA and the Samoan Ministry of Health.

The results show the water to be visually clear (in 93.6% of cases) and without smell (in 72.3% of cases). Only 29.2% of samples had no taste, implying that 70.8% of samples had some taste. Of concern is that only 5.4% of samples had some chlorine taste or smell. This is a very low figure given that the majority of water provided by SWA is chlorinated, and that SWA is the main supplier of piped water<sup>15</sup> in Samoa. It should also be noted that the piped water provided by IWS is not chlorinated or treated in any way, and so would not be expected to have any chlorine taste or smell.

There is also a significant regional variation in perceptions of ‘taste/smell chlorine’ with an almost complete absence of chlorine taste/smell in SAV (only 0.4%) and ROU (1.8%). The presence of chlorine taste or smell indicates that the water has a chlorine residual and this is necessary if water quality is to be maintained in the pipe network. It should be reiterated that this observation is subjective and not a scientific measure of the presence or absence of chlorine. Furthermore the absence of a chlorine taste/smell does not imply that the water is not safe to drink.

Differences in water quality between SWA water, which is treated, and IWS-supplied water, which is untreated, could be expected and this is examined in the table below. This analysis confirms that only 7.2% of the households receiving SWA water had any chlorine taste or smell. As would be expected, none of the households receiving IWS water had any observed chlorine taste or smell.

**#B1. Observe Water Quality, open the tap, check the water (by water provider)**

N = 1204. Observation. Multiple Response. Filter = (A3 = 11/12/13/14). Weight on = region. Split by type of piped water

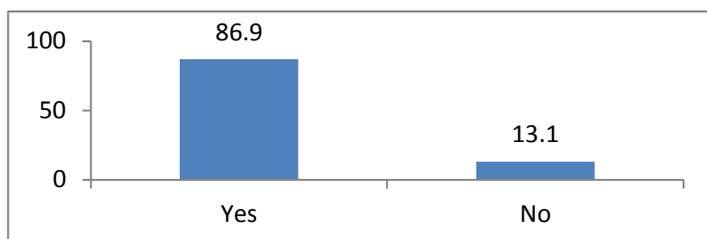
		SWA	IWS
Water is not available	f	37	24
	%	3.9%	9.2%
Looks clear	f	894	234
	%	98.7%	98.3%
No smell	f	671	200
	%	74.1%	84.0%
No taste	f	291	61
	%	32.1%	25.6%
Taste/Smell Chlorine	f	65	0
	%	7.2%	0.0%

**4.2 Boiling practice & other PoU water treatment**

This section examines ‘point of use’ (POU) water treatment (also known as household level water treatment) as practiced by households to make their water safe for drinking or other purposes.

**#B3. Is the water drinkable without any treatment?**

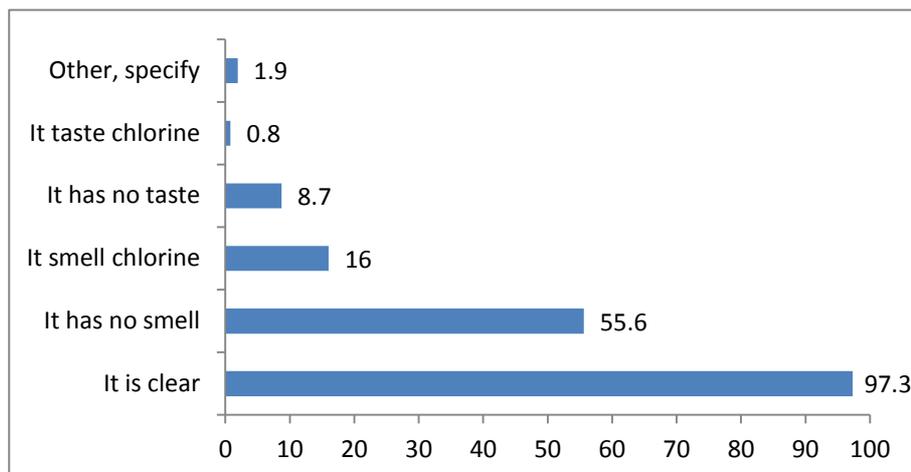
N = 1204. Interview. Filter = (A3 = 11/12/13/14). Weight on = region.



<sup>15</sup> Approximately 80% of all piped water is provided by SWA.

**#B4. How do you know the water is drinkable? N = 1047.**

Interview. Multiple Responses. Filter = (A3 = 11/12/13/14 & B3=1). Weight on = region.

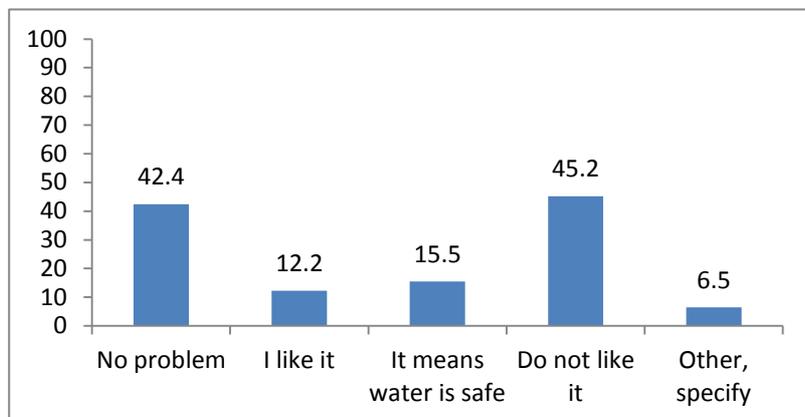


The vast majority of respondents (86.9%) regard their water as drinkable without the need for any additional treatment. Respondent’s perception of water quality is strongly associated with water clarity (97.3%). 55.6% of respondent also rated lack of smell as indicative of good water quality. People do not strongly associate chlorine taste or smell with the fact that the water is safe to drink. About 38% of respondents in NWU reported a chlorine smell in their water, with other regions reporting 15.2% (AUA), 4.2% (ROU) and not recorded (SAV).

**#B6. How do you like it when your water has such a smell/taste?**

Interview. Multiple Responses.

N = 477. Filter = (A3 = 11/12/13/14 & B3=1 & B4 = C/ D or B5 = 1). Weight on = region.



**#B6. How do you like it when your water has such a smell/taste?**

Interview. Multiple Responses. N = 477. Filter = (A3 = 11/12/13/14 & B3=1 & B4 = C/ D or B5 = 1).

Weight on = region. Split by region.

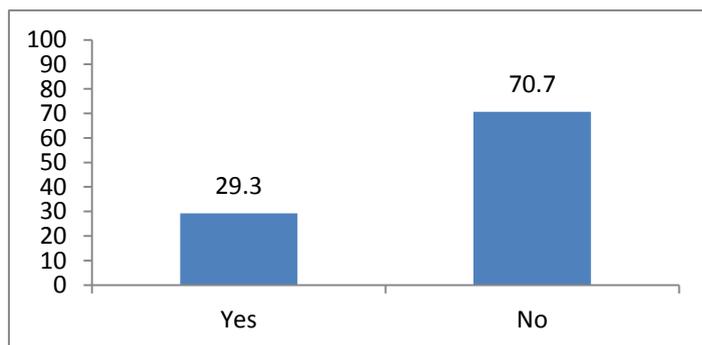
	AUA	NWU	ROU	SAV
No problem	54.1	40.5	28.6	15.0
I like it	8.8	14.6	10.0	15.0
It means water is safe	16.2	16.5	4.0	30.0
Do not like it	36.5	45.4	65.3	55.0
Other, specify	4.1	9.6		

In cases where respondents do detect a chlorine taste or smell (sample size 477), the results are fairly evenly divided between those that have no problem with the chlorine smell/taste (42%) and those that do not like it if the water has a chlorine smell/taste (45%). AUA and NWU regions had highest response of 'no problem' with chlorine taste/smell and ROU and SAV recorded the highest level of dislike of chlorine smell/taste.

The results clearly indicate a community misperception and lack of understanding of the role of chlorination and its importance to guaranteeing safe water. This needs to be addressed through a community education campaign which explains the function and benefits of chlorination.

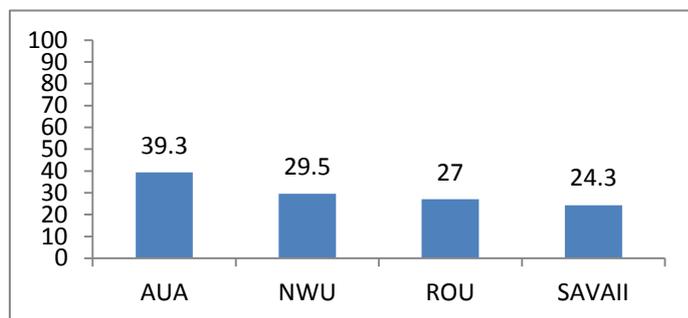
**#B7. Do you boil water before you drink it?**

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region.



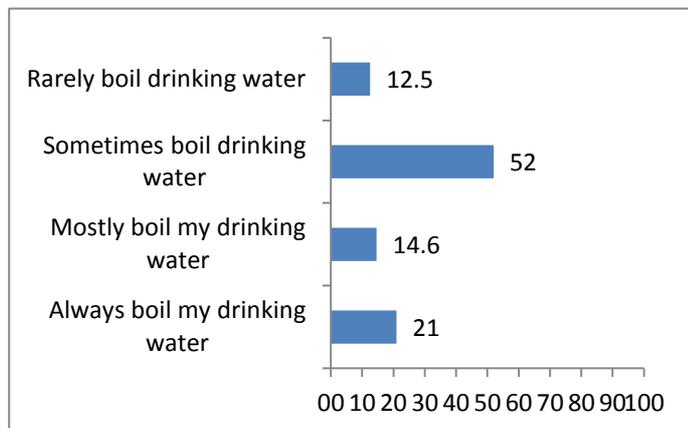
**B7. Do you boil water before you drink it?**

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by region.



**#B8. How often do you boil your drinking water?**

Interview. N = 353. Filter = (A3 = 11/12/13/14; B7 =1). Weight on = region.



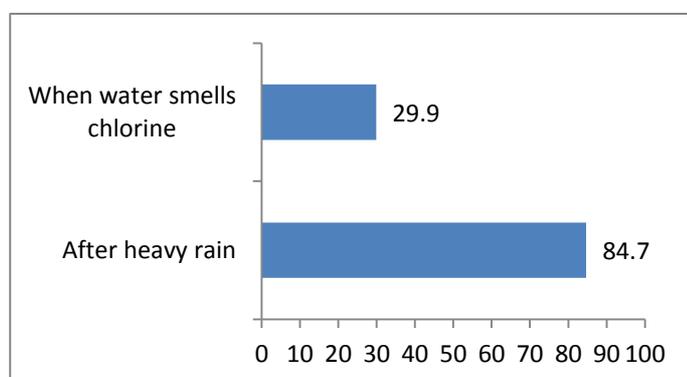
### #B8. How often do you boil your drinking water?

Interview. N = 353. Filter = (A3 = 11/12/13/14; B7 =1). Weight on = region. Split by region.

		AUA	NWU	ROU	SAV
<b>Always boil my drinking water</b>	f	29	20	16	9
	%	33.0%	17.5%	20.8%	12.2%
<b>Mostly boil my drinking water</b>	f	6	6	21	18
	%	6.8%	5.3%	27.3%	24.3%
<b>Sometimes boil drinking water</b>	f	37	71	35	40
	%	42.0%	62.3%	45.5%	54.1%
<b>Rarely boil drinking water</b>	f	16	17	5	7
	%	18.2%	14.9%	6.5%	9.5%
<b>Total</b>	f	88	114	77	74
	%	100.0%	100.0%	100.0%	100.0%

### #B9. When do you boil your drinking water?

Interview. Multiple Responses. N = 279. Filter = (A3 = 11/12/13/14, B7 =1 & B8 = 2/3/4). Weight on = region.



### #B9. When do you boil your drinking water (by Region)?

Interview. Multiple Responses. N = 279. Filter = (A3 = 11/12/13/14, B7 =1 & B8 = 2/3/4).

Weight on = region. Split by region.

		AUA	NWU	ROU	SAV
<b>After heavy rain</b>	f	51	69	55	61
	%	86.4%	73.4%	88.7%	95.3%
<b>When water smells chlorine</b>	f	7	50	16	10
	%	11.9%	53.2%	25.8%	15.6%

On average 29% of respondents (that have a piped water supply) boil their water before drinking – this practice is highest in AUA where 39% reported (mainly sometimes, not always) boiling their water before drinking. Frequency of boiling varied, with an average of 21% stating that they always boiled their water before drinking. This practice was most common in AUA where a third of respondents (33%) stated that they always boil their drinking water. Boiling water is an occasional practice, and is mostly carried out (or triggered by) perceived changes in water quality, such as after heavy rains. Boiling is also used to get rid of the chlorine smell in water.

### 4.3 Water supply reliability

#### #B13. (By Region) In the last six months, typically how many hours was the water available in the day?

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
< 8 hours a day	3.1	15.2	14.5	12.5
8 - 12 hours a day	5.4	14.5	9.0	8.2
13 - 17 hours a day	4.5	10.1	1.7	1.6
18 - 22 hours a day	3.6	4.7	7.3	3.3
Almost or 24 hours a day	82.1	54.5	67.1	74.1
Other, specify	1.3	1.0	0.3	0.3
Total	100.0	100.0	100.0	100.0

The results for water supply reliability show significant regional variability. Access to a 24-hour piped water supply is highest in AUA (at 82.1%) and lowest in NWU (at 54.5%). Approximately 30% of NWU respondents reported water availability of 12 hours or less daily, compared to only 8.5% of AUA respondents. When comparing water availability by water provider (i.e. SWA versus IWS) there is surprisingly little variation (Table below).

#### #B13. In the last six months, typically how many hours was the water available in the day (by water provider)?

Interview. N = 1204.

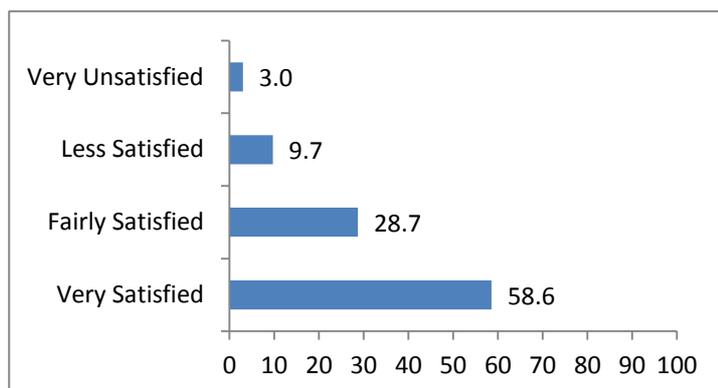
Filter = (A3 = 11/12/13/14). Weight on = region. Split by type of piped water.

		SWA	IWS
< 8 hours a day	f	110	36
	%	11.7%	13.8%
8 - 12 hours a day	f	93	26
	%	9.9%	10.0%
13 - 17 hours a day	f	48	10
	%	5.1%	3.8%
18 - 22 hours a day	f	43	14
	%	4.6%	5.4%
Almost or 24 hours a day	f	643	172
	%	68.2%	65.9%
Other, specify	f	6	3
	%	0.6%	1.1%
Total	f	943	261
	%	100.0%	100.0%

## 4.4 Satisfaction and complaint handling

### B15. How satisfied are you with your piped water supply?

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region.



### B15. How satisfied are you with your piped water supply?

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
Very Satisfied	60.7	60.8	37.8	73.4
Fairly Satisfied	26.3	31.4	37.2	18.7
Less Satisfied	9.8	4.1	21.5	5.9
Very Unsatisfied	3.1	3.6	3.5	2.0
Total	100.0	100.0	100.0	100.0

The results show that respondents are highly satisfied with their piped water supply. The percentage of respondents reporting that they are 'fairly satisfied' or 'highly satisfied' is:

- 87% in AUA
- 92.2% in NWU
- 92.1% in SAV and
- 75% in ROU.

When assessed by water provider (i.e. SWA versus IWS supply, refer Table below):

- 88.9% of the SWA customers, compared to
- 81.6% of IWS customers

reported that they are 'fairly satisfied' or 'highly satisfied' with their piped water supply. This is not a significant variation given the major differences between these two providers in terms of: management capacity, technical expertise, resources.

### #B15. How satisfied are you with your piped water supply (by water provider)?

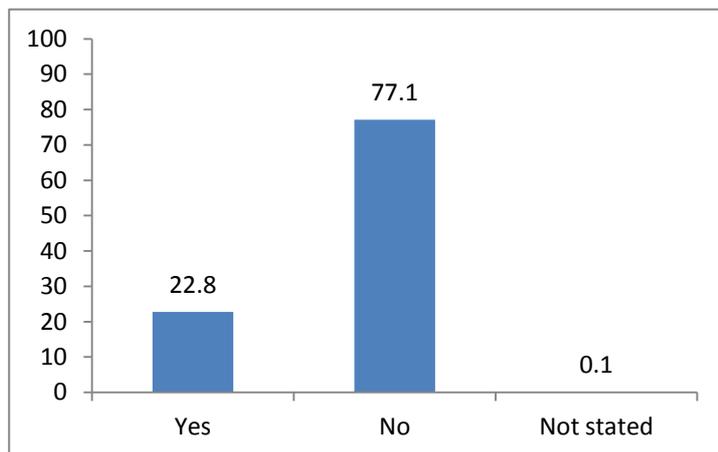
Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by type of piped water.

		SWA	IWS
Very Satisfied	f	568	137
	%	60.3%	52.5%
Fairly Satisfied	f	269	76
	%	28.6%	29.1%
Less Satisfied	f	84	33
	%	8.9%	12.6%

Very Unsatisfied	f	21	15
	%	2.2%	5.7%
Total	f	942	261
	%	100.0%	100.0%

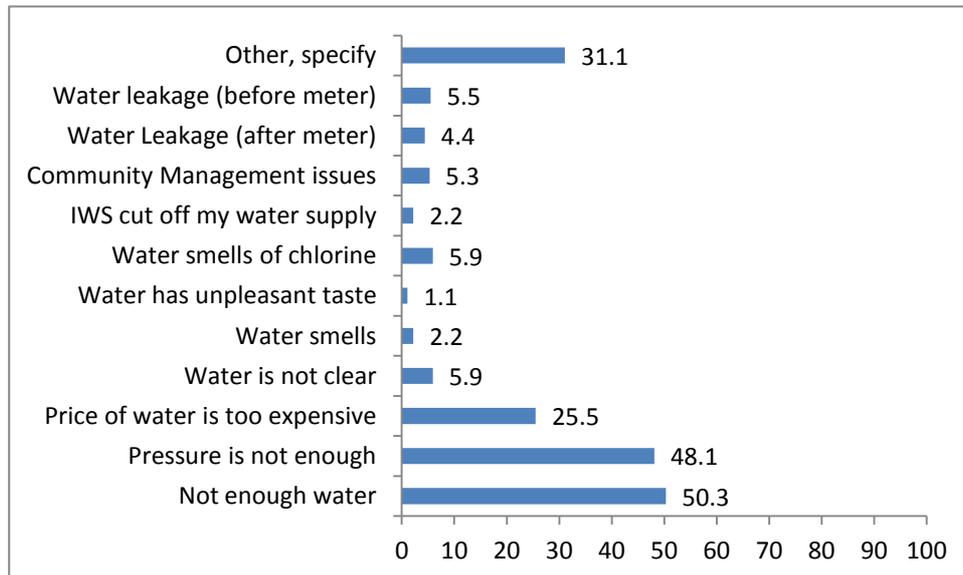
### B17. Have you had any complaints about your water supply?

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region.



### #B18. What were the complaints about?

Interview. Multiple Responses. N = 274. Filter = (A3 = 11/12/13/14 & B17 = 1). Weight on = region.



### #B18. What were the complaints about (by Region)?

Interview. Multiple Responses. N = 274. Filter = (A3 = 11/12/13/14 & B17 =1). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
Not enough water	39.0	50.5	44.2	73.9
Pressure is not enough	37.3	49.5	40.3	71.7
Price of water is too expensive	22.4	26.9	35.1	10.6
Water is not clear	1.7	6.5	10.4	2.2
Water smells	3.4	2.2		4.3
Water has unpleasant taste		2.2	1.3	
Water smells of chlorine	3.4	10.9	1.3	6.4
IWS cut off my water supply	1.7	2.2	2.6	2.2
Community Management issues		15.1	1.3	
Water Leakage (after meter)	8.6	3.2	3.9	2.2
Water leakage (before meter)	5.2	7.6		10.6
Other, specify	29.3	34.8	40.3	10.6

Only 22.8% of respondents have ever lodged a complaint about their water supply, and typically these complaints relate to insufficient availability of water, lack of pressure, and the cost of water. The percentage of complaints received is similar in the case of SWA and IWS (refer Table below).

### #B17. Have you had any complaints about your water supply (by water provider)??

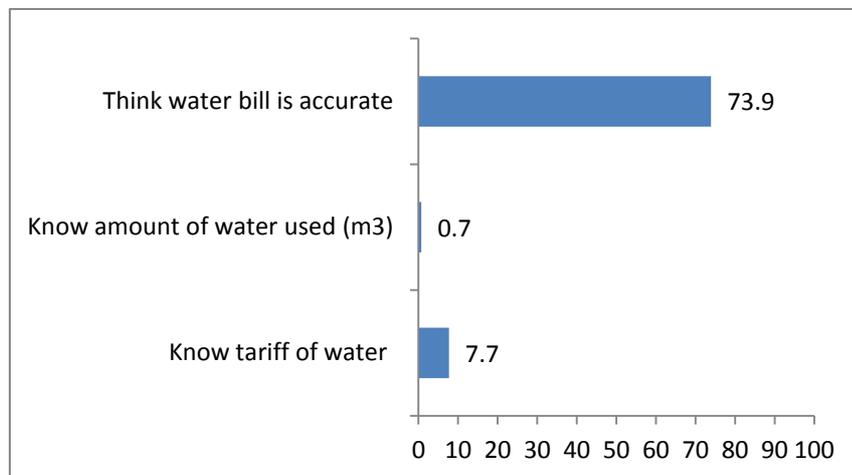
Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by type of piped water.

		SWA	IWS
<b>Yes</b>	f	219	56
	%	23.2%	21.4%
<b>No</b>	f	723	206
	%	76.7%	78.6%
<b>Not stated</b>	f	1	0
	%	0.1%	0.0%
<b>Total</b>	f	943	262
	%	100.0%	100.0%

## 4.5 Tariff awareness & tariff increase acceptance

### #B22/#B24/#B26 Knowledge on Water Tariff, Amount of Water Used and Perception on Accuracy of Water Bill

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region.



The results show that piped water customers are largely ignorant of the unit price of water and of their monthly consumption. This lack of knowledge/awareness will have implications for water conservation/demand management strategies. However respondents largely (73.9%) trust the accuracy of their water bill, which implies a large measure of trust in the water provider agency.

### #B27. What do you think about the current price of your piped water (by water provider) ?

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by type of piped water.

		SWA	IWS
Very expensive	f	104	11
	%	11.0%	4.2%
Somewhat expensive	f	345	17
	%	36.6%	6.5%
Rather cheap	f	435	105
	%	46.2%	40.2%
Very Cheap	f	21	66
	%	2.2%	25.3%
Do not know	f	35	61
	%	3.7%	23.4%
Not stated	f	2	1
	%	0.2%	0.4%
Total	f	942	261
	%	100.0%	100.0%

**#B28. To improve service quality, namely to increase water availability and better treatment of the water, are you willing to pay more for water (by water provider)?**

Interview. N = 1204. Filter = (A3 = 11/12/13/14). Weight on = region. Split by type of piped water.

		SWA	IWS
Yes	f	88	15
	%	9.3%	5.7%
No	f	852	246
	%	90.4%	94.3%
Not stated	f	2	0
	%	0.2%	0.0%
Total	f	942	261
	%	100.0%	100.0%

In terms of the cost of water, almost half of SWA customers (i.e 47.6%) feel that water is 'somewhat expensive' or 'very expensive', compared to only 10.7% of IWS customers. This reflects the different billing approaches of the two suppliers: SWA charge for water according to usage, which is metered, and; IWS supplies are unmetered and customers pay a monthly flat rate regardless of consumption. 25.3% of IWS customers feel that the price of water is very cheap compared to 2.2% of SWA customers. However IWS customers (94.3%) are as opposed to paying more for an improved water service as are SWA customers (90.4%).

## 5. Result C: Rain Water Tank Module

Although 16.4% of households have access to improved<sup>16</sup> rainwater less than half (i.e. only 7.4%) of households use this as their main drinking water source. Rainwater is an important water source for more remote rural communities that do not have access to a piped water connection from either SWA or an IWS. Rainwater use is highest in ROU (10.5%) and SAV (13.7%) regions (refer also Section on Water Access & Related Practices).

Due to the small sample sizes (e.g AUA: 4 households; NWU: 23 households; ROU: 37 households, and; SAV: 50 households) the data may not be truly representative of regional conditions and so the analysis will be primarily at the national level.

		AUA	NWU	ROU	SAV	Total
HHs with rain water as main drinking water source	f	4	23	37	50	114
	%	1.2%	4.5%	10.5%	13.7%	7.4%
HHs that do not have/ use rain water as main drinking water source	f	319	483	317	316	1435
	%	98.8%	95.5%	89.5%	86.3%	92.6%
Total	f	323	506	354	366	1549
	%	100.0%	100.0%	100.0%	100.0%	100.0%

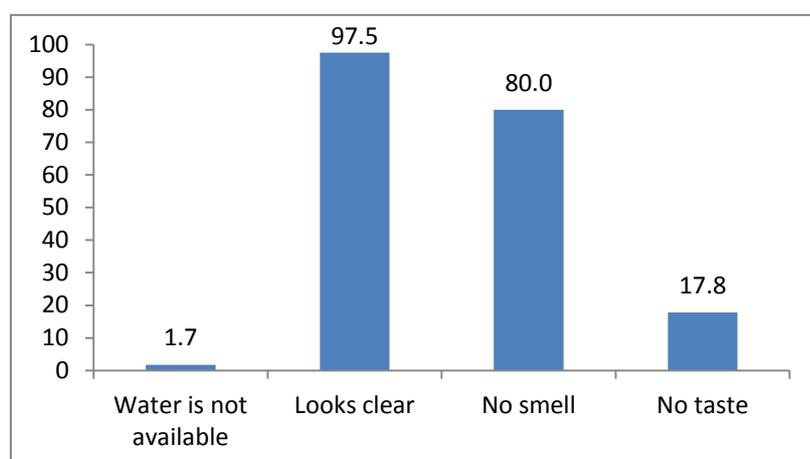
### 5.1 Water quality

Water quality relates to the field enumerator's observations of water quality (based on water visual appearance, taste and smell) at the time of the interview, and is therefore highly subjective. The water quality observations relate only to households with a rainwater tank (i.e. a sample size of 115 households or 7.4% of all households sampled).

The results show the water to be visually clear (in 97.5% of cases) and without smell (in 80% of cases). Only 17.8% of samples had no taste, implying that 82.2% of samples did have some taste.

#### #C1. Observe Water Quality, open the tap, check the water

N = 115. Observation. Filter = (A3 = 21/22). Weight on = region.



<sup>16</sup> i.e. a covered rainwater tank with or without a first flush device.

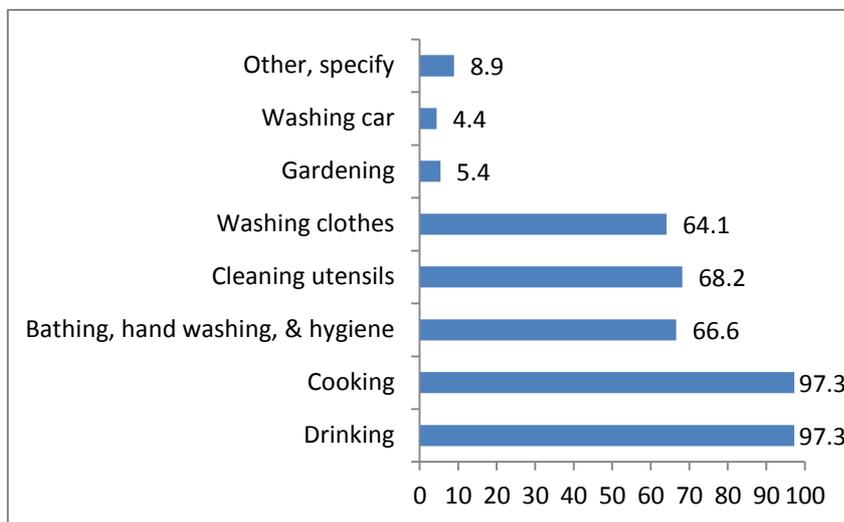
## 5.2 Water usages and rain water tank profile

Rainwater is used for a variety of purposes, and is prioritised for drinking and cooking purposes. Almost half (45.1%) of all rainwater tanks are of 5,000 litre capacity, with the remainder of smaller capacity (although in a significant number of cases the tank volume was not specified and marked as 'other, specify'). The majority of rainwater tanks are of 3,000 or 5,000 litres capacity. Some 43% of the respondents received some assistance in purchasing their tanks.

Rainwater is often the main water source for the more isolated households that lie outside of the SWA and IWS piped networks. Such households are typically representative of the lower socio-economic sector of Samoan society. Rainwater can also be a secondary or supplementary water source for households that do have access to a piped water supply. Increasingly households are being encouraged to install rainwater tanks as a supplementary water source, to reduce water demand from the piped systems, and to improve water security.

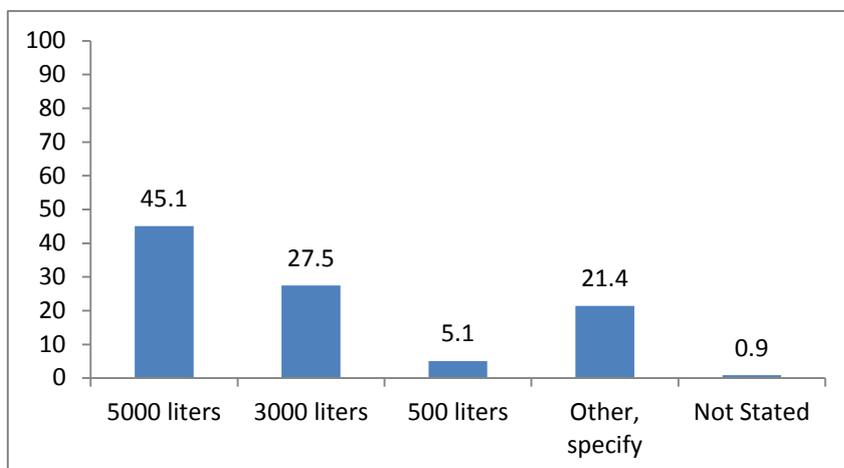
### #C2. What do you use the water in your rain water tank for?

N = 115. Interview. Multiple Responses. Filter = (A3 = 21/22). Weight on = region.



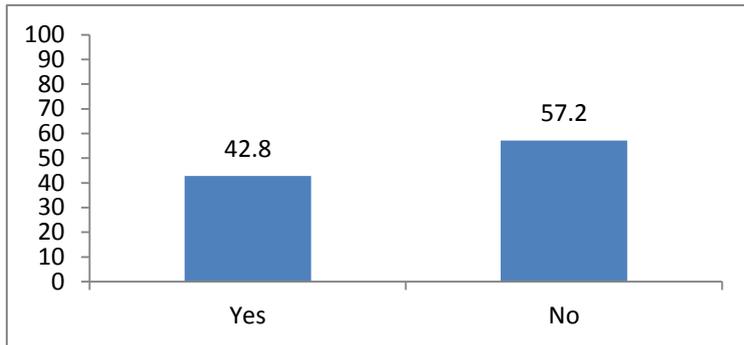
### #C3. Observe the rain water tank. Take note of the tank volume.

N = 115. Observation. Filter = (A3 = 21/22). Weight on = region.



#### #C4. Did you receive assistance in purchasing your rain water tank?

N = 115. Interview. Filter = (A3 = 21/22). Weight on = region.

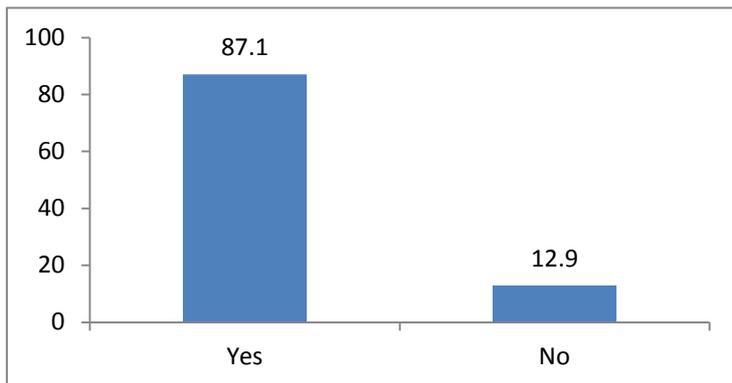


### 5.3 Boiling practice & other PoU water treatment

This section examines the practice of boiling water (from rainwater tanks) for the purpose of making the water safe for drinking or other purposes. Boiling of water is a 'point of use' (POU) water treatment, otherwise known as a 'household level water treatment'. It is practiced by households when they consider that their water is not safe for drinking (or other) purposes.

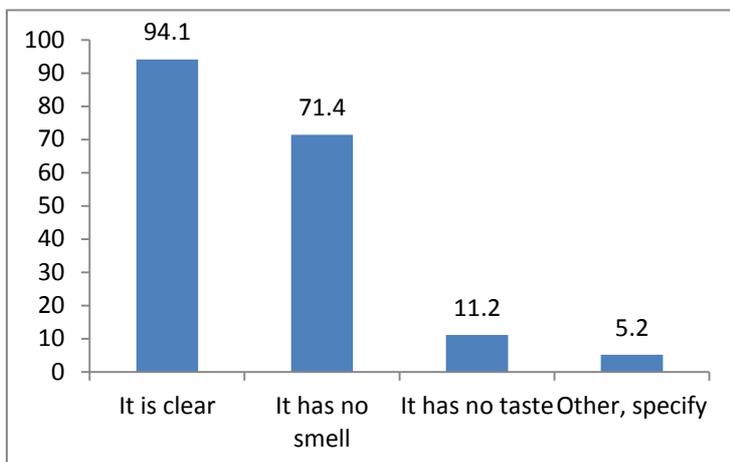
#### #C7. Is the rain water from the tank drinkable without any treatment?

N = 115. Interview. Filter = (A3 = 21/22). Weight on = region.



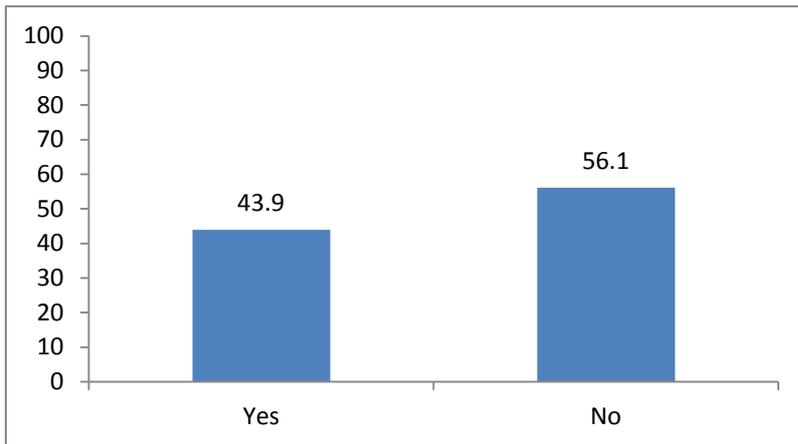
#### #C8. How do you know that the rain water from the tank is drinkable?

N = 100. Interview. Filter = (A3 = 21/22 & C7 = 1). Weight on = region.



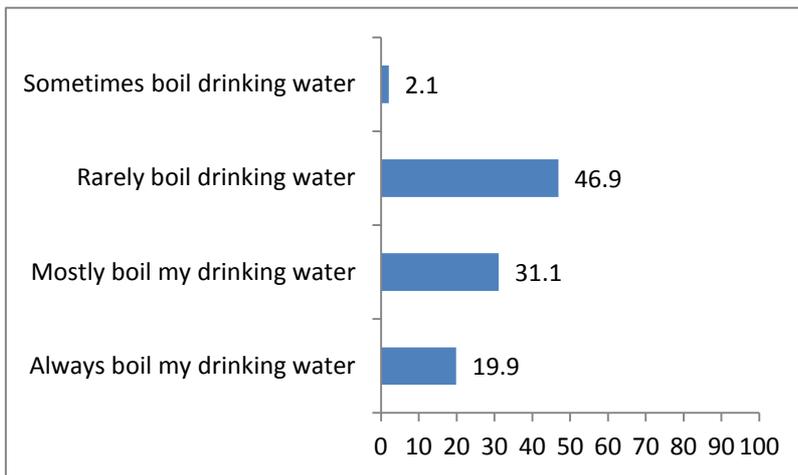
**#C9. Do you boil your rain water from the tank before you drink it?**

N = 115. Interview. Filter = (A3 = 21/22). Weight on = region. .



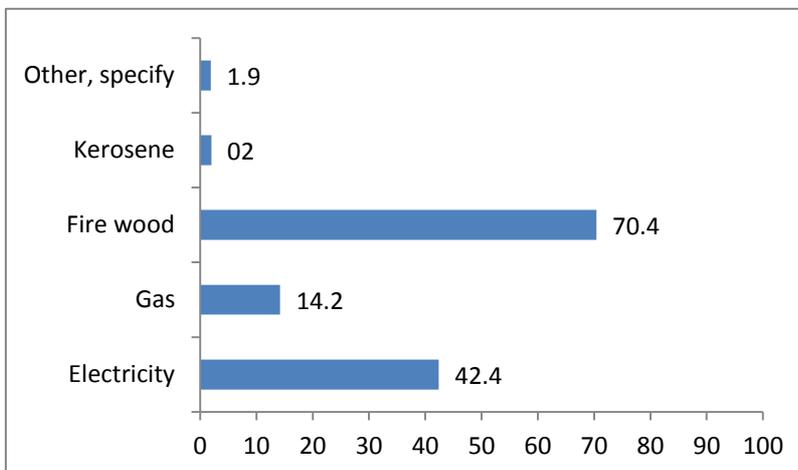
**C11. How often do you boil water from the tank before you drink it?**

N = 50. Interview. Filter = (A3 = 21/22 & C9 = 1). Weight on = region.



**#C10. What fuel do you use to boil the rain water?**

N = 50. Interview. Filter = (A3 = 21/22 & C9 = 1). Weight on = region.

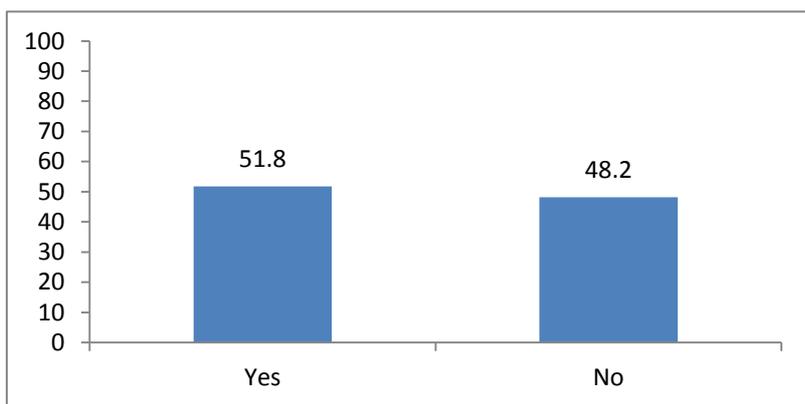


Respondent's perception of water quality is strongly associated with water clarity (94.1%) and lack of smell (71.4%) which they perceive as indicative of good water quality. The vast majority of respondents regard their water as drinkable without the need for any additional treatment. For those households that do boil their drinking water, the most common fuel used for boiling is firewood.

## 5.4 Reliability of rain water tank

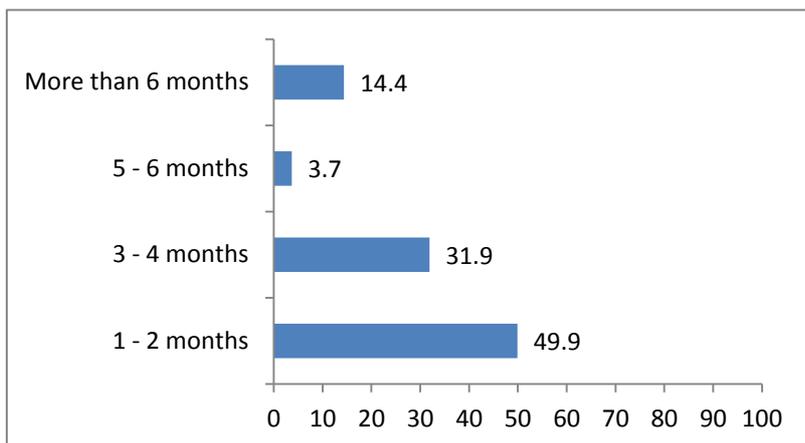
### #C14. Does your rainwater tank provide sufficient water to meet all of your household needs all year long?

N = 115. Interview. Filter = (A3 = 21/22). Weight on = region.



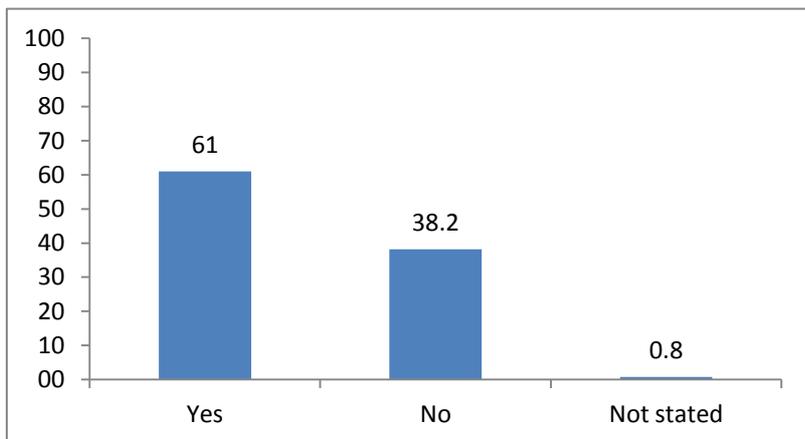
### #C15. For how many months was your rainwater tank NOT able to meet your household water needs?

N = 55. Interview. Filter = (A3 = 21/22 & C14 = 2). Weight on = region.



**#C17. Do you have an alternative source of water in place in an event of prolong dry season ?**

N = 115. Interview. Filter = (A3 = 21/22). Weight on = region.



In terms of reliability of rainwater tanks the results indicate that in almost half (48.2%) of all cases the tanks have insufficient water to meet all of the household needs all year long (question #C14). 50% of rainwater tanks are effectively dry (i.e. unable to meet all water needs) for 1 to 2 months a year. Almost a third of tanks (32%) run dry for a longer period of 3 to 4 months a year. And for 18% of rainwater tanks the period is even longer. The results indicate that rainwater tanks are of insufficient capacity. In addition 61% of respondents state they have no alternative water sources in the event of a prolonged dry spell.

The results indicate the need for improved design and specification of rainwater tanks based on household water needs, annual rainfall patterns (length of dry spells), usable roof area and availability of alternative water supplies.

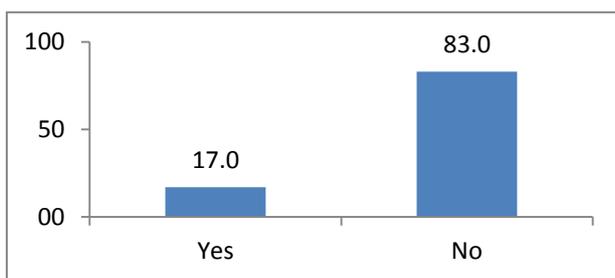
## 6. Result D: Awareness and Perceptions

### 6.1 Policy awareness and support

The purpose of questions D1, D2 and D3 is to assess levels of community awareness and support for a proposed government plan to require all new houses to install a rainwater tank. As the results indicate, there is overall a low level of awareness (17%) of this proposed plan, with the exception of Savaii where 32% of respondents had knowledge of it. Despite the low level of awareness there is potentially strong support for such a plan (question D3) and a good level of understanding within the community as to the purpose of such a plan (question D2). While the results indicate good support for such a plan, caution is needed in interpreting theoretical support in the absence of realistic details (such as costs, etc). However the results strongly suggest the need for an awareness campaign to increase public awareness and to provide further details of the plan.

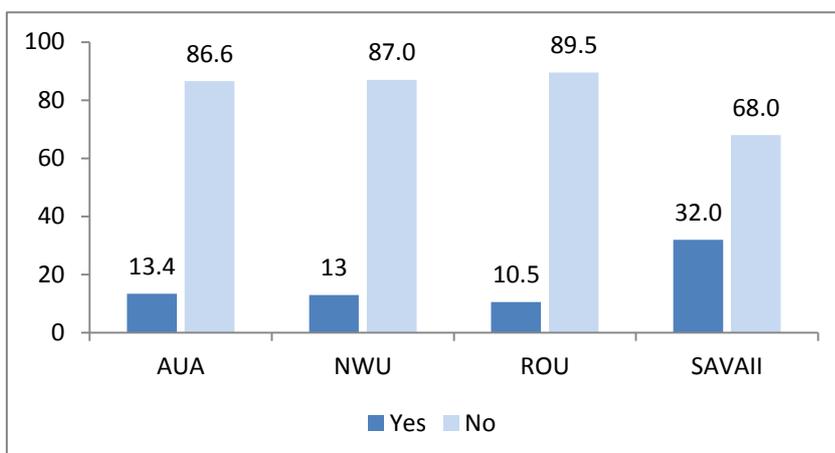
#### #D1. Are you aware of government's plan that might require new houses to have a rain water tank?

N = 1549. Interview. Filter = none. Weight on = region.



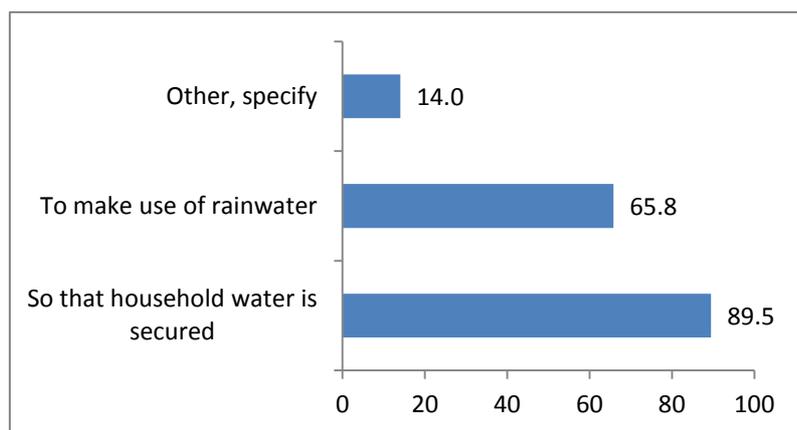
#### #D1. Are you aware of government's plan that might require new houses to have a rain water tank (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.



## #D2. In your view why is such a plan needed?

N = 1549. Interview. Filter = none. Weight on = region.



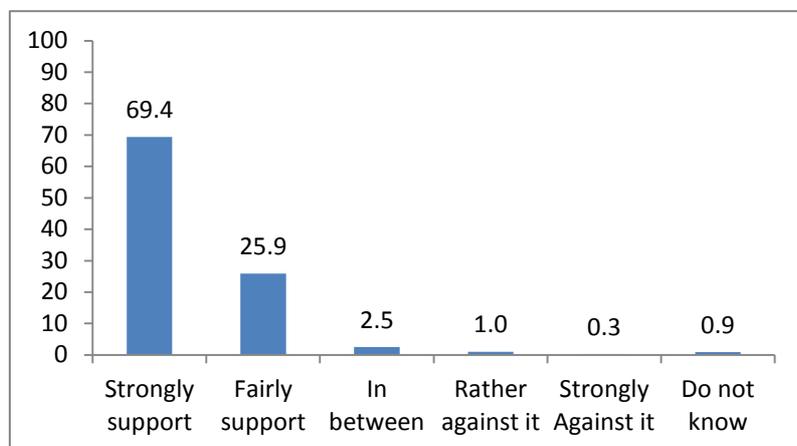
## #D2. In your view why is such a plan needed?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>So that household water is secured</b>	94.1	87.5	86.8	90.7
<b>To make use of rainwater</b>	74.6	53.0	67.3	74.0
<b>Other, specify</b>	3.4	34.2	8.8	0.5

## #D3. Do you support such plan?

N = 1549. Interview. Filter = none. Weight on = region.



## #D3. Do you support such plan (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Strongly support</b>	69.7	73.9	48.9	82.8
<b>Fairly support</b>	22.6	24.0	43.5	14.7
<b>In between</b>	5.3	1.4	4.0	
<b>Rather against it</b>	0.3	0.6	2.8	0.3
<b>Strongly Against it</b>	1.5			
<b>Do not know</b>	0.6	0.2	0.8	2.2

## 6.2 Perception of water scarcity & responsible party

Increasingly water is being seen as a scarce resource, with Pacific island nations considered especially vulnerable to climate change impacts. A well-founded understanding that water is a limited resource, which can become scarce if not properly managed and conserved, is fundamental if communities are to accept measures to increase water security.

The purpose of questions D4, D5 and D6 is to examine community attitudes to water scarcity and water conservation. The results indicate that a relatively high percentage of all respondents (40.1%) believe that water will never be scarce in their village. Regionally, SAV had the highest percentage of people (49.6%) who believe that water will never be scarce in their village. Strategies aimed at improving water security and promoting water conservation will need to address community perceptions and their relative complacency about water scarcity. For those that do believe water could become scarce in their village, there is relatively strong belief that factors such as 'poor management of water resource' and 'climate change' could be the main causes of scarcity.

The results (question #D6) show that Samoans feel a limited personal responsibility for water conservation, with the exception of AUA where 50.8% of respondents felt that the household or their family had some responsibility for conserving water. In the other regions relatively few respondents felt that water conservation was their personal responsibility (NWU-2.8%; ROU-15.5%; SAV-4.1%). In NWU 74% of respondents felt that this was mainly the responsibility of 'All Samoans'; the comparable figures for ROU and SAV were 47.7% and 49.3% respectively. The flip-side of thinking that this is the responsibility of 'everyone/all Samoans' is that no one wants to take personal responsibility (who is the leader?).

### #D4. In your view could water ever be scarce in your village ?

N = 1549. Interview. Filter = none. Weight on = region.

	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Yes</b>	884	57.1	57.1	57.1
<b>No</b>	621	40.1	40.1	97.2
<b>Do not know</b>	41	2.6	2.6	99.8
<b>Not stated</b>	3	0.2	0.2	100.0
<b>Total</b>	1549	100.0	100.0	

### #D4. In your view could water ever be scarce in your village (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Yes</b>	53.9	67.5	53.8	48.8
<b>No</b>	41.2	30.7	42.5	49.6
<b>Do not know</b>	5.0	1.2	3.7	1.6
<b>Not stated</b>		0.6		
	100.0	100.0	100.0	100.0

### #D5. In your view, what could be the main causes of water scarcity?

N = 884. Interview. Filter = (D4=1). Weight on = region.

	Frequency	Percent	Valid Percent	Cumulative Percent
Natural factors human cannot prevent	128	14.5	14.5	14.5
People degrading natural resource	175	19.8	19.8	19.8
People destroying forest/trees	259	29.3	29.3	29.3
Poor management of water resource	349	39.5	39.5	39.5
Climate change	603	68.3	68.3	68.3
Other, specify	193	21.9	21.9	21.9

### #D6. Who do you think has the most responsibility for conserving water to meet the future needs of all Samoans?

N = 1549. Interview. Filter = None. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
Government	13.9	15.2	9.3	27.7
Chief of village	3.1	3.0	15.0	12.9
Villagers	2.2	3.2	10.2	3.6
All Samoans	25.1	72.0	47.7	49.3
Household/family	50.8	2.8	15.5	4.1
Other, specify	5.0	3.9	2.3	2.5
	100.0	100.0	100.0	100.0

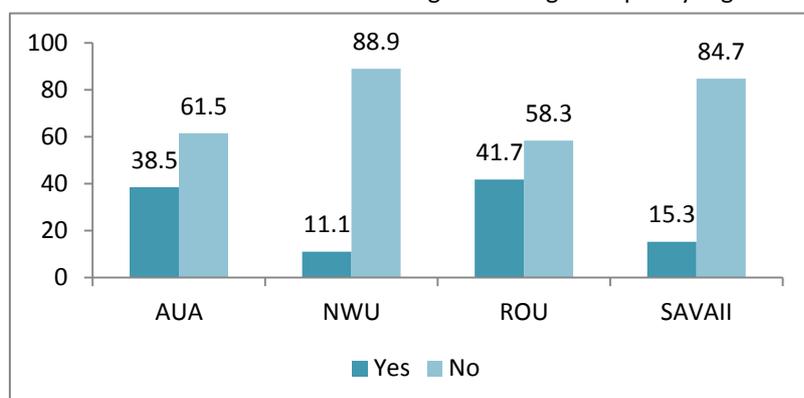
## 6.3 Participation in protecting water source

The results on rates of participation to protect water sources show obvious differences between respondents receiving water from SWA compared to an IWS. IWSs are community owned schemes that rely on community involvement, and it would be expected that this would include community works to protect water sources. The results show 56.3% of IWS respondents participate in such works, compared to only 15.5% of respondents who are customers of SWA.

The main activity that communities help with is cleaning the springs. The results show low levels of participation in meetings even for households with IWS (i.e. 21.1% of households with IWS compared to 15.1% of households with SWA).

### #D7. Do you participate in protecting watersource (by Region)?

N = 1549. Interview. Filter = None. Weight on = region. Split by region.



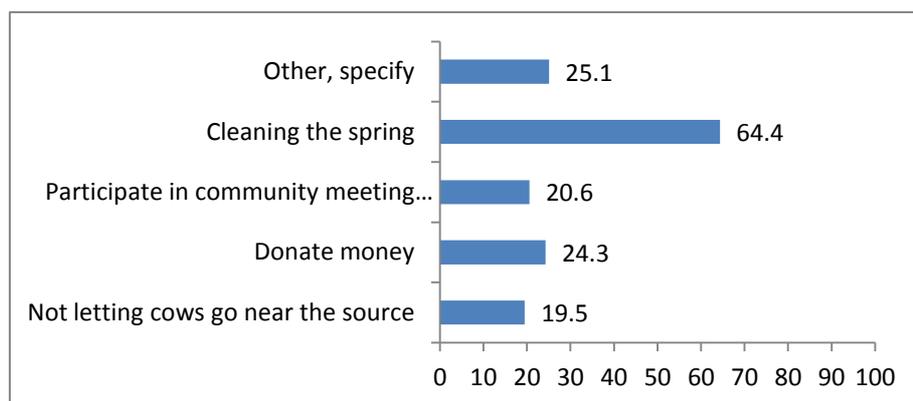
### #D7. Do you participate in protecting water source (by provider)?

N = 1204. Interview. Filter = (HHs with SWA). Weight = region..

		HHs with SWA	HHs with IWS
<b>Yes</b>	f	146	147
	%	15.5%	56.3%
<b>No</b>	f	797	114
	%	84.5%	43.7%
<b>Total</b>	f	943	261
	%	100.0%	100.0%

### #D8. What do you do to protect water source?

N = 384. Interview. Filter = (D7 = 1). Weight on = region.



### #D8. What do you do to protect water source (by Region)?

N = 384. Interview. Filter = (D7 = 1). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Not letting cows go near the source</b>	19.2	31.6	4.7	47.3
<b>Donate money</b>	21.6	24.6	30.4	16.1
<b>Participate in community meeting on water</b>	17.6	39.3	14.2	25.0
<b>Cleaning the spring</b>	64.5	57.1	76.2	41.1
<b>Other, specify</b>	19.2	46.4	23.8	20.0

### #D8. What do you do to protect water source (by provider)?

N = 293 Interview. Filter = (HHs with SWA & IWS; D7 = 1). Weight = region.

		HHs with SWA	HHs with IWS
<b>Not letting cows go near the source</b>	f	32	27
	%	22.10%	18.20%
<b>Donate money</b>	f	18	51
	%	12.30%	34.50%
<b>Participate in community meeting on water</b>	f	22	31
	%	15.10%	21.10%
<b>Cleaning the spring</b>	f	99	100
	%	68.30%	67.60%

## 7. Result E: Sanitation Access & Practices

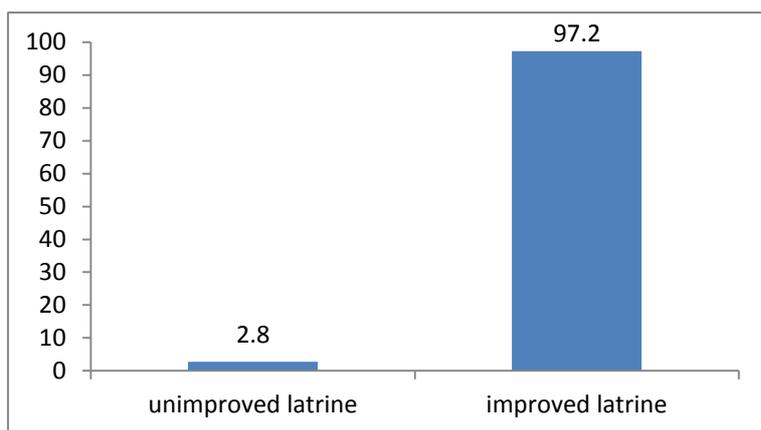
### 7.1 Type of Toilet/Latrine

An important international benchmark indicator is ‘the percentage of the population using an improved latrine’<sup>17</sup>. This indicator is used by the JMP to monitor progress internationally towards the achievement of the established MDG targets. For Samoa as a whole, the percentage of the population using an improved latrine (sanitation facility) is 97% based on the survey findings. It should be noted that the most recent published JMP data for Samoa<sup>18</sup> (based on 2012 estimates) shows only 92% of the population are using improved sanitation. The current survey data provides an accurate and current assessment of the sanitation situation in Samoa and shows that progress towards the achievement of sanitation goals has been better than previously estimated.

Since most households in Samoa have access to piped water, the most common type of latrine in use is the flush toilet with septic tank<sup>19</sup> (refer graph and table below).

#### Households using an improved sanitation facility

N = 1549. Interview. Filter = none. Weight on = region.



#### Households using an improved sanitation facility (by Region)

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

		AUA	NWU	ROU	SAV	Avg
<b>Unimproved latrine</b>	f	4	18	8	14	
	%	1.2%	3.6%	2.3%	3.8%	<b>2.8%</b>
<b>Improved latrine</b>	f	319	488	347	352	
	%	98.8%	96.4%	97.7%	96.2%	<b>97.2%</b>
<b>Total</b>	f	323	506	355	366	
	%	100.0%	100.0%	100.0%	100.0%	100.0%

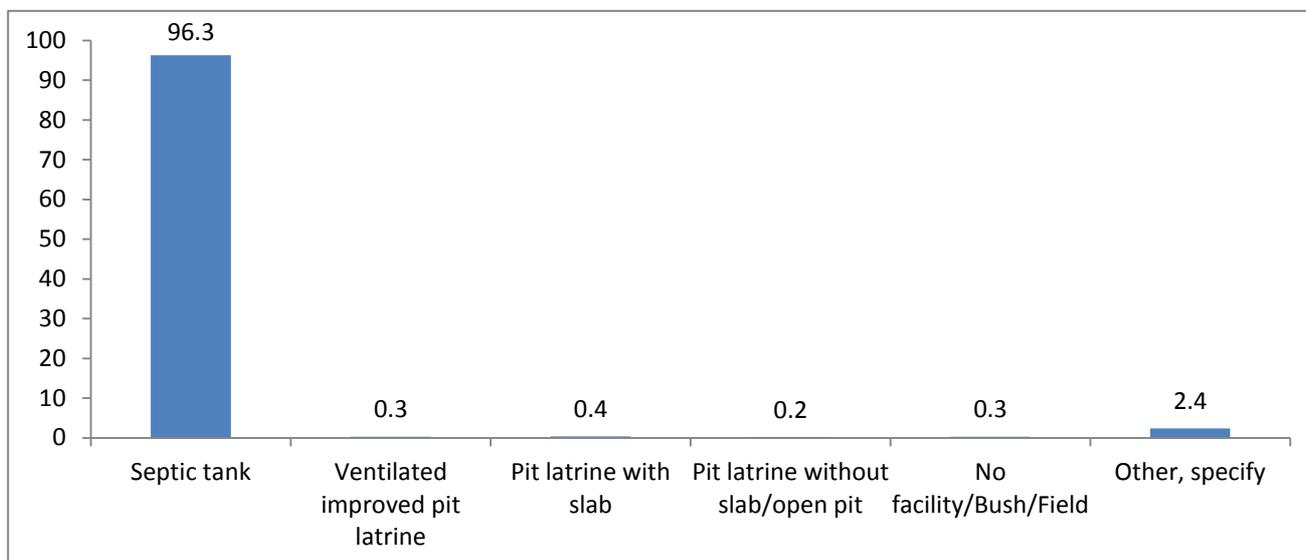
<sup>17</sup> The definition of an improved latrine includes: flush toilet or pour-flush toilet connected to a sewer system or septic tank, ventilated improved pit latrine or simple pit latrine with slab. Ref WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation.

<sup>18</sup> Progress on Drinking-Water and Sanitation 2014 Update, JMP/WHO/UNICEF.

<sup>19</sup> Throughout this report the term septic tank also implies that the household has a flush toilet.

## #E1. Type of toilet/latrine household mainly use

N = 1549. Interview. Filter = none. Weight on = region.



## #E1. Type of toilet/latrine household mainly use - by Region.

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
Septic tank (Pour Flush)	98.8	96.0	97.2	93.7
Ventilated improved pit latrine			0.6	0.8
Pit latrine with slab		0.4		1.4
Pit latrine without slab/open pit		0.4		0.3
No facility/Bush/Field	0.6	0.4		
Other (mostly pit without slab)	0.6	2.8	2.3	3.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

## 7.2 Quality of septic tank & knowledge around septic tank

Questions #E5 to #E15 explore the septic tank structure, operation and maintenance aspects and levels of understanding of the purpose/function of the septic tank.

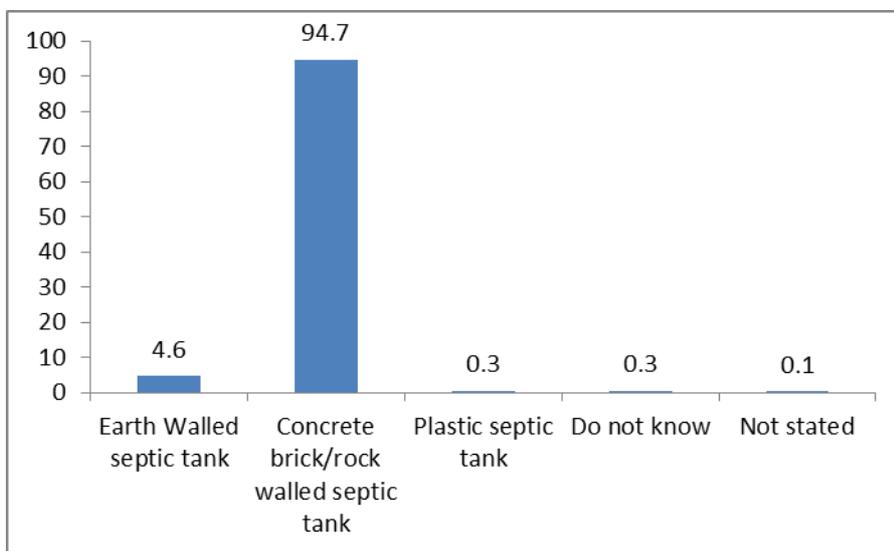
Assessments about the physical structure of the septic tank were made by observation of the exposed surface slab (by the enumerator) and by interview questions. A visually inspection of the inside of the septic tank was not practical nor was it attempted. The vast majority of septic tanks have a concrete cover slab and concrete brick or stone masonry walls. All septic tanks in Samoa are required to have concrete floor slabs, although this could not be verified during the survey. The results show that there is little adoption to date of alternative septic tank structures, such as plastic/polyethylene septic tanks.

The results (question #E6) show that most septic tanks are more than 5 years old on average, although in ROU almost a third of the tanks (30%) are two to four years old, and 14.5% are less than a year old.

A major concern is that a very high percentage of respondents (82%) report that their septic tank has never been full (question #E7). On a regional basis, this ranges from 68% in AUA to 95% in SAV. This suggests that either most septic tanks leak or that the householder is unaware when their tank is full and of the need to empty it. For the 18% of reported cases where the septic tank has been full, most respondents have stated that they empty their tank, although there is significant regional variation in this practice, with only two thirds (66.7%) of respondents in SAV stating that they have ever emptied their tank when it has become full (question #E9). In the other regions the comparable figures are 100% for AUA, 93.3% for NWU and 80.3% for ROU. The most common method of emptying a septic tank is to use a commercial pump out service (question #E11) although in SAV 38.5% of respondents stated that they pumped out their tank themselves.

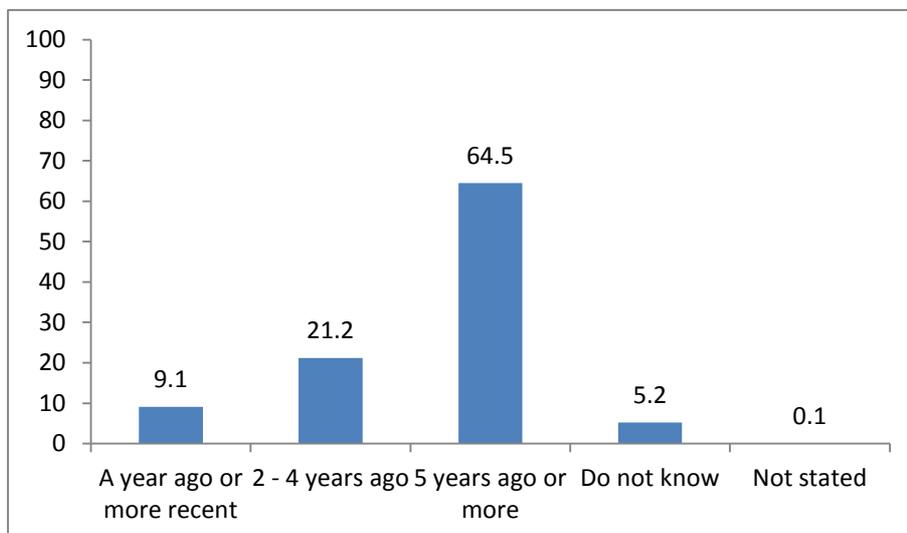
**#E5. What is the septic tank made of (for the main toilet/ latrine in E1)**

N = 1492. Interview. Filter = (E1 = 1). Weight on = region. Split by region.



**#E6. When was the septic tank built?**

N = 1492. Interview. Filter = (E1 = 1). Weight on = region.



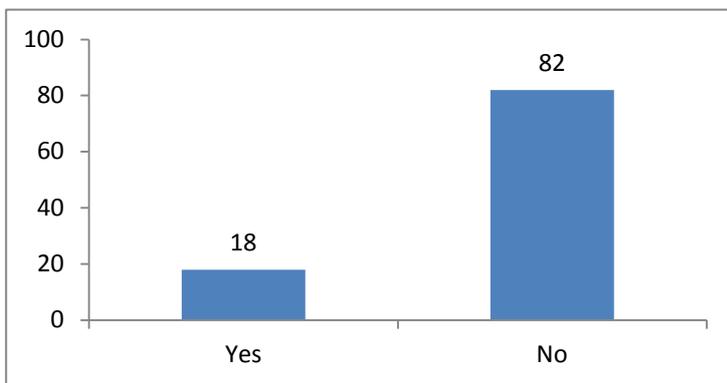
### #E6. When was the septic tank built ( by Region)?

N = 1492. Interview. Filter = (E1 = 1). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
A year ago or more recent	7.5	7.8	14.5	7.3
2 - 4 years ago	13.5	19.5	29.9	21.8
5 years ago or more	70.2	66.0	53.2	68.0
Do not know	8.5	6.6	2.3	2.9
Not stated	0.3			
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

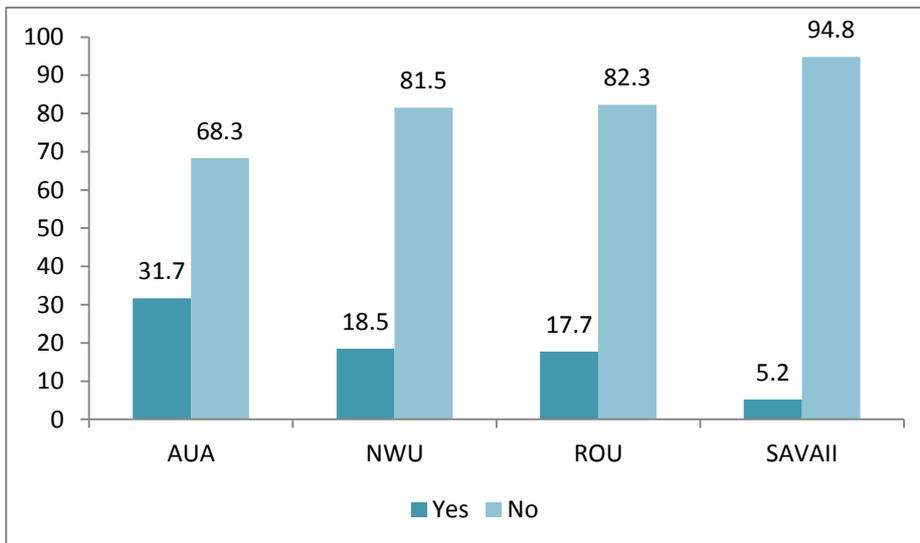
### #E7. Has the septic tank ever been full?

N = 1492. Interview. Filter = (E1 = 1). Weight on = region.



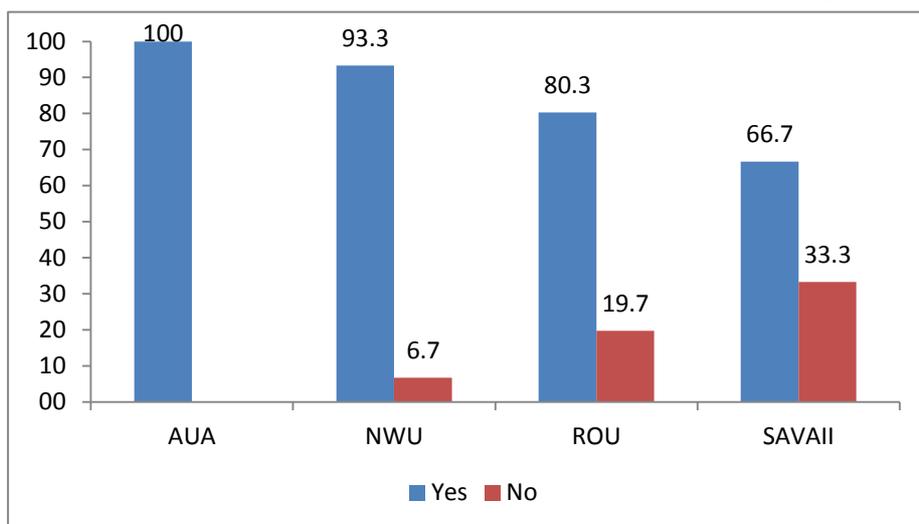
### #E7. Has the septic tank ever been full (by Region)?

N = 1492. Interview. Filter = (E1 = 1). Weight on = region. Split by region.



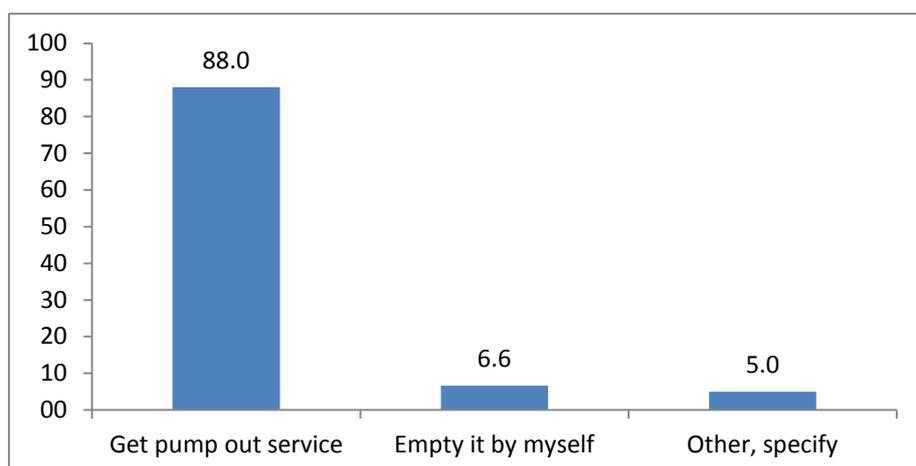
### #E9. Have you ever emptied your septic tank (by Region)?

N = 269. Interview. Filter = (E1 = 1 & E7 = 1). Weight on = region. Split by region



### #E11. How did you empty your septic tank?

N = 245. Interview. Filter = (E1 = 1 & E7 = 1 & pump out = 1). Weight on = region.



### #E11. How did you empty your septic tank (by Region)?

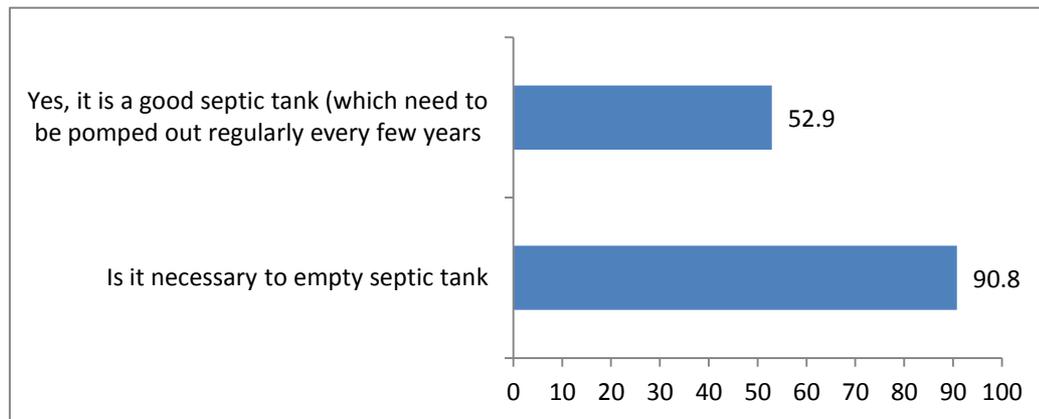
N = 245. Interview. Filter = (E1 = 1 & E7 = 1 & pomp\_out = 1). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
Get pump out service	98.0	86.7	77.1	61.5
Empty it by myself	2.0	9.6	2	38.5
Other, specify		3.6	16.3	8.3

Questions #E12 to #E14 relate to householder knowledge of septic tanks. Overall there is a high level of awareness of the need to empty their septic tank, but less understanding about how often this needs to be carried out. The function of a septic tank is also not well understood (question #E14) with only 51% of respondents aware that one of the key functions of a septic tank is to prevent contamination. Clearly there is some conflict and misunderstanding about what is a good (i.e. well-functioning) septic tank: some regard a septic tank that rarely needs to be pumped out as a good one, while one that needs more frequent pump outs will cost them more in maintenance costs and so may not be regarded as 'good'. The results indicate the need for an awareness campaign about the need for improved maintenance of septic tanks.

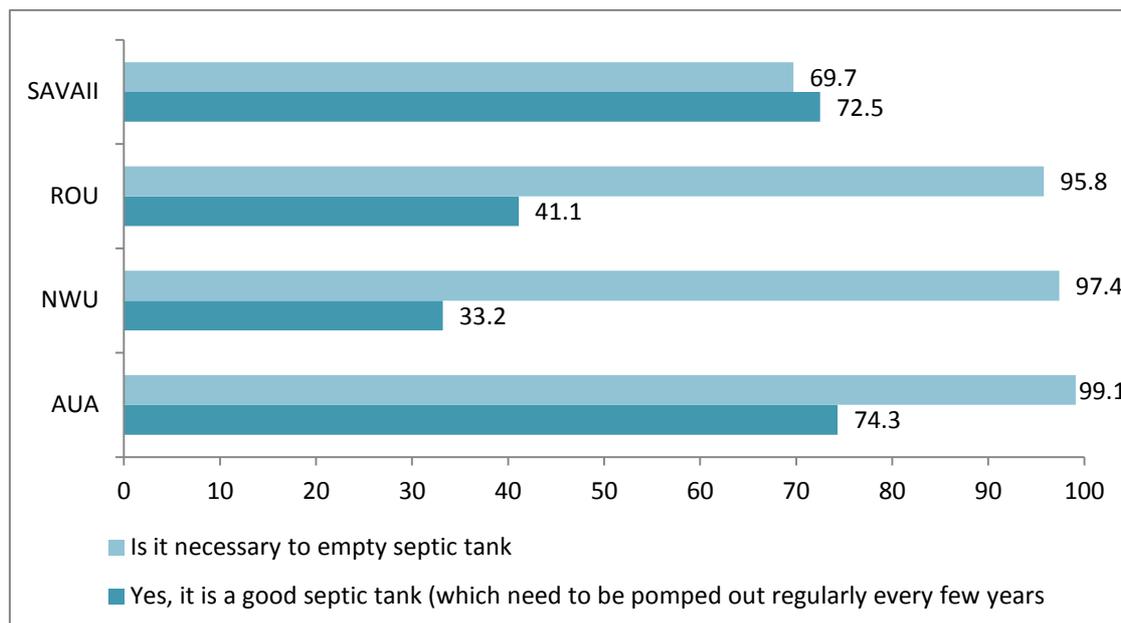
**#E12 & #E13. Do you think it is necessary for a septic tank to be emptied? & How do you regard a septic tank that needs to be pumped out regularly every few years? Is it a good septic tank?**

N = 1549. Interview. Filter =None. Weight on = region.



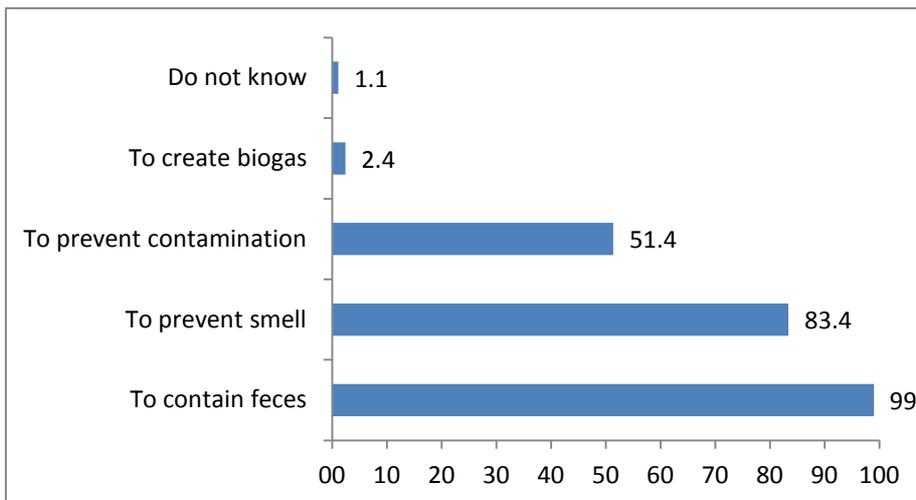
**#E12 & #E13. (By Region) Do you think it is necessary for a septic tank to be emptied? & How do you regard a septic tank that needs to be pumped out regularly every few years? Is it a good septic tank?**

N = 1549. Interview. Filter =None. Weight on = region. Split by region.



### #E14. To your knowledge what is the function of a septic tank?

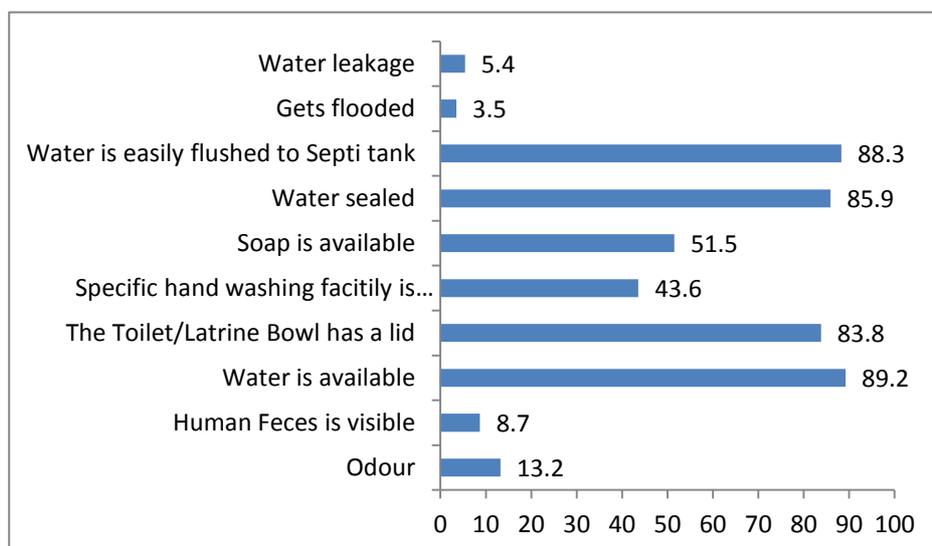
N = 1549. Interview. Filter =None. Weight on = region.



Question #E15 relates to the condition of the latrine and facilities at the time of interview, with observations made by the enumerator. The results show that the majority of toilets were functioning, had a lid, water seal and could be properly flushed. However less than half of all toilets (43.6%) had a nearby handwashing facility and only 51.5% of toilets had soap available. The results indicate a need to strengthen hygiene awareness and handwashing practice. On a regional comparison, Savaii had the lowest availability of handwash facilities (27.3%) and presence of soap (34.1%) indicating the need for a particular focus on Savaii to improve hygiene awareness and handwashing practices.

### #E15. Observe the main toilet, its bowl, check the flush.

N = 1549. Interview. Filter =None. Weight on = region.



### #E15. Observe the main toilet, its bowl, check the flush (by Region)

N = 1549. Interview. Filter =None. Weight on = region. Split by region.

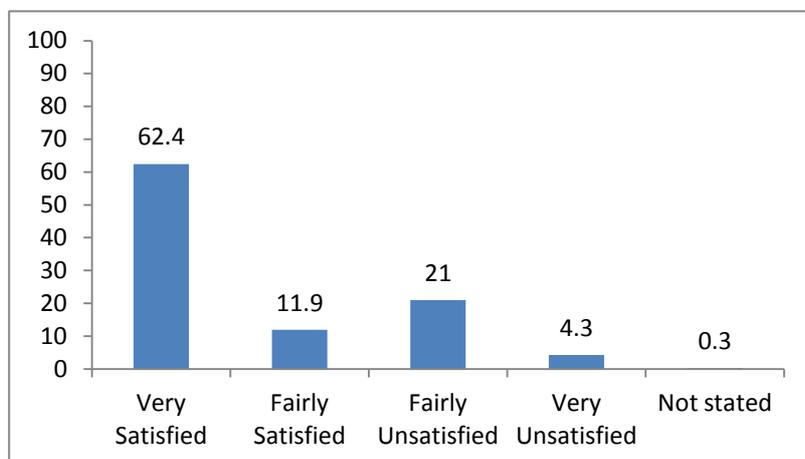
	AUA	NWU	ROU	SAV
<b>Odour</b>	6.9	10.3	14.9	21.5
<b>Human Feces is visible</b>	5.3	4.8	12.4	13.7
<b>Water is available</b>	94.1	92.9	91.5	79.0
<b>The Toilet/Latrine Bowl has a lid</b>	90.9	87.5	76.9	80.6
<b>Specific hand washing facility is installed</b>	61.4	43.8	44.5	27.3
<b>Soap is available</b>	60.8	63.1	45.5	34.1
<b>Water sealed</b>	90.0	89.3	83.9	80.6
<b>Water is easily flushed to Septi tank</b>	93.8	90.5	86.7	83.3
<b>Water is blocked</b>	3.8	1.8	2.8	5.7
<b>Gets flooded</b>	2.2	0.6	4.5	7.4
<b>Water leakage</b>	3.8	6.4	5.1	5.7

### 7.3 Satisfaction

Most households are satisfied with their toilet facility. The percentage of households stating that they are fairly or very satisfied with their toilet facility is: 83.8% in AUA; 75.7% in NWU, 79.5% in SAV and lowest is 59.7% in ROU. The relative high levels of satisfaction correlate with the high percentage of households that have a flush toilet (i.e. or other form of improved sanitation facility).

### #E16. How satisfied are you with your latrine/toilet facility?

N = 1549. Interview. Filter =None. Weight on = region.



### #E16. How satisfied are you with your latrine/toilet facility (by Region)?

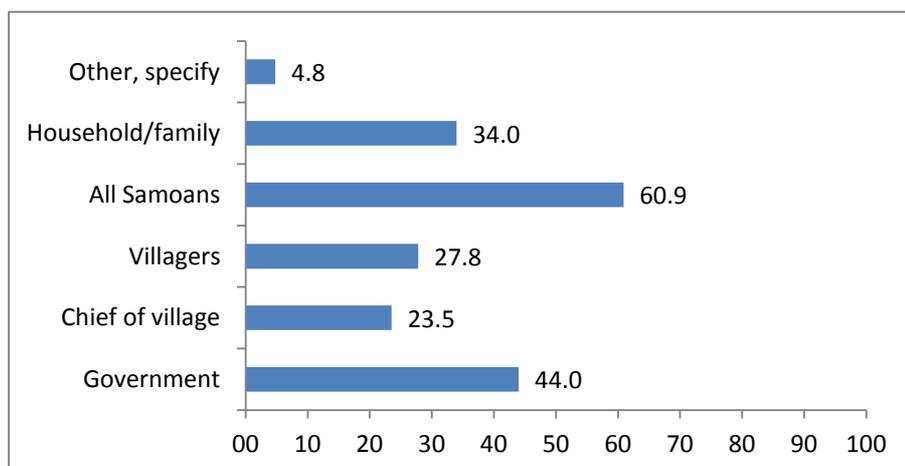
N = 1549. Interview. Filter =None. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Very Satisfied</b>	74.4	65.2	39.7	71.0
<b>Fairly Satisfied</b>	9.4	10.5	20.0	8.5
<b>Fairly Unsatisfied</b>	11.9	20.5	35.8	15.6
<b>Very Unsatisfied</b>	4.4	3.8	4.5	4.9
	100.0	100.0	100.0	100.0

## 7.4 Perception of responsible party

### #E22. To your knowledge who has the most responsibility for protecting ground/surface water from toilet/latrine waste contamination?

N = 1549. Interview. Filter =None. Weight on = region



### #E22. (By Region) To your knowledge who has the most responsibility for protecting ground/surface water from toilet/latrine waste contamination?

N = 1549. Interview. Filter =None. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Government</b>	42.9	44.8	16.3	70.8
<b>Chief of village</b>	20.4	16.0	25.4	34.7
<b>Villagers</b>	26.0	23.9	36.3	26.5
<b>All Samoans</b>	33.4	85.4	62.5	49.7
<b>Household/family</b>	69.3	16.8	41.7	19.1
<b>Other, specify</b>	7.4	6.1	2.0	3.3

The findings of question #E22 indicate that most respondents feel there is some personal responsibility for protecting surface and/or ground water from latrine waste contamination: either at the village level or the household levels (which implies a sense of ownership and commitment). Respondents also feel that ‘all Samoans’ and ‘Government’ and ‘Chief of village’ have a large measure of responsibility for protecting surface and ground water which, in contrast, implies a lack of ownership and responsibility<sup>20</sup>.

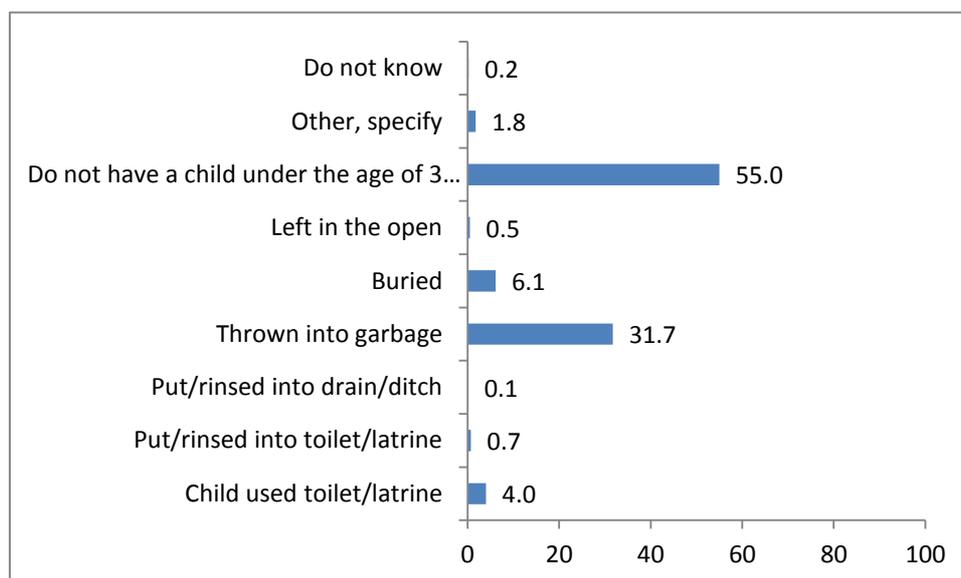
Respondents in Savaii are relatively alone in their view that government has the main responsibility in this regard. This correlates with earlier findings (question #E9) that households in Savaii are the least willing to take responsibility for emptying their septic tanks when full.

<sup>20</sup> It can be interpreted that something that is everyone’s responsibility (eg ‘all Samoans’) is also no one’s responsibility, i.e. it is a public not a private issue.

## 7.5 Disposal of children faeces

### #E25. The last time your child under the age of 3 passed stools, what was done to dispose of the stools?

N = 1549. Interview. Filter =None. Weight on = region.



### #E25. The last time your child under the age of 3 passed stools, what was done to dispose of the stools? (by Region)

N = 1549. Interview. Filter =None. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
Child used toilet/latrine	1.9	2.6	0.6	11.4
Put/rinsed into toilet/latrine	0.3	0.2		2.5
Put/rinsed into drain/ditch		0.2		
Thrown into garbage	30.3	32.5	39.7	24.0
Buried	3.1	8.3	4.5	7.4
Left in the open	0.3	0.8		0.5
Do not have a child under the age of 3 years	62.5	51.9	54.4	52.9
Other, specify	1.5	3.6	0.8	0.5
Do not know				0.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

The correct disposal of children stools is a proxy indicator of good sanitation practice and hygiene awareness<sup>21</sup>. The results show that in almost a third of cases overall child faeces are disposed of unsafely (i.e. mixed with the household garbage).

<sup>21</sup> From a public health perspective, correct disposal of child stools is a good indicator of sanitation knowledge and practice. In the absence of good hygiene/sanitation knowledge, adults often do not see child stool as a potential disease risk, and this incorrect understanding can lead to bad sanitation practice.

## 8. Result F: Hygiene Practices

The availability and use of soap (at certain critical times) is an accepted proxy for hygiene awareness and practice. Handwashing with soap is considered one of the most effective and simplest measures to prevent diarrhoea and other faecal-oral infections. For this reason question #F2 is a standard question used by JMP for monitoring hygiene practice.

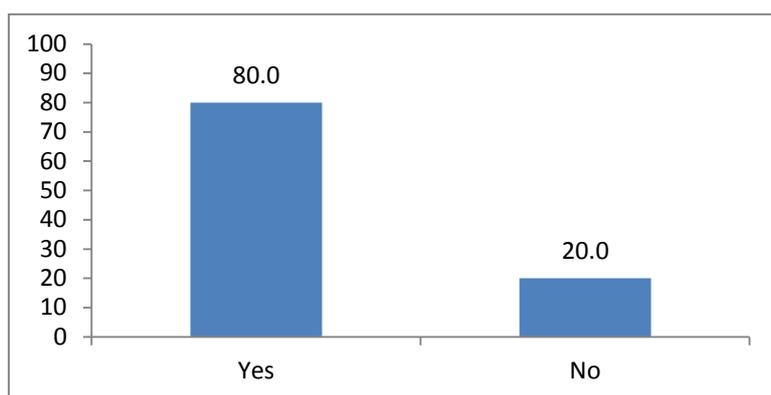
### 8.1 Presence of soap

The results show that the majority (or 80%) of Samoan households have soap available in their home. About a fifth or 20% did not have soap at the time the survey was conducted. The regional data demonstrates that Savaii has a significantly lower percentage of households with soap in their home ( i.e. 47%).

#### #F1 Households that have soap

N = 1549. F1. Can you show me the soap? OBSERVE. Interview verified with observation.

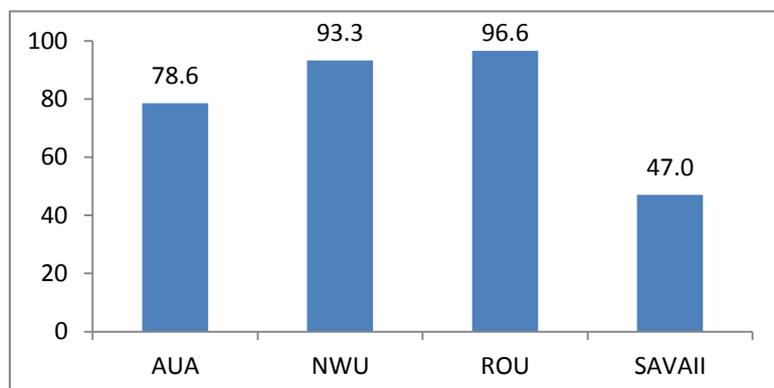
Filter = none. Weight on = region



#### #F1 Households that have soap (by Region)

N = 1549. F1. Can you show me the soap? OBSERVE. Interview verified with observation.

Filter = none. Weight on = region. Split by region.

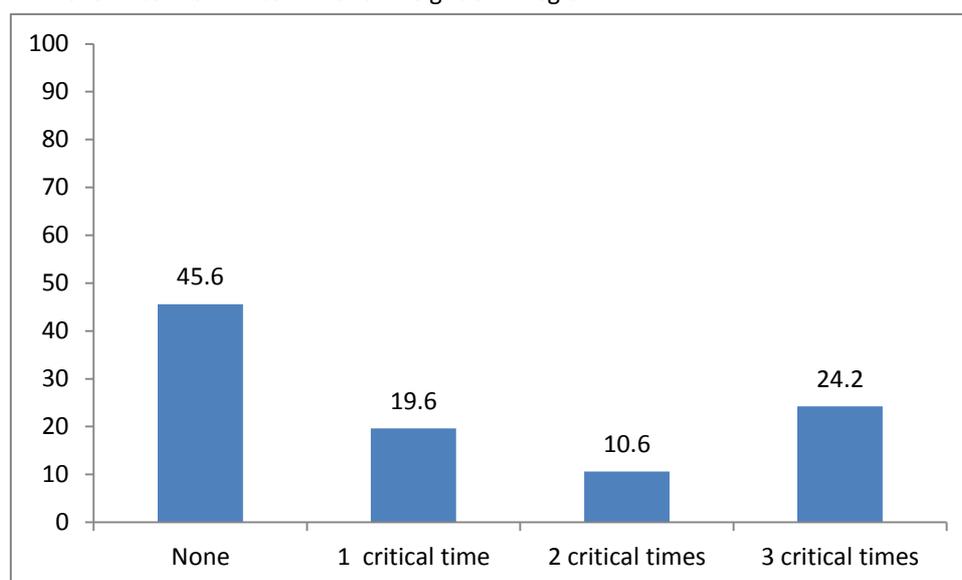


## 8.2 Handwashing Practice

Question #F2 is a standard question used by JMP for monitoring hygiene practice. The question is indirect: it does not ask respondents directly what time they washed their hands with soap, but rather asks ‘what was the soap used for?’. The use of direct questioning tends to bias towards good behaviour and hence would over-report practice. Whereas indirect questioning tends to slightly under-report practice and concentrates on those who wash hand with soap as a conscious/normal practice. It should also be noted that respondents may wash their hands without the use of soap at all the critical times, however the use of soap is important for diarrhoea-related disease prevention hence the focus on use of soap for this indicator.

### #F2 Can you remember, starting from yesterday up to now, what did you use soap for?

N = 1549. Interview. Filter = none. Weight on = region.



### #F2 Can you remember, starting from yesterday up to now, what did you use soap for (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>None</b>	24.8	42.5	36.2	77.6
<b>1 critical time</b>	11.5	32.8	10.2	17.5
<b>2 critical times</b>	17.6	15.6	2.8	4.9
<b>3 critical times</b>	46.1	9.1	50.8	

In general, the three critical times<sup>22</sup> for hand washing with soap are :

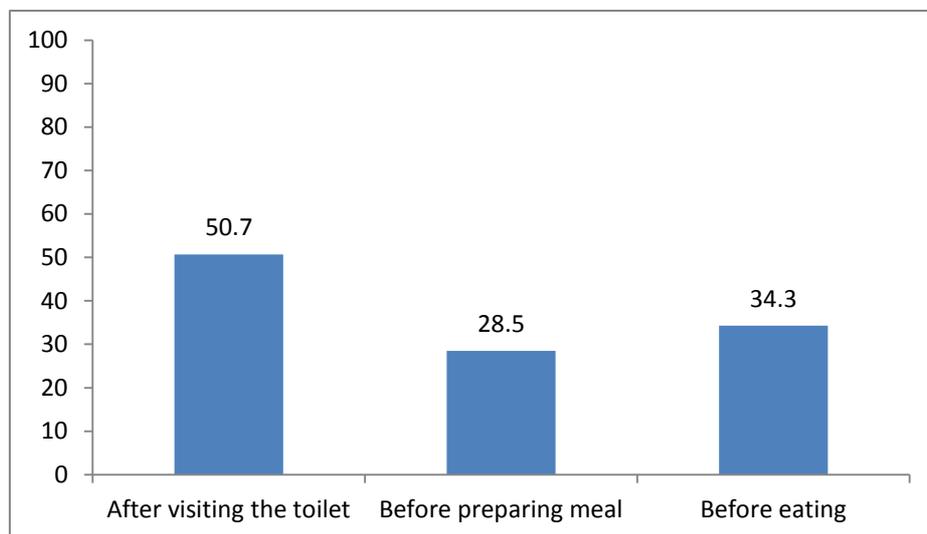
- 1) After visiting the toilet,
- 2) Before preparing meals, and
- 3) Before eating.

<sup>22</sup> Note: for mothers with under-five year age children, there are five critical times for hand washing with soap: 1) After visiting the toilet, 2) After cleaning the child’s bottom, 3) Before feeding, 4) Before preparing meals, and 5) Before eating.

The survey results reveal that in almost half of cases, or about 45%, respondents do not wash their hands at any critical times. A quarter, or 24%, reported washing hands at the 3 critical times. Across the four regions SAV has the largest population of respondent who do not wash their hands with soap at any critical times (77.6%), followed by NWU (42.5%). In ROU approximately half (50.8%) of respondents wash their hands with soap at the three critical times.

**#F2. Can you remember, starting from yesterday up to now, what did you use soap for?**

N = 1549. Interview. Filter = none. Weight on = region.



**#F2. Can you remember, starting from yesterday up to now, what did you use soap for (by Region)?**

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>After visiting the toilet</b>	69.0	53.6	62.3	19.1
<b>Before preparing meal</b>	55.4	13.4	52.8	2.2
<b>Before eating</b>	60.9	24.3	53.5	6.3

Among the three critical times, using soap for handwashing after visiting the toilet recorded the highest percentage. Overall, around a half or 50% of respondents reported washing hands with soap after visiting the toilet. Handwashing with soap before eating was the second most common practices, at 34%.

Use of soap at critical times is significantly lower in Savaii compared to the other Regions.

## 9. Result G: Incidence Of Diarrhoea

Diarrhoea and other related gastrointestinal illnesses continue to be one of the most important causes of illness and death worldwide, especially amongst young children. Much of this illness is due to exposures to contaminated water or food, as a result, for example, of poor water quality, limited access to water, poor food hygiene and safety, or poor sanitation in the home. Incidence of diarrhoea is therefore commonly used as an indicator of household hygiene status. The survey data uses self-reporting of diarrhoea in the family (from interviews), rather than recorded data from health centres (which typically under-reports actual occurrence of diarrhoea, since in many cases it may not be referred to hospital but treated in the home).

### 9.1 Incidence of Diarrhoea & People Perception to it

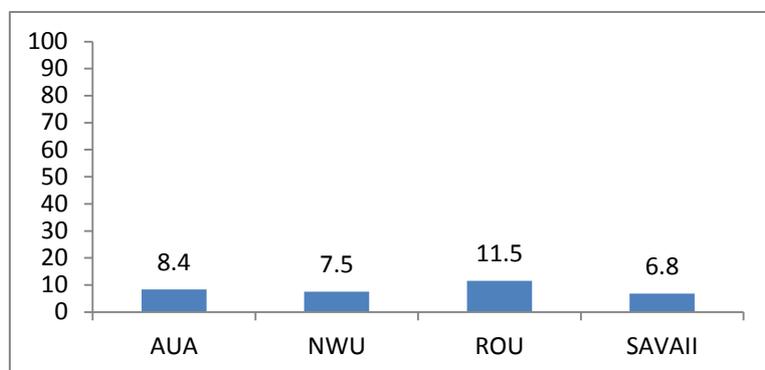
The recall period (question #G1) is limited to 2 weeks according to standard international reporting practice<sup>23</sup>. The survey results show that the average rate of diarrhoea incidence in the last 2 weeks was 8.3% across all regions. ROU reported the highest incidence of diarrhoea, with 11.5%<sup>24</sup> of households reporting an occurrence in the family in the previous 2 weeks. The lowest reported incidence was in SAV where 6.8% of households reported an occurrence. SAV households also recorded the lowest levels of handwashing and soap availability (questions #F1 and F2).

The diarrhoea incidences affected adults as well as children with some regional variation (refer question #G2). It should be noted that while diarrhoea affects both adults and children, the consequences for under-five age children can be quite serious, ranging from reduced nutritional status to death due to severe dehydration, at its most extreme.

The aim of question #G3 is to assess people's understanding of the causes of diarrhoea. The results indicate that most people understand there is a link between diarrhoea and water safety (88.5%) and unhygienic food (84%). However very few people (3%) understand that there is a link between having dirty hands and diarrhoea. This underlines the need for a campaign aimed at improving knowledge and practice of handwashing with soap.

#### #G1. In the last two weeks were there any members of your family who had experienced diarrhea for 3 times or more in a day (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

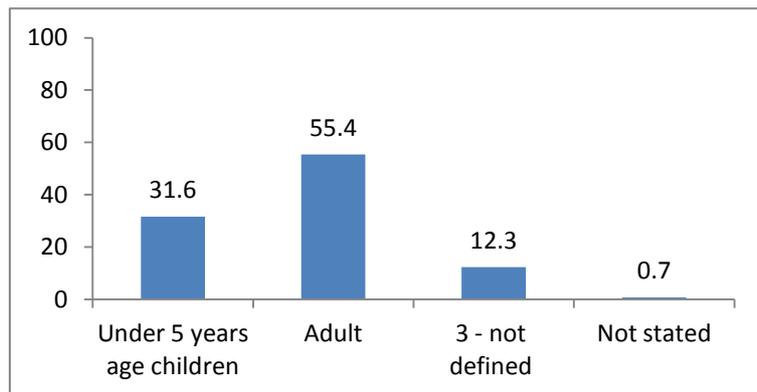


<sup>23</sup> IE this is a Health Demographic Survey standard used globally, including by health department in Samoa.

<sup>24</sup> Incidence rate above 10% can be considered as moderately high.

### #G2. Who were they?

N = 129. Interview. Filter = (G1 =1). Weight on = region.



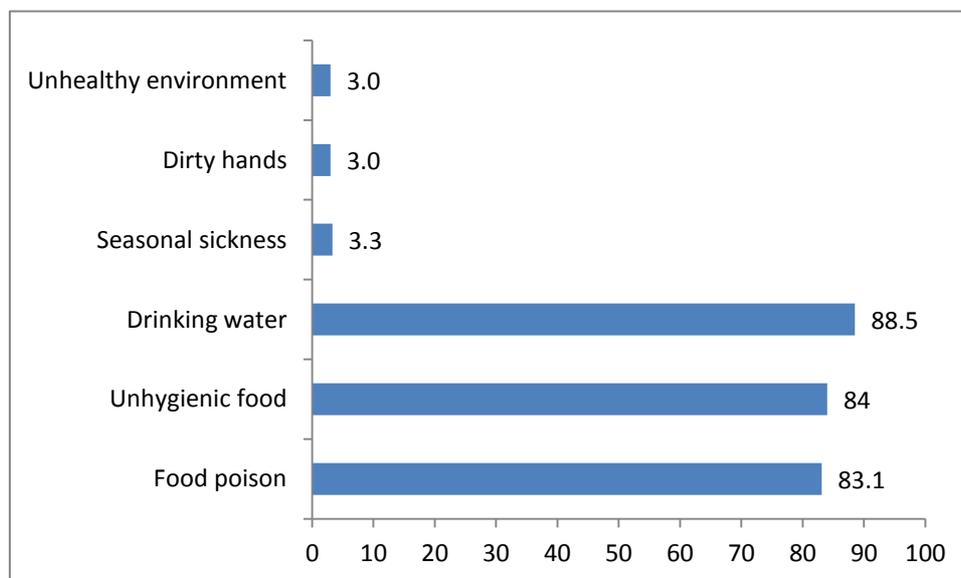
### #G2. Who were they (by Region)?

N = 129. G2. Who were they? Interview. Filter = (G1 =1). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Under 5 years age children</b>	25,9	34,2	22,5	50,0
<b>Adult</b>	51,9	63,2	60,0	37,5
<b>3 – not defined</b>	22,2	2,6	17,5	8,3
<b>Not stated</b>				4,2
<b>Total</b>	100,0	100,0	100,0	100,0

### #G3. To your knowledge why do children get diarrhea?

N = 1549. Interview. Filter = None. Weight on = region.



# 10. Result H: Solid Waste Disposal

## 10.1 Solid waste disposal practice

Questions #H1 to #H5 examine household solid waste disposal practice. The results show that households can use one or other of four methods of disposal: (i) the available collection service (ii) burying their rubbish (iii) burning their rubbish and (iv) disposing of their rubbish to open land. Of these methods, the collection service<sup>25</sup> is the most improved method (if collection frequency is a minimum of twice a week) and should be the preferred method for households. The other disposal methods are harmful to the environment.

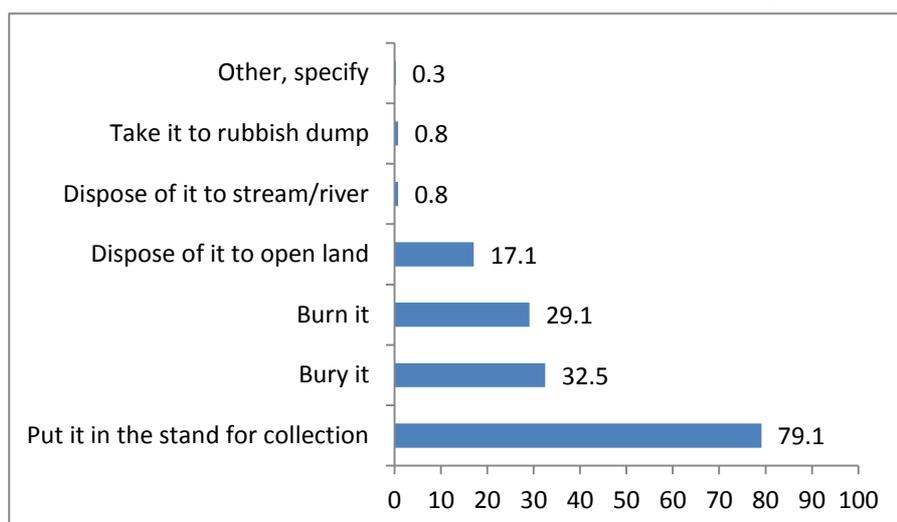
The results show that the main and most popular method of disposal is to use the regular collection service provided (71.4% of all households). The second most used method of disposal is to bury the rubbish, practiced by 16.8% of all households. The frequency of the collection service varies from 2 to 3 times a week for most (65.1%) households, to once a week (28.7% of all households). Overall 97% of all households have their rubbish collect at least once a week.

The convenience of the collection service underscores its popularity and would suggest that any non- usage of this service would be due to negative factors related to the standard of service provided, such as irregular or infrequent collection, or inadequate storage capacity at the stand. This may explain the regional variation in use of the collection service (as the main method of disposing of rubbish). In AUA 67.5% use the service as the main method of rubbish disposal, the percentages in the other regions is: NWU - 67.9%, ROU - 82.5% and SAV - 68.9%. The rate of usage of the collection service is significantly higher in ROU than in the three other regions. In terms of standard of service, 36% of households in SAV have their rubbish collected only once a week (a relatively poor standard of service), compared to 20.6% in AUA, 28.6% in NWU and 28.4% in ROU.

On a regional basis almost a quarter (24.3%) households in Savaii bury their rubbish, as their main method of disposal, compared to 18.6% for AUA, 14.9% for NWU and 10.2% for ROU.

### #H1. What do you do to dispose of your household rubbish?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region.



### #H1. What do you do to dispose of your household rubbish by Region)?

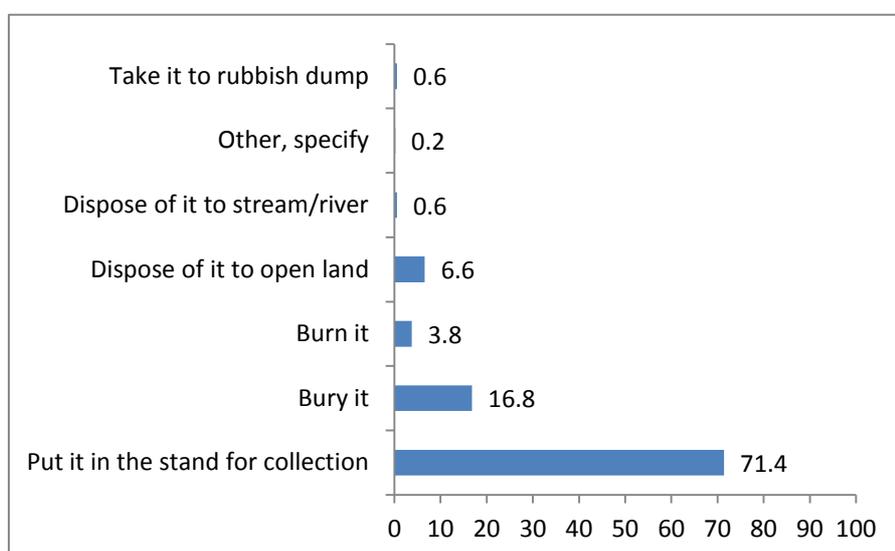
<sup>25</sup> The collection service includes disposal to landfill site.

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Put it in the stand for collection</b>	90.1	71.1	86.2	73.5
<b>Bury it</b>	36.0	35.0	20.3	37.7
<b>Burn it</b>	22.6	35.2	13.5	41.3
<b>Dispose of it to open land</b>	10.5	18.8	6.2	31.1
<b>Dispose of it to stream/river</b>	0.6	1.0		1.4
<b>Take it to rubbish dump</b>	0.3	2.2		
<b>Total</b>	100.0	100.0	100.0	100.0

## #H2. What is the main way of disposing your household rubbish?

N = 1549. Interview. Filter = none. Weight on = region.



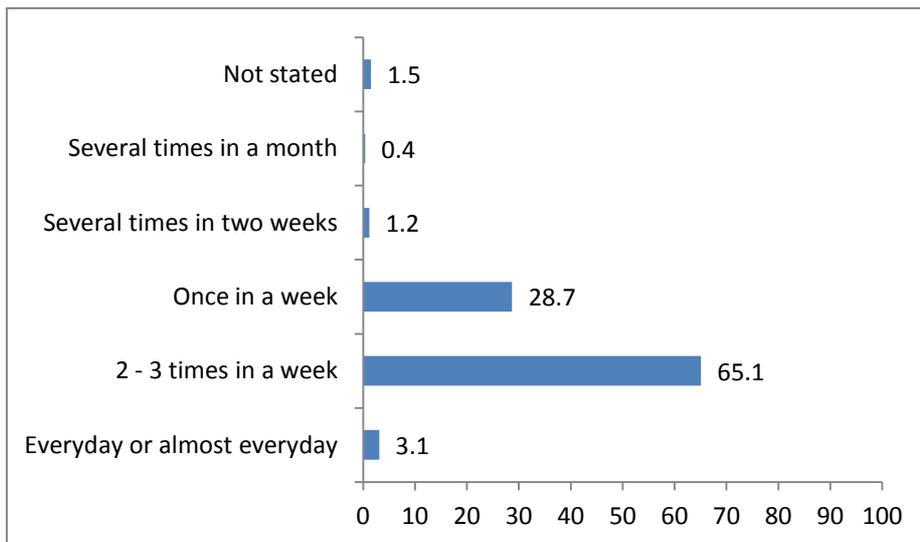
## #H2. What is the main way of disposing your household rubbish (by Region)?

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Put it in the stand for collection</b>	67.5	67.9	82.5	68.9
<b>Bury it</b>	18.6	14.9	10.2	24.3
<b>Burn it</b>	6.2	3.8	4.8	0.8
<b>Dispose of it to open land</b>	6.5	10.5	2.5	5.2
<b>Dispose of it to stream/river</b>	0.6	1.0		0.8
<b>Other, specify</b>	0.3	0.4		
<b>Take it to rubbish dump</b>	0.3	1.6		
<b>Total</b>	100.0	100.0	100.0	100.0

**#H3. In the last 2 months, how many times in a week was your rubbish collected?**

N = 1105. Interview. Filter = (H2 = 1). Weight on = region.



**#H3. In the last 2 months, how many times in a week was your rubbish collected (by Region)?**

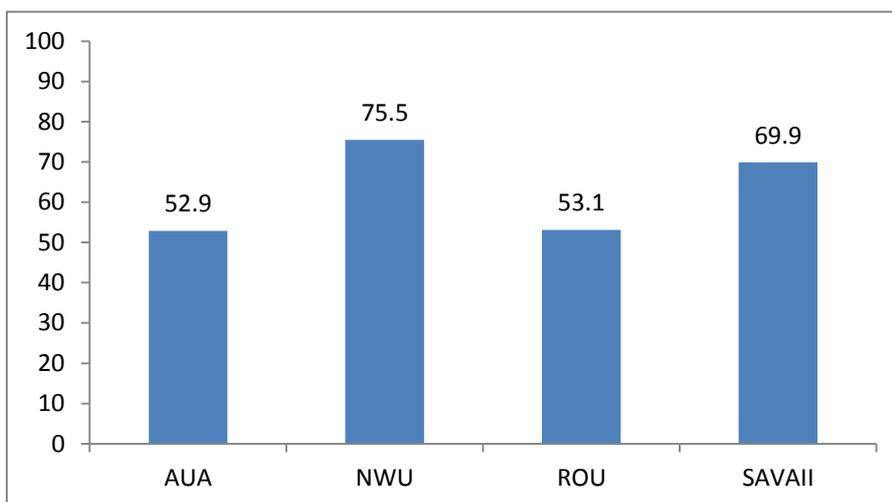
N = 1105. Interview. Filter = (H2 = 1). Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Everyday or almost everyday</b>	11.5	2.0	0.3	0.4
<b>2 - 3 times in a week</b>	64.7	64.4	70.5	59.7
<b>Once in a week</b>	20.6	28.6	28.4	36.0
<b>Several times in two weeks</b>	1.8	0.6		3.2
<b>Several times in a month</b>	0.5	0.3	0.3	0.8
<b>Not stated</b>	0.9	4.1	0.3	
<b>Total</b>	100.0	100.0	100.0	100.0

**#H4. Do you separate your rubbish (by Region)? [VERIFY WITH OBSERVATION]**

(Percentages shown = yes responses)

N = 1549. Interview. Filter = none. Weight on = region. Split by region.



## 10.2 Cleanliness and greywater disposal

Question #H6 is based on enumerator assessment of cleanliness, based on observation at the time of interview. The percentages shown (in graph and table) are the percent not clean. Clean means absence of visible organic waste material (not in bins)<sup>26</sup>.

The results show significant regional variation, with generally higher rates of cleanliness (i.e. low percentage presence of rubbish) in AUA and ROU. Lack of cleanliness (or presence of rubbish) inside the house varied significantly, from lows of 18.3% in AUA and 26% in ROU, to 64% in SAV and 75% in NWU. The results for AUA follow the expected trend of, in order of cleanliness: 1. inside the house, 2.in the yard, and 3. nearby road/land (results Table #H6). The reverse is true in the case of NWU and SAV where the order of cleanliness is: 1. nearby road/land, 2.in the yard, and 3. inside the house<sup>27</sup>.

The most common method of disposal of greywater (question #H7) is to a separate pit or tank. Disposal of greywater to the septic tank is practiced in AUA (60%), NWU (38%), ROU (5%) and SAV (36%). The least hygienic method of disposal of greywater is to the yard or open land, and this practice is relatively common in rural areas with larger yard/land availability. In ROU this is practiced by 42% of households, in SAV by 28% of households, in NWU by 21% of households and by only 9% of households in the urban area of AUA.

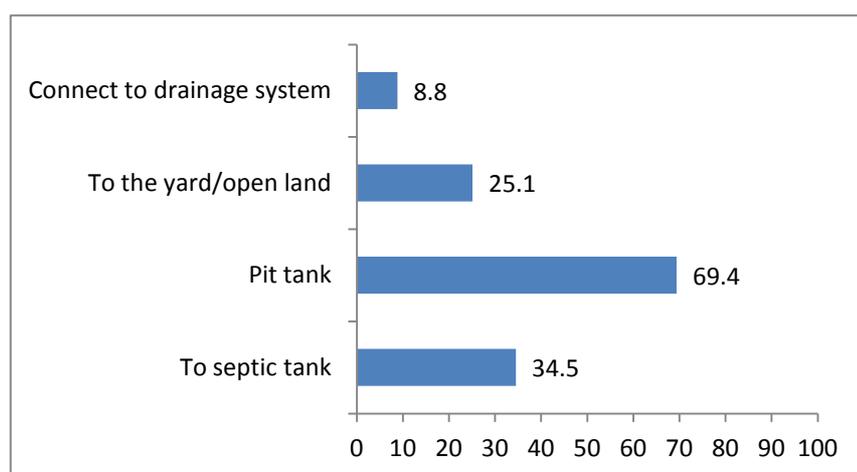
### #H6. Observe cleanliness inside the house, houseyard and road/land near respondent property (by Region). Any rubbish? (Percentages = yes rubbish)

N = 1549. Interview. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>Inside the house</b>	18.3	74.9	26.0	63.9
<b>In the yard</b>	37.3	64.6	28.5	52.2
<b>In nearby road/land</b>	29.7	63.8	29.7	44.0

### #H7. Observe how household dispose their grey water

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region.



<sup>26</sup> In the definition adopted for the survey, waste/rubbish means primarily organic material (eg left over food) not in bins etc. It does not include glass/bottles (which may be reused). Assessment of cleanliness was left to enumerator discretion.

<sup>27</sup> This may be due to the subjective nature of the interpretation of 'clean' by enumerators (especially in NWU and SAV).

**#H7. Observe how household dispose their grey water (by Region)**

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region. Split by region.

	<b>AUA</b>	<b>NWU</b>	<b>ROU</b>	<b>SAV</b>
<b>To septic tank</b>	59.9	38.0	5.1	35.8
<b>Pit tank</b>	72.4	79.8	62.3	59.4
<b>To the yard/open land</b>	8.7	21.4	42.3	27.9
<b>Connect to drainage system</b>	4.6	2.8	19.4	10.9

# 11. Result I: Sources of Information

## 11.1 Health, water and latrine related matters

The purpose of questions #11 to #13 is to identify the sources of information used by householders to get information on health, water and sanitation related issues. The results provide information on the full range of sources used, and on which are the more popular (and trusted) sources used by the community. The results provide feedback on the effectiveness of the information methods and sources currently being used in information/education campaigns, and can be used by the sector to more effectively target information campaigns in the future.

The results indicate a wide range of information sources are used on occasion. In terms of importance, the top four most used sources for information nationally are:

- Health related matters:
  1. TV (87.1%)
  2. Radio (71%)
  3. Health Providers (64.9%)
  4. Family members (17.4%)
- Water related matters:
  1. TV (87.6 %)
  2. Radio (67.9 %)
  3. Health Providers (43.6%)
  4. Family members (14.8%)
- Sanitation/latrine related matters:
  1. TV (71.4%)
  2. Radio (41.2%)
  3. Family members (19.6%)
  4. Health Provider (17.4%)

The results indicate that TV and radio are the two most popular sources of information for health, water and sanitation related matters. Health providers (and local health facilities) are the third most popular source for information on health related and water related matters. On matters related to sanitation /latrines, family members (19.6%) and Health Providers (17.4%) have similar levels of use (+/- 2%) as information sources. This result further indicates that health providers are not educating people as much on sanitation matters, compared to health and water related matters.

The overall three main sources of information (TV, radio and Health Providers) in combination make for an effective approach. Mass media such TV and radio offer short-term rather than a long lasting impact and are generally unable to provide sufficient detail. People do not actively seek out this information from their TV/ radio and so they are considered as passive sources of information. TV and radio are therefore more effective at raising awareness, but less effective at getting people to take action (further information may be required to enable people to choose the right course of action). However when TV/radio are used in combination with health providers, who can provide

more detail and repeat messages if needed, it can result in a highly effective campaign leading to behaviour change.

A significant finding of the survey data is that school teachers play a relatively insignificant role as information sources in health, water and sanitation matters<sup>28</sup>. Raising awareness of the importance of safe water, sanitation, and hygiene practices usually needs to start at schools and therefore teachers (supported by the school curriculum) have an important role as advocates and educators.

There are some regional variations in the data: the village chief is an important source of information on water (24.2%) in ROU; in SAV the village Focal Point (MWCSD) is an important source of information on water (35.2%) and sanitation (30.8%) matters. Of concern is that a significant percentage of households claim they do not get any information on sanitation related issues from any of the sources: this applies to 21.1% of households in AUA and 20% of households in ROU.

The results indicate some lessons in the current WASH campaigns:

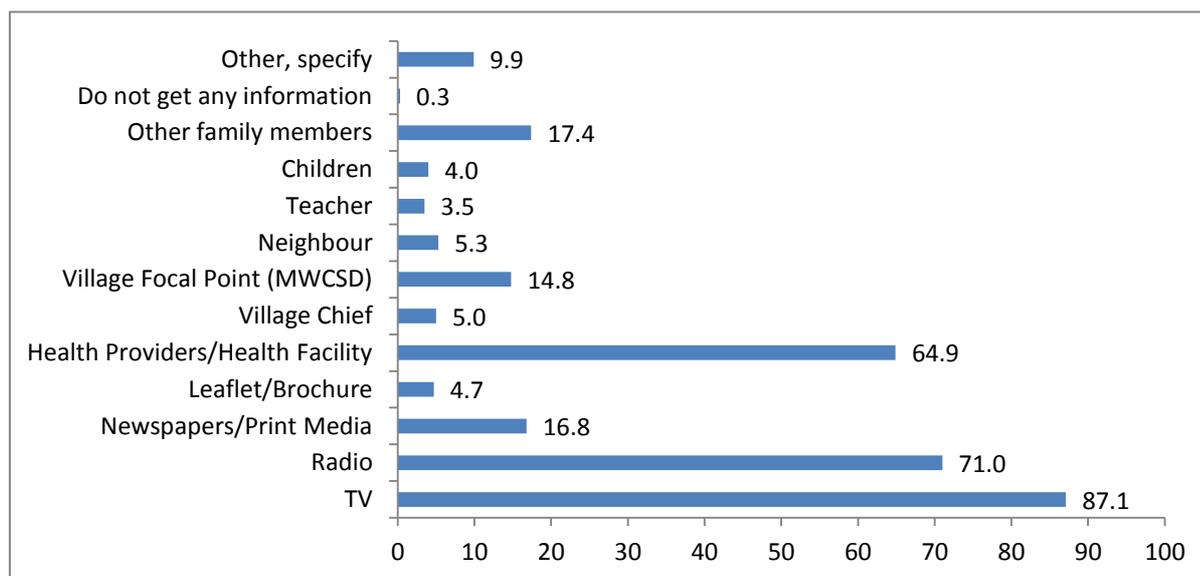
- TV and Radio are the main media sources that Samoans are exposed to, and are effective information sources for raising awareness on (health, water/sanitation) issues.
- Print media has limited impact and reach outside of urban areas. Its impact is limited to AUA and NWU regions.
- Health providers are an important source of information for communities on health issues; however their role in water and sanitation (especially) should be strengthened. Health providers can play significant role in linking water and sanitation with health issues due to their strong credibility in the community.
- Schools and teachers should have a greater focus in future campaigns aimed at improving knowledge and practices in water and sanitation targeting children. School-based campaigns can facilitate children to discuss water/sanitation/hygiene issues with their families to effect change at the household level.
- Village Focal Points and other family members are important sources of information in SAV but not in other regions. Village leaders (as well as church leaders) are well trusted and important change agents in the community, and should be included in future campaigns aimed at improving knowledge and practices in water, sanitation and hygiene related issues. The relative success of using Focal Points in SAV should be replicated in other regions.

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<sup>28</sup> The respondents interviewed (i.e. household heads) may not be fully aware of the role of teachers at schools. School age children would be better informants on this however it was not possible during the survey to interview school-going family members.

### #11. Where do you obtain your information regarding health matters?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region.



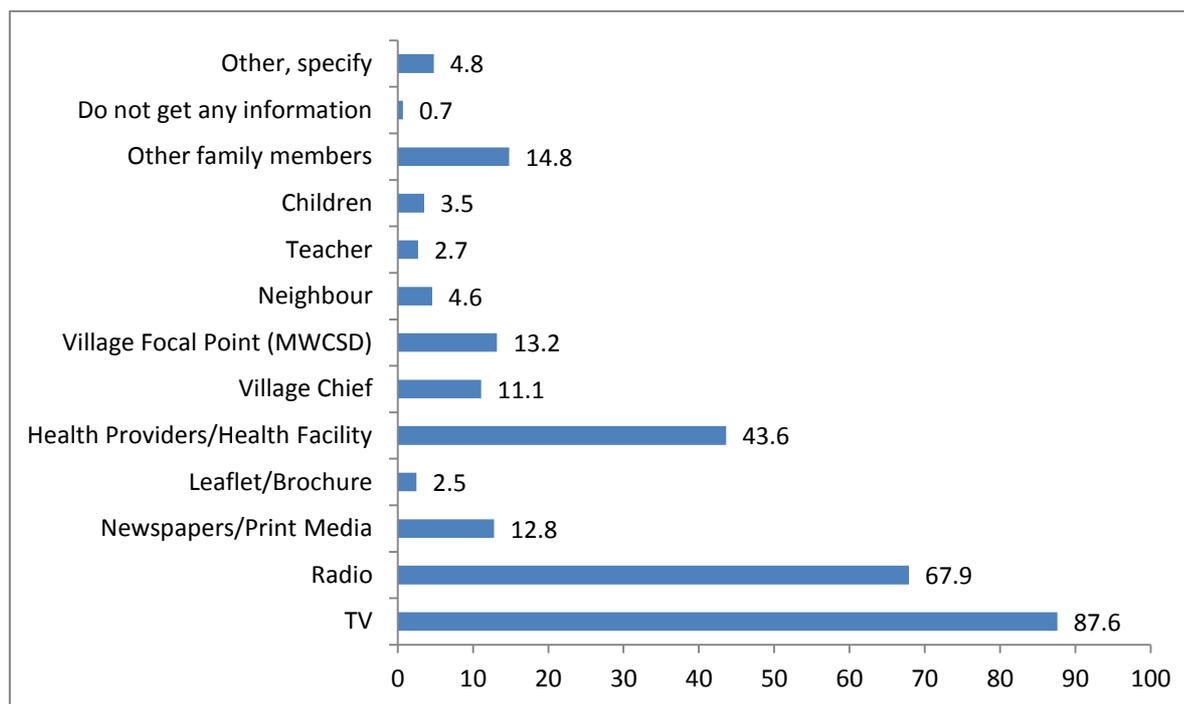
### #11. Where do you obtain your information regarding health matters (by Region)?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>TV</b>	87.3	93.5	78.3	87.2
<b>Radio</b>	55.4	75.5	68.6	80.9
<b>Newspapers/Print Media</b>	27.9	23.3	5.6	8.7
<b>Leaflet/Brochure</b>	12.7	4.7	1.7	0.3
<b>Health Providers/Health Facility</b>	58.4	76.7	62.5	56.6
<b>Village Chief</b>	0.9	5.7	4.5	7.7
<b>Village Focal point (MWCSO)</b>	2.2	11.5	9.6	35.5
<b>Neighbour</b>	4.6	2.0	1.7	13.9
<b>Teacher</b>	2.5	2.0	2.0	7.7
<b>Children</b>	5.9	1.8	4.5	4.6
<b>Other family members</b>	17.1	11.9	13.8	28.7
<b>Do not get any information</b>	1.2			
<b>Other, specify</b>	7.1	20.2	2.5	5.5

## #12. Where do you obtain information regarding water related matters?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region.



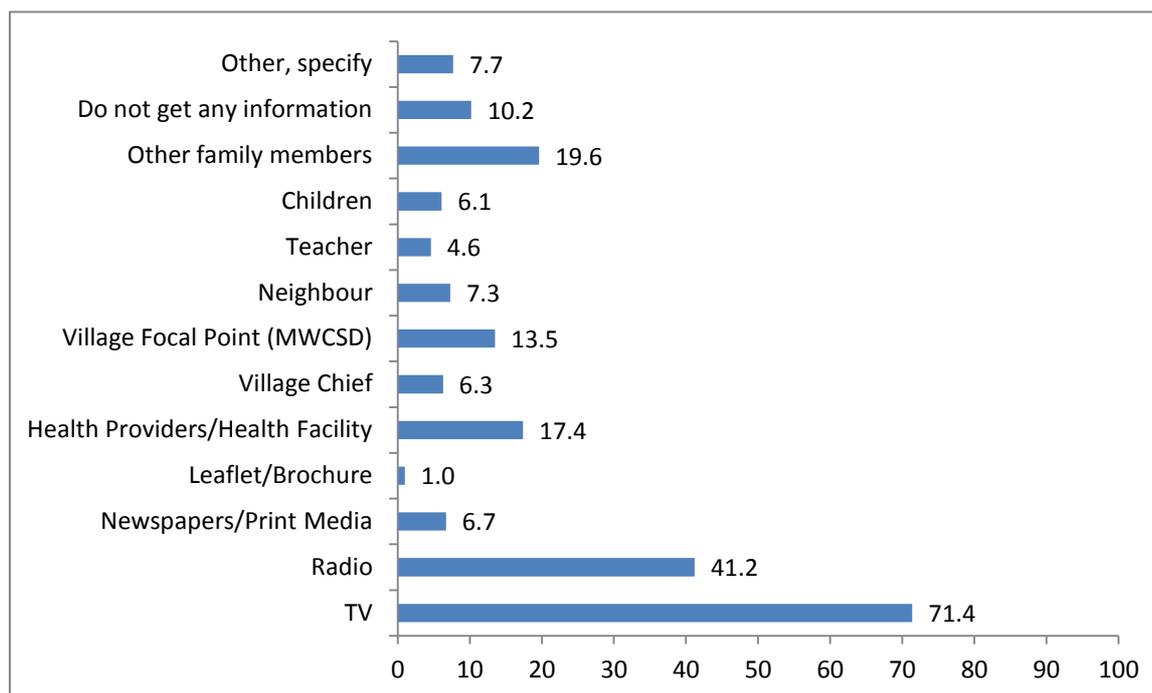
## #12. Where do you obtain information regarding water related matters (by Region)?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>TV</b>	87.9	94.7	79.2	86.1
<b>Radio</b>	54.8	72.3	60.6	80.3
<b>Newspapers/Print Media</b>	22.0	16.8	3.1	8.2
<b>Leaflet/Brochure</b>	5.9	2.8	1.1	0.8
<b>Health Providers/Health Facility</b>	41.6	54.3	25.1	48.6
<b>Village Chief</b>	3.1	6.9	24.2	11.2
<b>Village Focal point (MWCSD)</b>	2.5	8.1	7.6	35.2
<b>Neighbour</b>	2.8	1.6	2.5	12.0
<b>Teacher</b>	1.2	0.6	1.4	8.2
<b>Children</b>	3.7	1.6	4.8	4.6
<b>Other family members</b>	7.4	10.3	14.6	27.9
<b>Do not get any information</b>	2.2	0.4	0.6	

### #13. Where do you obtain information on latrine related matters ?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region.



### #13. Where do you obtain information on latrine related matters (by Region)?

N = 1549. Interview. Multiple Response. Filter = none. Weight on = region. Split by region.

	AUA	NWU	ROU	SAV
<b>TV</b>	70.3	90.1	48.3	68.9
<b>Radio</b>	27.6	45.1	37.7	51.1
<b>Newspapers/Print Media</b>	11.5	8.7	2.0	4.4
<b>Leaflet/Brochure</b>	2.5	0.8	0.6	0.3
<b>Health Providers/Health Facility</b>	21.4	8.5	4.2	39.1
<b>Village Chief</b>	0.6	4.9	13.5	6.3
<b>Village Focal point (MWCSD)</b>	1.5	12.5	8.2	30.8
<b>Neighbour</b>	2.8	3.0	1.4	23.0
<b>Teacher</b>	0.6	1.0	1.1	16.4
<b>Children</b>	3.1	2.2	7.6	12.3
<b>Other family members</b>	4.6	15.0	26.3	32.5
<b>Do not get any information</b>	21.1	3.8	20.0	0.3
<b>Other, specify</b>	7.1	11.9	7.3	2.7