



Samoa Bureau of Statistics

Environment Statistics

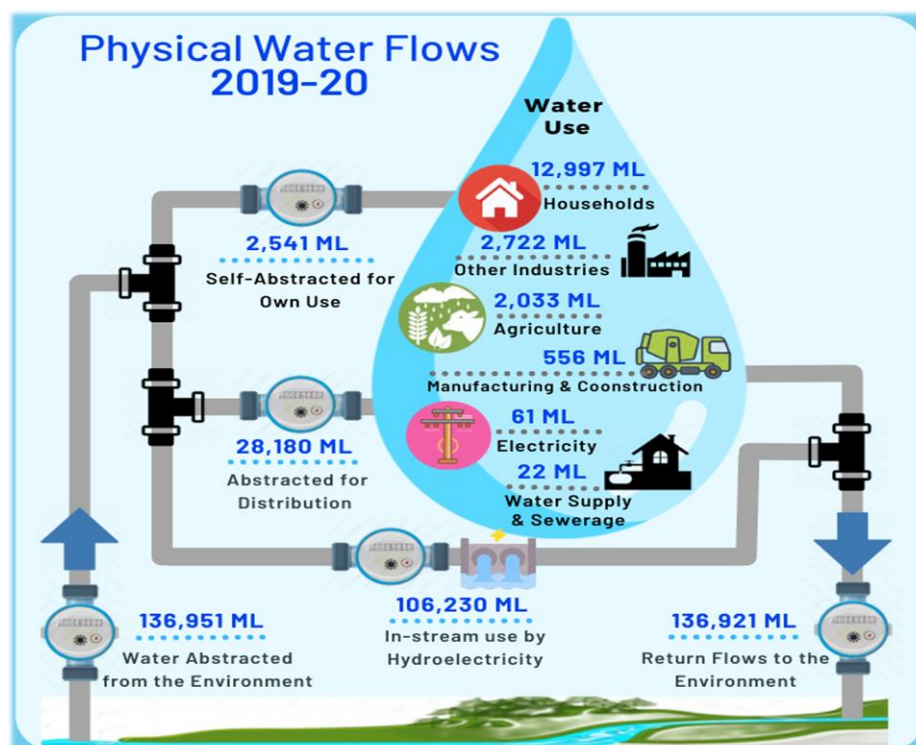
Samoa Water Accounts, 2019-20

Executive Summary

The Samoa Water Account for the financial year 2019-20 presents information on the physical and monetary supply and use of water in Samoa. This is the 6th edition of the Samoa's Water Accounts and it provides the highlights of water statistics, aggregates and indicators with comparison to the previous years. This account compilation closely followed the 2012 United Nation System of Environmental-Economic Accounting Central Framework (UN SEEA) guidelines and principles.

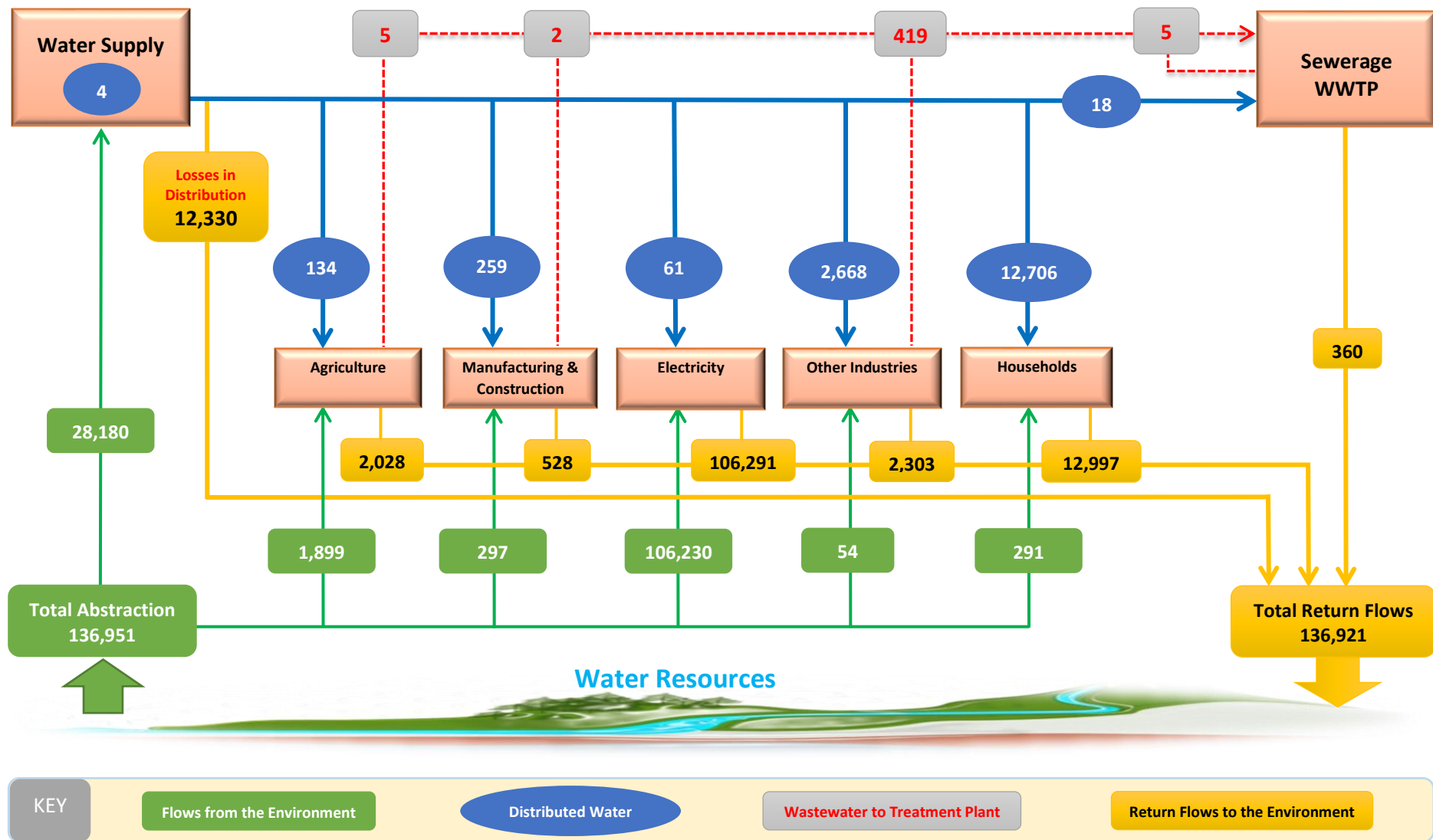
Figure 1 briefly summarizes the physical flows of water from the environment into the economy, its flows within the economy and return flows back to the environment. This flow diagram is shown in detail in Figure 2.

Figure 1: Samoa's Main Physical Water Flows Diagram, 2019-20 (Megalitres¹)



¹ 1 ML = 1,000 Cubic meters (m³)
1m³ = 1,000 Litres (L)

Figure 2: Major Water Flows for Samoa, 2019-20 in Megalitres (ML)



1. Account Results and Findings

1.1 Physical Water Supply and Use

Table 1 below summarizes water statistics from water abstraction to water use for the last five financial years from 2015-16 to 2019-20.

Table 1: Total Water Abstraction and Total Water Use, Samoa 2015-16 to 2019-20 (ML)

	2015-16	2016-17	2017-18	2018-19	2019-20
Total Abstraction by Water Type	101,836	82,530	114,144	163,005	136,951
Surface Water	93,335	74,045	106,846	155,587	129,212
Ground Water	7,912	7,843	6,634	7,147	7,448
Rainwater (a)	589	641	665	272	291
Total Abstraction by Industry & Households	101,836	82,530	114,144	163,005	136,951
Industries	101,247	81,892	113,482	162,733	136,660
Electricity	68,130	50,180	80,050	130,060	106,230
Water Supply Industry	29,727	28,164	29,949	28,783	28,180
Agriculture, Livestock & Fishing (b)	3,127	3,277	3,393	3,538	1,899
Manufacturing & Construction	83	92	66	333	297
All other Industries	180	180	25	19	54
Households	589	637	662	272	291
Total Water Use by Industry & Households (a)	101,836	82,530	114,144	163,005	136,951
Industries	75,230	57,771	87,312	137,828	111,624
Electricity	68,131	50,184	80,062	130,117	106,291
Agriculture, Livestock & Fishing	3,206	3,369	3,476	3,644	2,033
All other Industries	3,475	3,765	3,339	3,284	2,722
Manufacturing & Construction	415	449	413	700	556
Sewerage	1	2	16	78	18
Water Supply Industry	2	2	6	4	4
Households	13,574	13,994	13,060	12,783	12,997
Losses (d)	13,032	10,765	13,772	12,394	12,330

Source: Samoa Bureau of Statistics

Note:

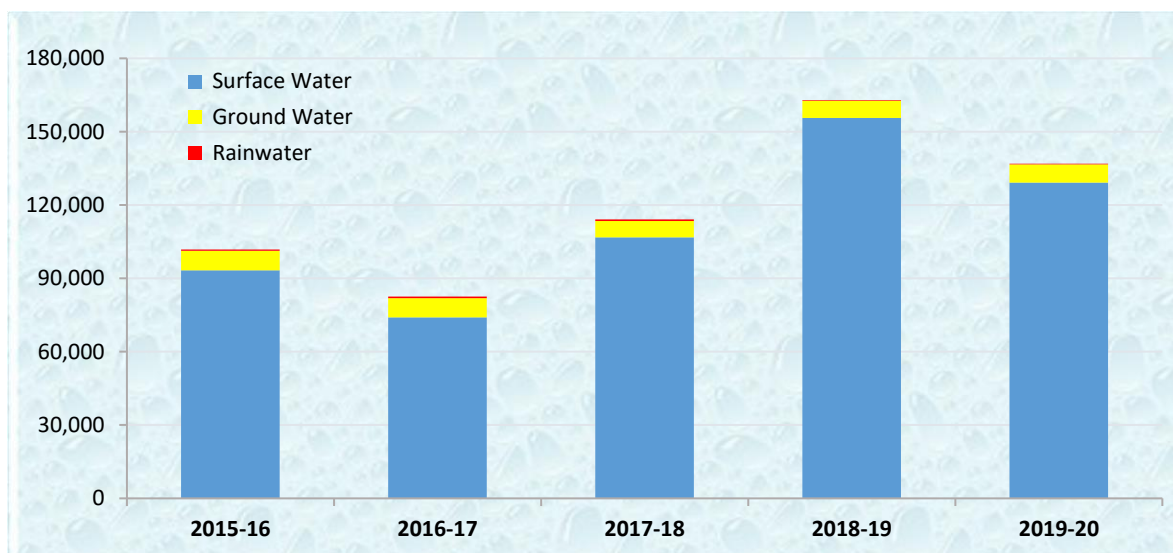
- (a) Rainwater is estimated only for the proportion of households not supplied by other water suppliers
- (b) Actual Livestock numbers based on 2019 Agriculture Census
- (c) Total Water Use = Self-Abstracted water use + Distributed water use
- (d) Include distribution losses through leakages, illegal connections, overflows and other authorized unbilled consumption

1.1.1 Water Abstraction

An estimated total of 136, 951 ML of water was abstracted from the environment into Samoa's economy in 2019-20, a decrease of about 16.0 % or 26,054 ML of water when compared to 2018-19. The decline is attributed to the decrease in water abstracted for hydro electricity generation from 130,060 ML in 2018-19 to 106,230 ML in 2019-20. However, Electricity Industry is still the main abstractor which accounted for about 78.0 % of total water abstracted.

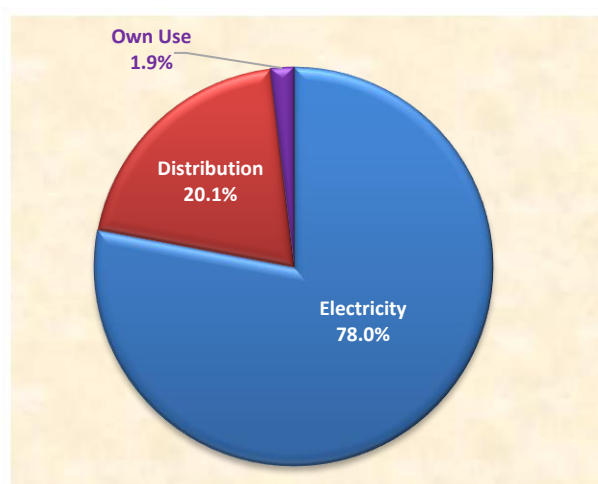
Surface water remains the main water type for abstracted water throughout the financial years. For 2019-20, it accounted for approximately 129,200 ML (94.3%) of total water abstraction. Groundwater accounted for 7,400 ML (5.5%) and the rest was rainwater harvesting at about 300 ML (0.2%) (Refer, **Chart 1**)

Chart 1: Total Water Abstraction by Water Type, Samoa 2015-16 to 2019-20 (ML)



Source: Samoa Bureau of Statistics

Chart 2: Proportion of Total Water Abstraction by Purpose of Use, Samoa 2019-20

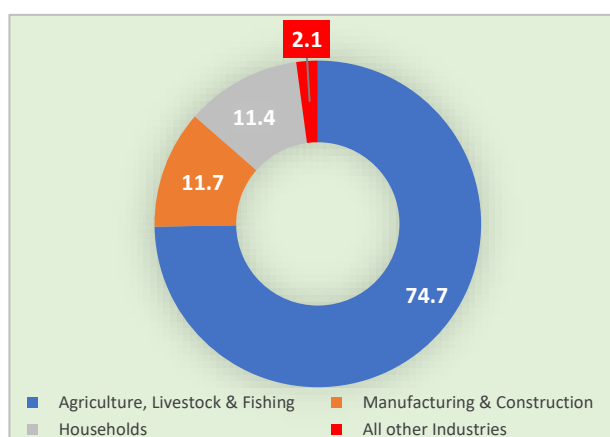


- **Electricity:** 78.0 % or 106,230 ML of total abstraction was self-abstracted² water by the Electricity Industry for hydropower and the vast majority of this water is returned back to the environment.
- **Distribution:** 20.1 % or about 27,400 ML of water was abstracted by the Water Supply industry mainly for distribution.
- **Own Use:** The remaining 2,300 ML of water or 1.9 % was self-abstracted for own use by industries and households (Refer **Chart 2**)

Note: Please note that the following charts (**Chart 3 & 4**) exclude figures for hydroelectricity used by the Electricity Industry and self-abstracted water for distribution by the Water Supply Industry. It only includes self-abstracted water for own use by the selected industries and households.

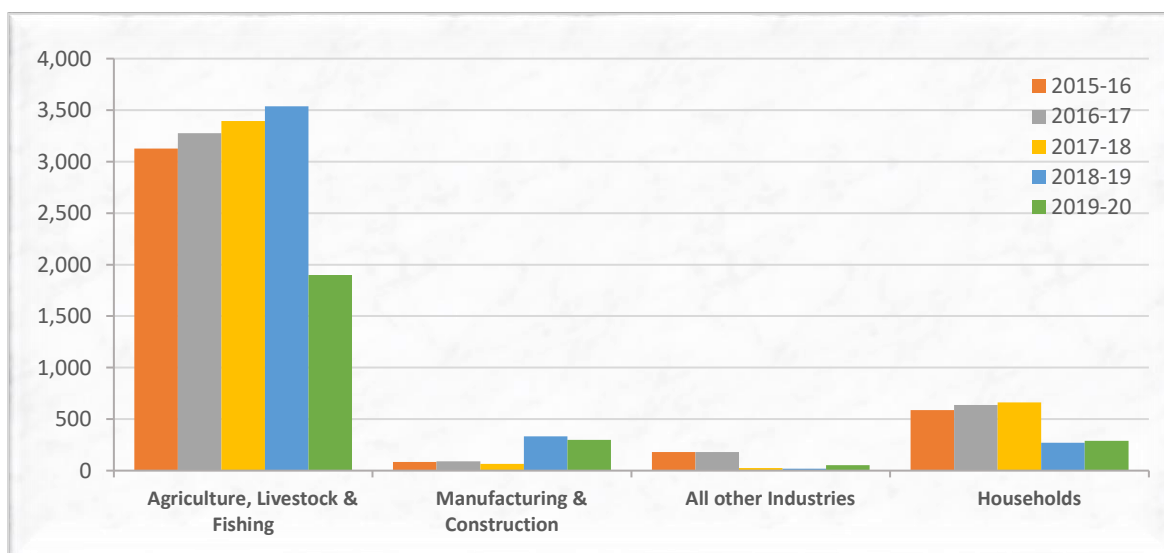
² **Self-abstracted** water refers to water that is directly abstracted from the environment.

Chart 3: Proportion of self-abstracted water for own use, Samoa 2019-20



- Out of the 2,500 ML or 2.0 % of self-abstracted water for own use, 74.7 % or 1,900 ML comes from the Agriculture Industry.
- Manufacturing and Construction accounted for about 300 ML or 11.7 %.
- Households accounted for 11.4 % or 290 ML of water
- The remaining 54 ML of water or 2.1 % was self-abstracted by All Other Industries.

Chart 4: Total Self-Abstracted Water for Own Use by Industries & Households, Samoa 2014-15 to 2019-20 (ML)



Source: Samoa Bureau of Statistics

Chart 4 summarizes self-abstracted water for own use from 2015-16 to 2019-20. Agriculture industry is clearly the dominant industry and has steadily increased from 2015-16 to 2018-19 and then declined in 2019-20. The use of actual livestock numbers from the latest Agriculture Census 2019 resulted in the decline as less livestock numbers were recorded as opposed to the projected numbers used in the previous four years. Further details on agriculture water use by different livestock and poultry are tabulated in **Appendices A4 & A5**. Furthermore, the decrease in self-abstracted water for households partially due to more households been connected to pipe water supply.

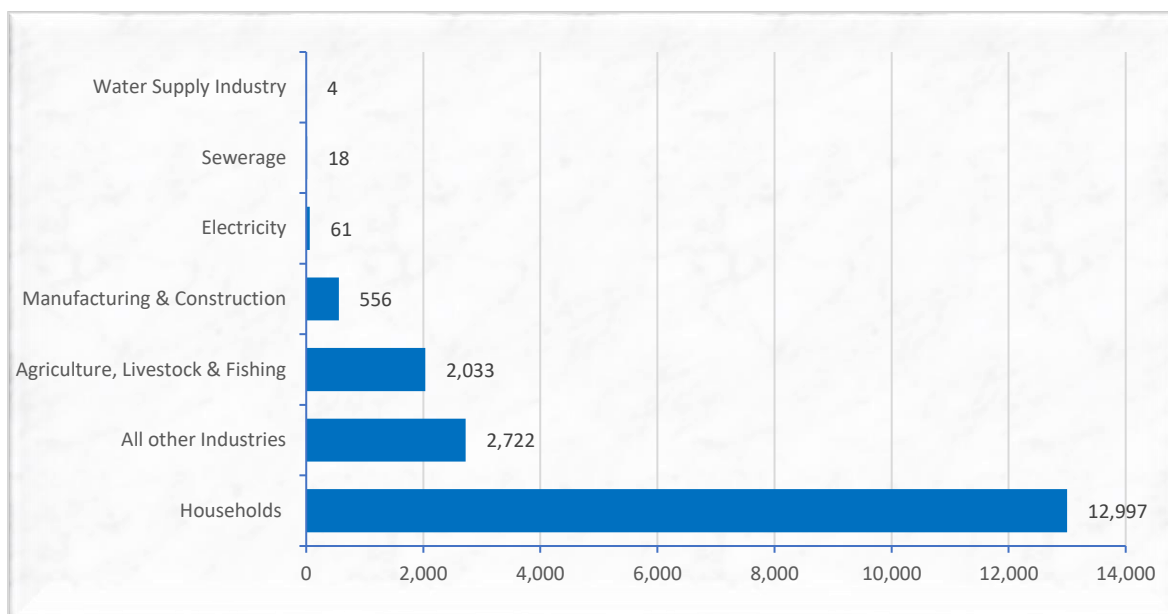
1.1.2 Water Use

The total water use (hydroelectricity excluded) in 2019-20 was about 18,390 ML (Refer **Chart 5**).

- 70.7 % or 12,997 ML of total water use was used by households
- 14.8 % or 2,722 ML was used by Other Industry;
- 11.1 % or 2,033 ML was used by Agriculture, Livestock and Fishing;

- 3.0 % or 556 ML was used by Manufacturing and Construction;
- The remaining 0.4 % or 83 ML was used by the Electricity industry (81 ML), Sewerage (18 ML) and Water Supply Industry (4 ML)

Chart 5: Total Water Use by Industries and Households, Samoa 2019-20 (ML)

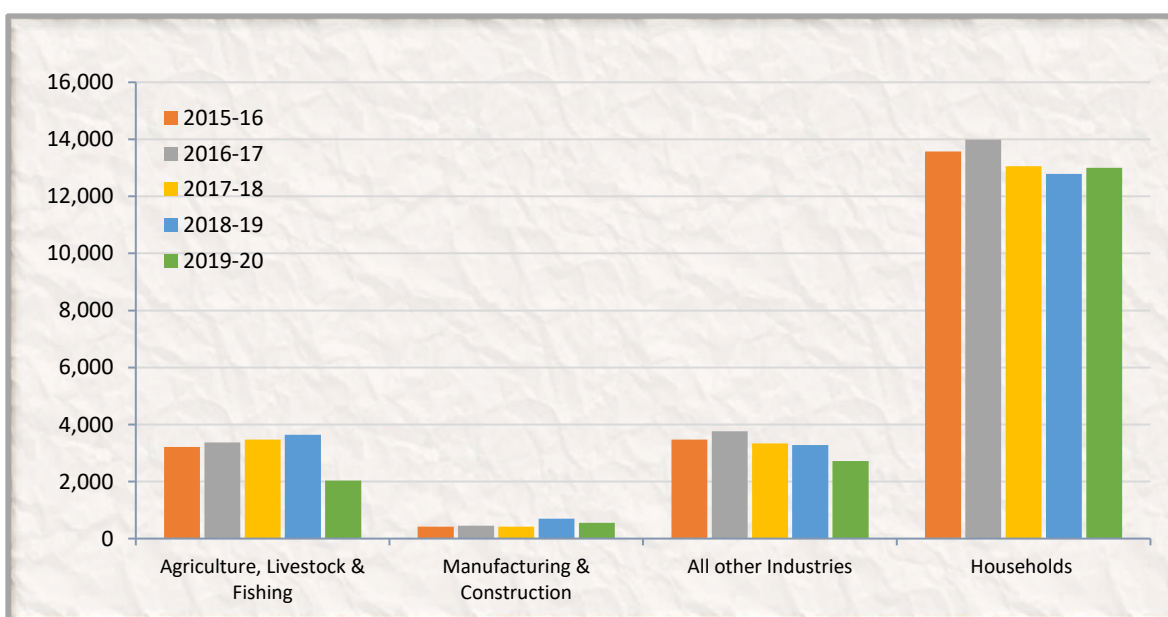


Source: Samoa Bureau of Statistics

Note: Hydroelectricity water use is excluded

Households are the main users of water, which accounted for the majority of water use across all the financial periods (Refer **Chart 6**).

Chart 6: Total Water Use by Industries and Households, Samoa 2015-16 to 2019-20 (ML)



Source: Samoa Bureau of Statistic

1.2 Monetary Water Supply and Use

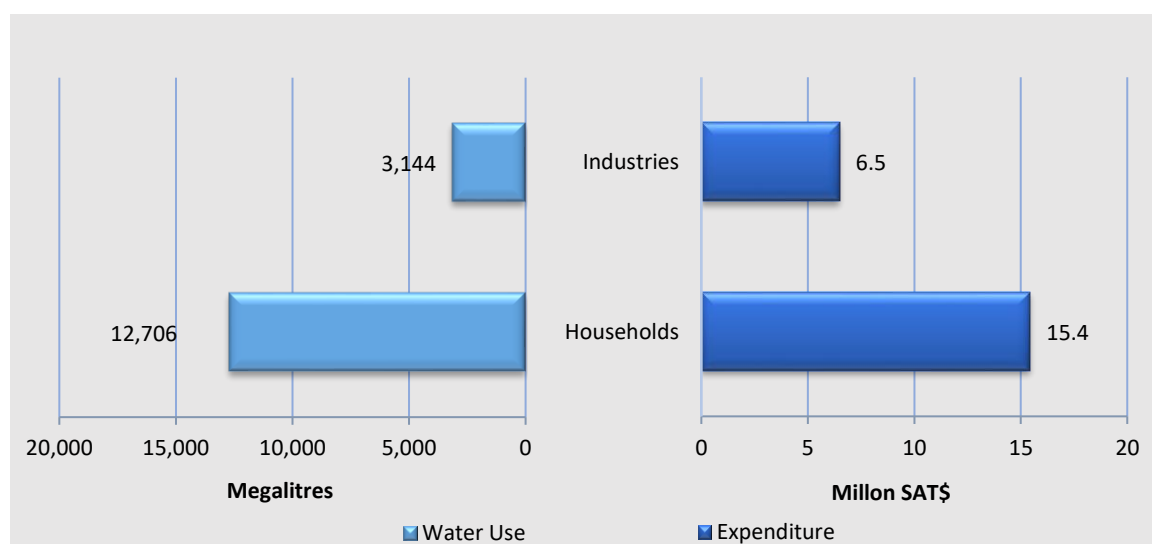
Coverage of financial information is still limited to distributed water use. More than 82.0 % of distributed water³ use comes from metered water; the monetary estimates are considered reliable but should still be interpreted with caution. All monetary values are in Samoan Tala and notes under

Table 2 briefly describe how monetary values were calculated. The following charts provide detailed graphical analysis on distributed water use for 2019-20 together with Table 2-4.

■ Total Distributed Water Use and Expenditure by Households and Industries

Chart 7 summarizes total distributed water use by households and industries in volume and expenditures for water use. In 2019-20, an estimated total of about 15,850 ML of distributed water was used by households and industries. Out of that amount, about 80.2% or 12,706 ML was used by households and the remaining 19.8% or 3,144 ML was used by Industries.

Chart 7: Total Distributed Water Use and Expenditure, Samoa 2019-20



Source: Samoa Bureau of Statistics

An estimated 21.9 million Tala were paid by all users for distributed water use where households accounted for the bulk of it at about 70.4% or 15.4 million Tala. Industries makes up the remaining 29.6% or 6.5 million Tala of total expenditure on distributed water use

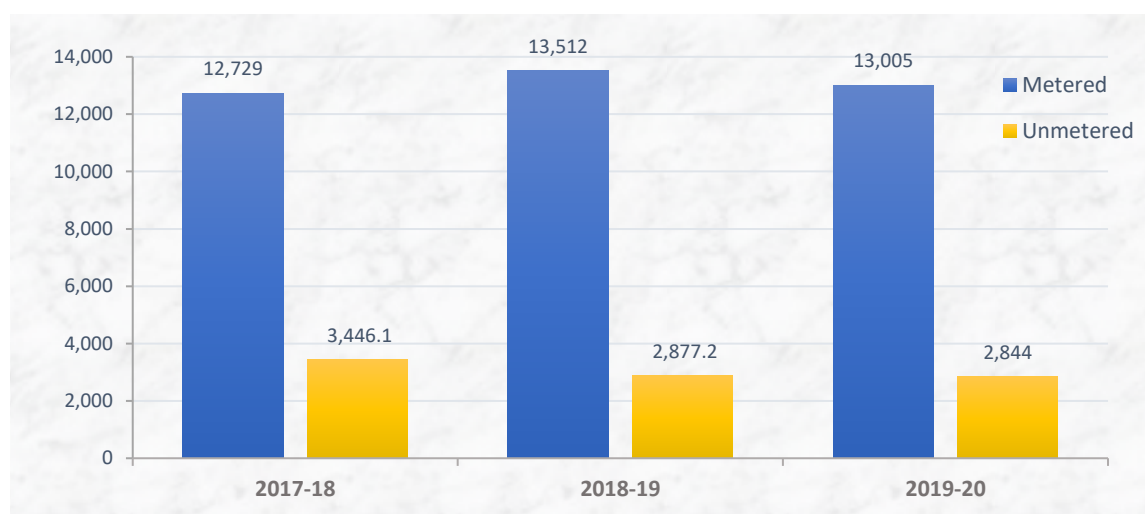
■ Distributed Metered Water Use versus Unmetered Water Use

Metered water consistently dominated total distributed water use throughout the three-year period. In 2019-20, metered water accounted for 82.1% or 13,005 ML of total

³ **Distributed water** refers to water supplied by the water suppliers to industries and households or between economic units where an economic transaction occurs.

distributed water. The remaining 17.9% or 2,844 ML was unmetered water (Refer **Chart 8**).

Chart 8: Distributed Metered and Unmetered Water Use, Samoa 2017-18 to 2019-20 (ML)

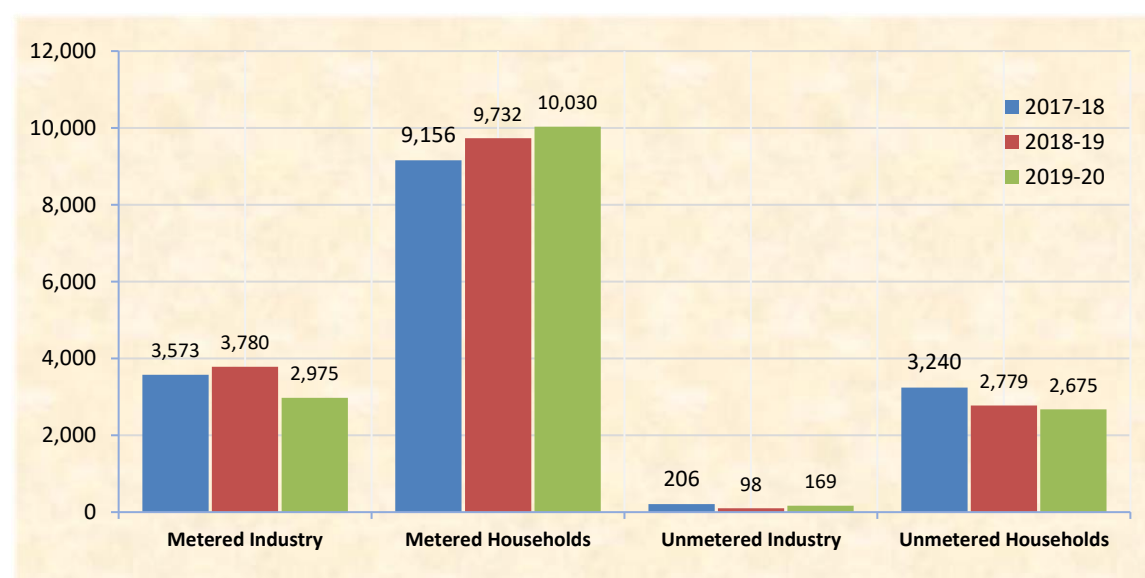


Source: Samoa Bureau of Statistics

■ Distributed Water Use by Type of Water Use

In 2019-20, households metered water use accounted for most of the total distributed water use at about 63.3 % or 10,030 megaliters. Unmetered industry accounted for the least at about 1.1% or 169 ML (Refer **Chart 9**).

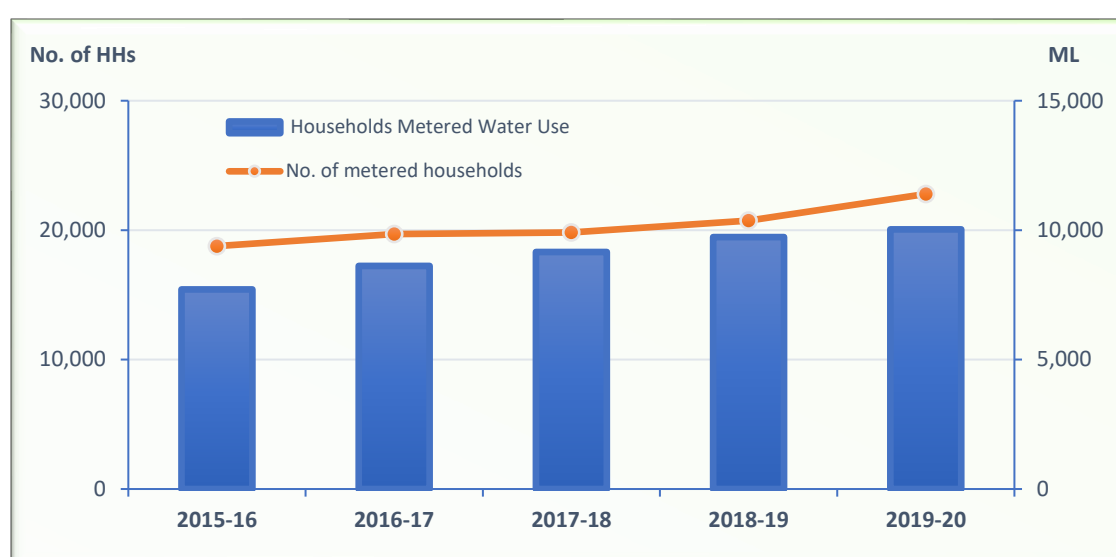
Chart 9: Water Use by Type of Distributed Water Use, Samoa 2017-18 to 2019-20



Source: Samoa Bureau of Statistics

Households metered water use accounted for the bulk of total distributed water use, and it increases from year to year since 2017-18. The increase is attributed to the increase in number of metered households' connections (Refer **Chart 10**).

Chart 10: Number of Metered Households versus Metered Water Use, Samoa 2015-16 to 2019-20



Source: Samoa Water Authority & Samoa Bureau of Statistics.

Distributed water used by Metered Industry was declined by around 21.3% or 805 ML in 2019-20 compared to the last financial period. This could plausibly due to the effects of MEASLE Outbreaks in late 2019 and COVID 19 in early 2020⁴, limiting operations of some of the industries. The side effects of these events are clearly evident by the negative percentage change in metered water use by most of the individual industries (Refer Table 2).

Table 2: Metered Water Use (ML) and Percentage Change from 2018-19 to 2019-20

Industries	2018-19	2019-20	Change %
Agriculture, Forestry and Fishing	106.40	133.80	25.8
Manufacturing and Construction	365.70	258.10	-29.4
▪ Manufacturing	300.40	223.00	-25.8
▪ Construction	47.20	29.10	-38.3
▪ Mining & Quarrying	18.10	6.10	-66.3
Electricity, Gas and Air Conditioning	57.20	61.00	6.6
Water Supply, Collection and Treatment	4.00	4.00	0.0
Sewerage	77.70	18.40	-76.3
Other Industries	3,168.80	2,499.70	-21.1
▪ Accommodation and Food Services	675.60	462.50	-31.5
▪ Education	563.40	524.40	-6.9
▪ Public Administration and Defense	424.50	333.20	-21.5
▪ Wholesale and Retail Trade	357.80	394.60	10.3
▪ Human Health and Social Work Activities	305.70	197.90	-35.3
▪ Real Estate, Rental and Leasing Activities	145.20	43.00	-70.4
▪ Other Service Activities	248.10	232.80	-6.2
▪ Financial and Insurance Services	149.30	61.70	-58.7

⁴ **Measle outbreak:** November 17-December 7, 2019, all schools closed; **Extreme Weather Conditions:** 18-19 Feb 2020, schools closed due to flooding and affecting the central business area in Apia; **COVID 19:** 26 Mar-21 May 2020 – First orders for State of Emergency was reinforced for Samoa, limiting public gatherings, regulating schools, businesses and government bodies operating hours.

▪ Transportation and Storage	92.10	72.70	-21.1
▪ Arts, Entertainment and Recreation	109.90	59.90	-45.5
▪ Administrative and Support Service Activities	35.40	42.30	19.5
▪ Activities of Extraterritorial Organizations	39.10	41.00	4.9
▪ Information and Communication	10.90	10.30	-5.5
▪ Professional, Scientific and Technical Activities	8.30	5.10	-38.6
▪ Waste Collection and Management	3.50	3.00	-14.3
▪ Unclassified	0.00	15.30	100.0
Total Industries	3,779.80	2,975.10	-21.3
Total Households	9,732.50	10,030.20	3.1
Total Metered Water Use	13,512.30	13,005.30	-3.8

Source: Samoa Water Authority

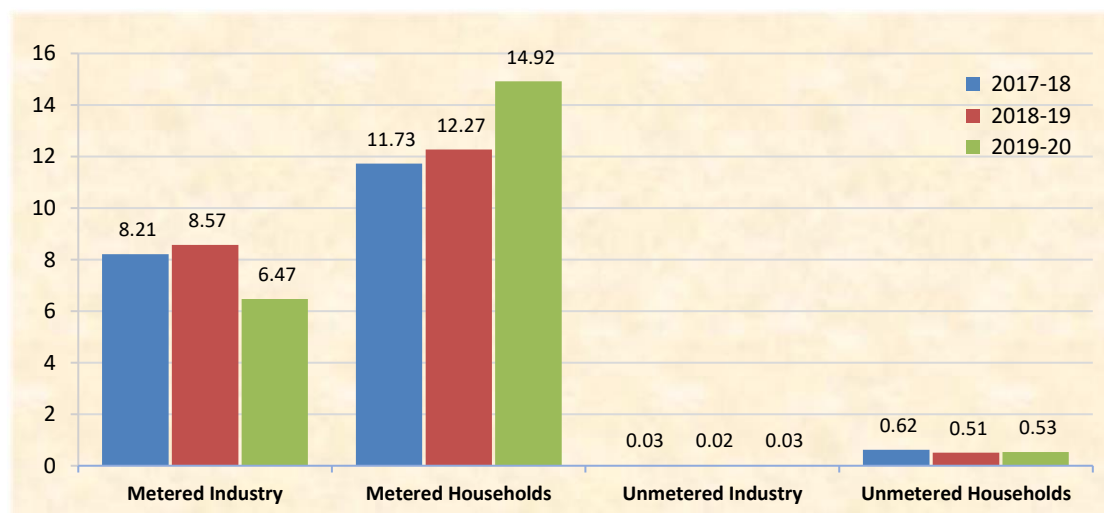
Note: Unclassified – refers to unidentified industries.

▪ Expenditure by Type of Distributed Water Use

In 2019-20, metered households paid the highest share among the various categories for distributed metered water use with 67.9 % or \$14.9 million Tala. Unmetered Industry spent the least with about 0.1% or 0.03 million Tala of total distributed water use.

Metered Industry spent less in 2019-20 with about 24.5% or \$2.1 million Tala compared to 2018-19. In contrast, expenditure by metered households has increased by around 21.6% or \$2.65 million Tala. Increase in households metered water use and tariff rates (See A10) are the main contributing factors to the overall increase (Refer **Chart 11**).

Chart 11: Expenditure by Type of Distributed Water Use, Samoa 2017-18 to 2019-20 (Mill. Tala)



Source: Samoa Bureau of Statistics

By detailed industry (Refer **Table 3**), the most significant contributors to the Total Expenditure on distributed water were the Education Industry and the Accommodation and Food Services Industry with an estimated \$1.1 million Tala (17.8%) and \$1.0 million Tala (15.8%), respectively.

Table 3: Estimated Expenditure on Distributed Water Use by Industries and Households, 2015-16 to 2019-20 (Samoan Tala).

Industries	2015-16	2016-17	2017-18	2018-19	2019-20
Agriculture, Livestock and Fishing	147,916.7	152,762.7	156,964.7	206,714.0	300,453.2
Manufacturing and Construction	606,379.8	628,073.2	662,035.7	712,484.8	570,969.7
▪ Manufacturing	538,457.2	546,828.7	543,855.5	590,403.6	497,509.9
▪ Construction	62,250.1	79,926.5	89,085.8	87,426.4	60,165.6
▪ Mining & Quarrying	5,672.5	1,318.0	29,094.4	34,654.8	13,294.2
Electricity Industry	1,379.0	6,749.0	23,236.5	113,889.0	137,662.4
Water Supply Industry	480.0	400.0	7,094.5	7,586.5	6,020.3
Sewerage	1,364.0	3,542.0	55,795.5	52,081.7	13,289.0
Other Industries	5,815,303.5	6,434,566.5	7,334,470.2	7,500,143.7	546,8378.2
▪ Accommodation and Food Services	1,010,250.4	1,415,161.1	1,704,785.9	1,469,555.4	1,022,296.5
▪ Education	1,108,299.4	1,102,703.0	1,112,031.9	1,096,745.1	1,149,935.7
▪ Public Administration and Defense	753,963.2	754,431.9	841,490.2	1,155,997.6	739,416.9
▪ Human Health and Social Work	384,237.2	607,176.1	1,015,173.8	1,030,093.1	831,389.4
▪ Wholesale & Retail Trade	665,723.0	710,681.4	675,623.6	748,139.1	444,095.8
▪ Real Estate, Rental and Leasing Activities	480,756.3	499,702.6	382,479.6	412,395.8	93,823.4
▪ Other Service Activities	465,054.1	379,767.1	477,654.7	465,451.3	484,765.0
▪ Financial and Insurance Services	443,391.0	356,712.6	479,765.9	512,414.5	135,916.9
▪ Arts, Entertainment and Recreation	171,747.5	214,746.8	169,762.4	182,955.5	130,408.6
▪ Transportation and Storage	170,033.3	197,676.1	234,326.4	213,779.0	160,594.3
▪ Administrative and Support Service Activities	88,250.1	92,106.6	87,171.3	73,431.9	90,986.1
▪ Activities of Extraterritorial Organizations	47,850.3	63,120.5	76,316.0	77,706.0	91,277.4
▪ Information and Communication	13,295.0	20,158.8	29,728.0	21,947.8	20,734.6
▪ Professional, Scientific and Technical Activities	12,452.7	14,483.9	14,340.0	14,733.6	9,441.2
▪ Waste Collection and Management	-	5,938.0	6,383.5	6,507.0	6,360.3
▪ Unclassified	-	-	27,437.0	18,291.0	34,755.0
Total Industries	6,572,823.0	7,226,093.4	8,239,597.1	8,592,899.7	6,496,772.6
Households	10,356,546.3	11,182,834.0	12,439,347.2	12,779,568.1	15,447,145.1
Grand Total	16,929,369.3	18,408,927.4	20,678,944.3	21,372,467.8	21,943,917.7

Source: Samoa Water Authority, Independent Water Scheme and Samoa Bureau of Statistics

Note: Unclassified – are unidentified industries

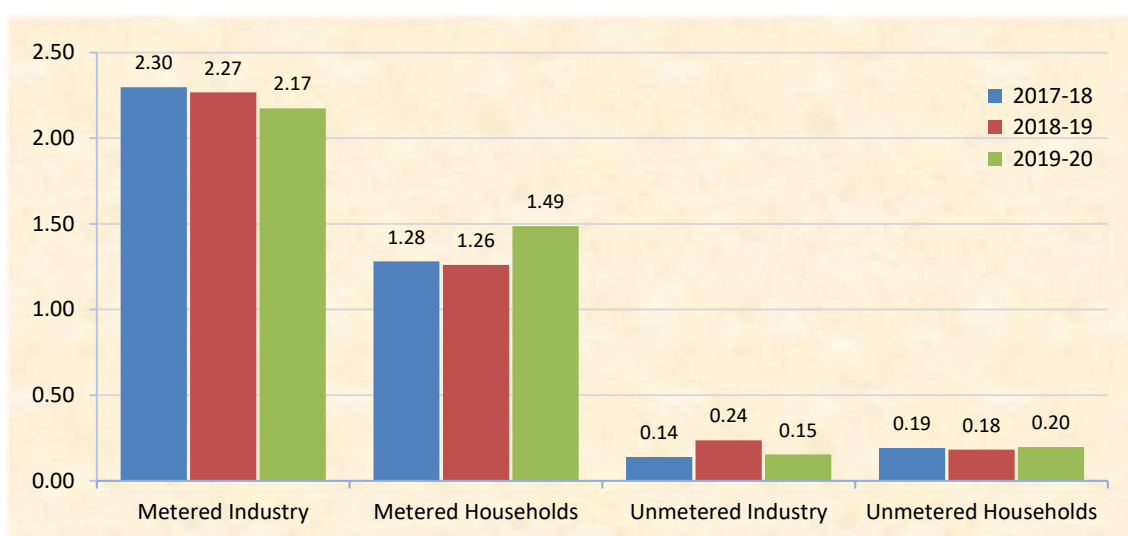
-: Nil or not available

■ Implicit Prices ⁵

In 2019-20, the average price per cubic meter of distributed water use for metered industry was the highest with \$2.17 while distributed unmetered water to industry accounted for the cheapest at \$0.15 per cubic meter (Refer **Chart 12**).

⁵ **Implicit Price** is imputed as the Water expenditure divided by water supplied (\$SAT/m³). The expenditures used to calculate the price do not include any water-related subsidies that might have been received by the supplier of water or use of water. Furthermore, expenditures for not necessarily cover all the costs of supplying water.

Chart 12: Implicit Price for Distributed Water Use, Samoa 2017-18 to 2019-20



Source: Samoa Bureau of Statistics.

All implicit prices for industry for all types of distributed water use in 2019-20 have decreased compared to 2018-19. On the contrary, implicit prices for both metered and unmetered have increased compared to 2018-19. For metered households, it increased by 15.4% or \$0.20.

Table 4: Monetary Supply and Use Table, Samoa 2017-18 to 2019-20

Volume in Megaliters (ML)	2017-18	2018-19	2019-20
Metered Water Use	12,729.50	13,512.28	13,005.32
Industry	3,573.20	3,779.79	2,975.12
Households	9,156.30	9,732.49	10,030.20
Unmetered Water Use	3,446.10	2,877.20	2,844.25
Industry (a)	205.67	98.09	168.79
Households (b)	3,240.43	2,779.10	2,675.46
Total Distributed Water	16,175.60	16,389.48	15,849.57
Expenditure in Million Tala (SAT\$)	2017-18	2018-19	2019-20
Metered Water Use	19.94	20.84	21.39
Industry	8.21	8.57	6.47
Households	11.73	12.27	14.92
Unmetered Water Use	0.65	0.53	0.55
Industry (c)	0.03	0.02	0.03
Households (d)	0.62	0.51	0.53
Total Value	20.59	21.37	21.94
Implicit Price (\$/m3)	2017-18	2018-19	2019-20
Metered Industry	2.30	2.27	2.17
Metered Households	1.28	1.26	1.49
Unmetered Industry	0.14	0.24	0.15
Unmetered Households	0.19	0.18	0.20

Source: Samoa Water Authority, Independent Water Scheme and Samoa Bureau of Statistics

Note:

(a) Unmetered water use for industry was estimated by calculating the average metered water use for each individual industry

- (b) Unmetered household water use was estimated by calculating the average household metered water use.
- (c) Revenue for unmetered industries was estimated at \$SAT32/month flat rate for SWA commercial customers and \$SAT10 for IWS Commercial customers.
- (d) Revenue for unmetered households was estimated by \$SAT10 maintenance fee/month for IWS customers and \$SAT20/month flat rate for SWA household customers.

1.3 Water Productivity

Water Productivity is the amount of GDP generated per cubic meter of water abstracted, calculated by GDP divided by total water abstracted. Table 4 highlights water productivity over the last five financial years.

Table 4: Samoa Water Productivity for the financial years 2015-16 to 2019-20

	Total Water Abstracted m ³	GDP (Bill. Tala)	Water Productivity (\$/m ³)
2015-16	101,836,320	2,107,457,000	20.69
2016-17	82,529,566	2,109,400,000	25.56
2017-18	114,144,000	2,105,500,000	18.45
2018-19	163,005,000	2,231,200,000	13.69
2019-20	106,208,849	2,177,400,000	15.99

Source: Samoa Bureau of Statistics

Samoa's economy in 2019-20 produced \$15.99 of GDP from every cubic meter of total water abstracted, which is more productive compared to \$13.69 recorded in 2018-19. On the other hand, Samoa's water productivity has decreased from \$20.69 in 2015-16 to \$15.99 in 2019-20 (Refer **Table 4**).

1.4 Wastewater and Treatment Plant

The Wastewater Treatment Plant operated by SWA is used mainly by some businesses and government ministries within the Apia business area. There are no households connected to this wastewater treatment plant.

A total of 430.9 ML of wastewater was discharged to the Wastewater Treatment Plant by all industries in 2019-20, slightly increased by around 1.8% or 7.8 ML compared to the previous financial year 2018-19. An estimated total payment of about \$2.3 million Tala was recorded for all the wastewater discharged by different industries to the Wastewater Treatment Plant for 2019-20, an increase of about 3.1 % from \$2.2 million Tala in 2018-19 (Refer **Table 5**).

Table 5: Wastewater Treatment Plant Use and Expenditure, Samoa 2017-18 to 2019-20

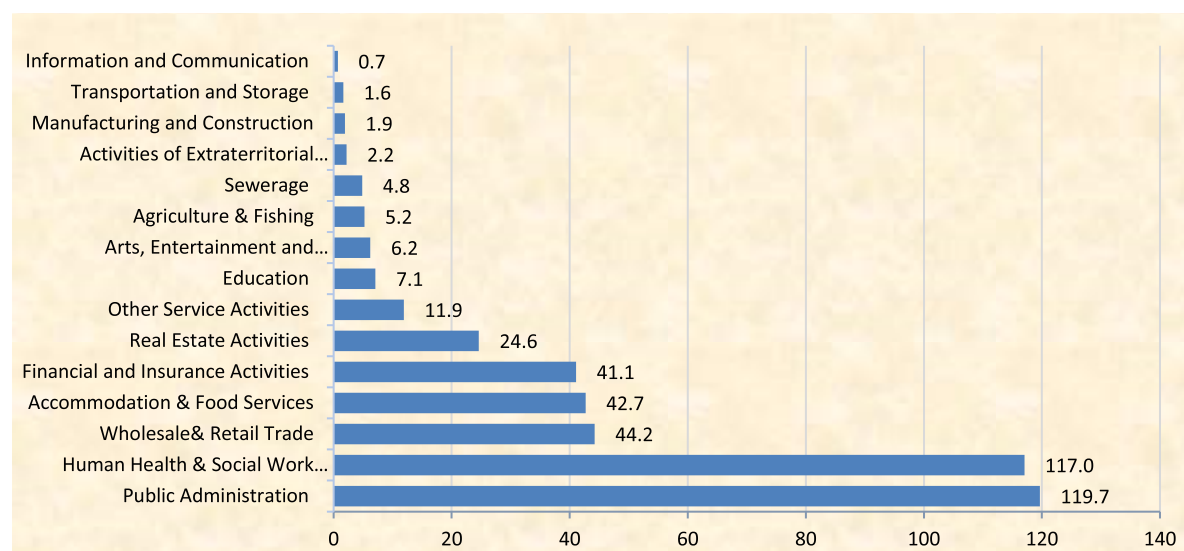
Industries	Megaliters (ML)			Expenditure \$SAT		
	2017-18	2018-19	2019-20	2017-18	2018-19	2019-20
Human Health & Social Work Activities	118.6	115.5	117.0	686,930.9	666,417.0	677,460.6
Public Administration	80.2	111.8	119.7	439,241.6	612,123.5	663,274.3
Wholesale & Retail Trade	33.6	47.3	44.2	159,482.7	202,564.2	188,901.6
Accommodation & Food Services	53.9	45.4	42.7	301,857.7	230,009.9	229,662.6
Financial and Insurance Activities	38.7	43.5	41.1	218,984.6	247,164.9	232,141.8
Other Service Activities	12.6	21.5	11.9	63,758.9	107,157.9	57,355.1
Real Estate Activities	17.5	13.1	24.6	97,372.1	71,818.4	137,833.8
Sewerage	7.2	6.8	4.8	38,291.5	35,683.7	247,48.5
Agriculture & Fishing	5.0	5.5	5.2	14,473.3	16,907.2	16,961.2
Arts, Entertainment and Recreation	3.9	5.1	6.2	15,780.2	20,814.7	26,981.7
Education	5.6	4.5	7.1	27,423.2	22,290.1	38,281.2
Information and Communication	2.0	1.2	0.7	9,087.8	4,922.1	25,38.1
Activities of Extraterritorial Organizations	0.5	0.9	2.2	1,858.5	3,076.5	9,199.5
Manufacturing and Construction	0.7	0.8	1.9	2,292.5	2,709.0	9,177.7
Transportation and Storage	0.3	0.4	1.6	1,011.5	1,456.0	7,519.8
Total Wastewater Discharge	380.2	423.1	430.9	2,077,847.0	2,245,125.1	2,322,037.5

Source: Samoa Water Authority (SWA).

Public Administration accounted for most of the wastewater discharged with 119.7 ML (27.8%), followed by Human Health and Social Work Activities industry with 117.0 ML (27.2%).

Conversely, Transportation and Storage together with Information and Communication accounted for the least of the wastewater discharged with 1.6 ML (0.4%) and 0.7 ML (0.2%) respectively (Refer **Chart 14**).

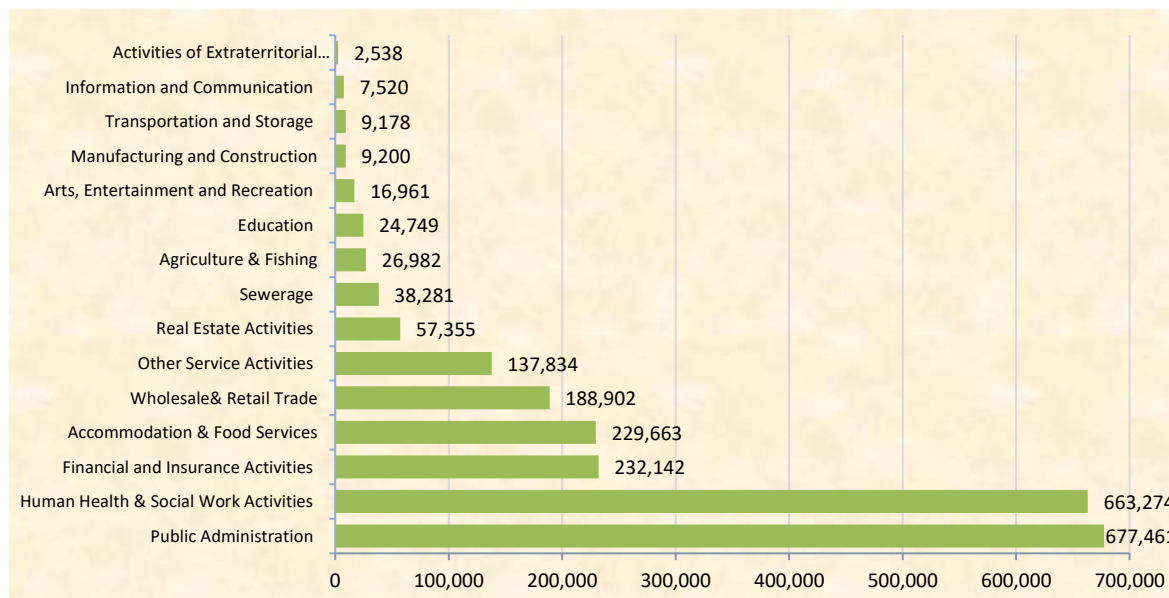
Chart 14: Volume of Wastewater Discharged to Wastewater Treatment Plant by Industry, 2019-20 (ML)



Source: Samoa Water Authority

Public Administration industry spent the most with \$677,461.00 accounting for 29.2 % of total expenditure, while Activities of Extraterritorial Organizations industry spent the least with \$2,538.00 representing only 0.1 % of total expenditure (Refer **Chart 15**)

Chart 15: Expenditure on Wastewater Discharged to Wastewater Treatment Plant by Industry, 2019-20 (SAT\$)

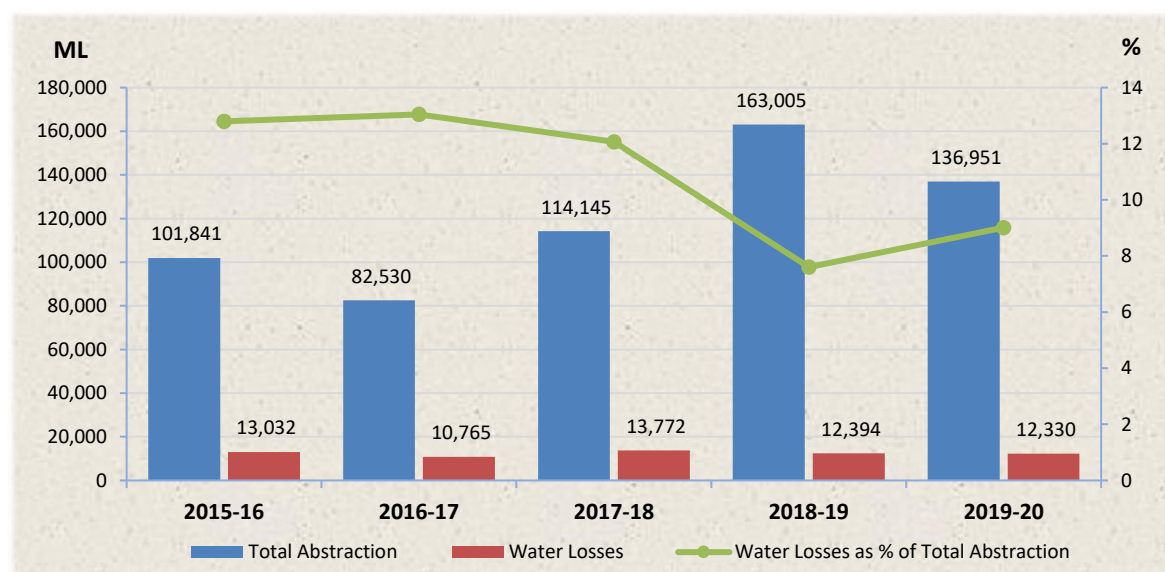


Source: Samoa Water Authority

1.5 Water Losses

Water Losses continue to be a major challenge for the Water Supply Industry. Losses are referred to as unaccounted water including leakages through aging networks, overflows, authorized unbilled consumption and illegal connections.

Chart 16: Estimated Water Losses, 2014-15 to 2019-20 (ML)



Source: Samoa Bureau of Statistics

Water losses has slightly declined from 12,394 ML in 2018-19 to 12,330 ML in 2019-20. The decline, according to the water suppliers, was due to the increase in metered connections and the upgrading of old leaking systems. The continuous public awareness programs to all levels of customers especially the village communities also contributed to the decline in water losses.

1.6 Other Key Water Indicators

Table 6: Other Key Water Indicators, Samoa 2015-16 to 2019-20

	Unit	2015-16	2016-17	2017-18	2018-19	2019-20
Total Population (Nov) (a)	Persons	194,238.0	195,979.0	197,611.0	199,243.0	202,506.0
Total number of households (Nov)	HHs	27,748.0	28,880.0	29,060.0	29,950.0	30,485.0
Total number of metered households	HHs	18,768.0	19,686.0	19,832.0	20,737.0	22,793.0
Water use by Industry	ML	75,230.0	57,771.0	87,312.3	137,827.9	111,624.4
Water use by Households	ML	13,574.0	13,994.0	13,059.9	12,783.2	12,996.6
Total Water Use	ML	88,804.0	71,765.0	100,372.2	150,611.2	124,621.0
Water use per capita (b)	m ³	457.2	366.2	507.9	755.9	615.4
Water use per households (c)	m ³	489.2	484.6	449.4	426.8	436.4
% of HHs with Metered Water Use (d)	%	67.6	68.2	68.2	69.2	74.8

Source: Samoa Water Authority and Samoa Bureau of Statistics

Note:

- (a) Projection based on average household size of 7 people for all years except 2016-17, the Census year
- (b) Calculated by **total water use** divided by the total population multiply by 1000
- (c) Calculated by **water use by households** divided by the total number of households multiply by 1000
- (d) Calculated by Total number of metered households divided by Total Number of Households

1. Changes in this Issue

Methodology for the rest of the account is very much similar to the last water account for the financial year 2017-18. There is also a slight change in terminology where distributed water replaces the supplied water used in the previous accounts. Due to these changes, please note that caution should still be taken into consideration when trends and changes over time are interpreted.

There is at least one major change to the account which is using of Agriculture Census 2019 livestock numbers to estimate water use by livestock. It really had an impact on the estimated water use across the last four financial years as less numbers were recorded during the census compared to the projected numbers used before.

2. Methodological Notes

This account was solely dependent on administrative datasets provided. The timeliness of responses to various questionnaires and small surveys is still an issue. Hence, most of the estimates and aggregates are derived from the best available information presented to the bureau. Please refer Appendices for all the tables used for this compilation.

3. Conclusion and Way Forward

Samoa's Water Account is building towards solidifying data series for years and it will keep on improving in terms of quality, compilation, coverage and application. The physical supply and use information have been consistently improved as well as monetary information.

The application and usefulness of water accounts for users at every level and in policy decision making will be achieved as accounts will be produced consistently. That will come with challenges as data access and data quality through data sharing are still majors issues faced by the Bureau. Lessons learned from this compilation will also provide room for more work for the bureau to improve water accounts.

4. Feedback on the Accounts

The accounts will be improved significantly as we keep publishing series of water accounts over the years and any feedback provided will further enhance this. Any feedback or issues on this report for future improvements are mostly welcome.

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5. Acknowledgement

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6. Appendices

A1: Estimated population and number of households, 2015 to 2020

	2015	2016 (a)	2017	2018	2019	2020
Population	193,483	195,979	197,611	199,243	200,874	202,506
Estimated no. of households (b)	27,251	28,880	29,120	29,950	30,485	31,020

Source: Samoa Bureau of Statistics

Note:

(a) Population and Housing Census year

(b) Based on (6.8) persons per household (PHC, SBS 2016)

A2: Samoa Water Authority Metered and Estimated Unmetered Water Supply by ISIC Industry, FY2019-20

Industries	Metered Water (ML)	Est. Unmetered Water (ML)	Total Supply (ML)
Agriculture, Forestry and Fishing	133.8	-	133.8
Manufacturing and Construction	258.1	0.9	259.0
▪ Manufacturing	223.0	-	223.0
▪ Construction	29.1	0.9	30.0
▪ Mining & Quarrying	6.1	-	6.1
Electricity, Gas and Air Conditioning	61.0	-	61.0
Water Supply, Collection and Treatment	4.0	-	4.0
Sewerage	18.4	-	18.4
Other Industries	2,499.7	40.0	2,539.8
▪ Accommodation and Food Services	462.5	-	462.5
▪ Education	524.4	16.5	540.8
▪ Public Administration and Defense	333.2	3.7	336.9
▪ Wholesale and Retail Trade	394.6	-	394.6
▪ Human Health and Social Work Activities	197.9	7.3	205.1
▪ Real Estate, Rental and Leasing Activities	43.0	-	43.0
▪ Other Service Activities	232.8	8.4	241.3
▪ Financial and Insurance Services	61.7	-	61.7
▪ Transportation and Storage	72.7	-	72.7
▪ Arts, Entertainment and Recreation	59.9	-	59.9
▪ Administrative and Support Service Activities	42.3	4.2	46.5
▪ Activities of Extraterritorial Organizations	41.0	-	41.0
▪ Information and Communication	10.3	-	10.3
▪ Professional, Scientific and Technical Activities	5.1	-	5.1
▪ Waste Collection and Management	3.0	-	3.0
▪ Unclassified	15.3	-	15.3
Total Industries	2,975.1	40.9	3,016.0
Total Households	10,030.2	245.9	10,276.1
Total SWA	13,005.3	286.8	13,292.1

Source: Samoa Water Authority and Samoa Bureau of Statistics

Note: -: Nil or rounded to zero

A3: Expenditure on SWA Distributed Metered and Unmetered Water Use by ISIC, FY2019-20 (SAT\$)

Industries	Metered	Unmetered	Total
Agriculture and Fishing	300,453.2	-	300,453.2
Manufacturing and Construction	570,759.7	210.0	570,969.7
▪ Manufacturing	497,509.9	-	497,509.9
▪ Construction	59,955.6	210.0	60,165.6
▪ Mining and Quarrying	13,294.2	-	13,294.2
Electricity, Gas and Air Conditioning	137,662.4	-	137,662.4
Water Supply, Collection and Treatment	6,020.3	-	6,020.3
Sewerage	13,289.0	-	13,289.0
Other Industries	5,442,456.8	3,650.0	5,446,196.8
▪ Accommodation and Food Service Activities	1,022,296.5	-	1,022,296.5
▪ Education	1,148,153.7	1,782.0	1,149,935.7
▪ Public Administration and Defense	739,032.9	384.0	739,416.9
▪ Wholesale and Retail Trade	831,389.4	-	831,389.4
▪ Human Health and Social Work Activities	443,885.8	210.0	444,095.8
▪ Real Estate Activities	93,823.4	-	93,823.4
▪ Other Service Activities	483,875.0	890.0	48,4765.0
▪ Financial and Insurance Services	135,916.9	-	135,916.9
▪ Arts, Entertainment and Recreation	130,408.6	-	130,408.6
▪ Transportation and Storage	160,594.3	-	160,594.3
▪ Administrative and Support Service Activities	90,602.1	384.0	90,986.1
▪ Activities of Extraterritorial Organizations	91,277.4	-	91,277.4
▪ Information and Communication	20,734.6	-	20,734.6
▪ Professional, Scientific and Technical Activities	9,441.2	-	9,441.2
▪ Waste Collection and Management	6,360.3	-	6,360.3
▪ Unclassified	34,755.0	-	34,755.0
Total Industries	6,470,731.2	3,860.0	647,4591.2
Households	14,918,784.3	106,914.0	15,025,698.3
Grand Total	21,389,515.6	110,774.0	20,988,356.8

Source: Samoa Water Authority and Samoa Bureau of Statistics.

A4: Livestock Numbers and Daily Water Requirement, Samoa 2015-16 to 2019-20

Livestock (a)	2015-16	2016-17	2017-18	2018-19	2019-20	Daily water requirement used (liters)
Cattle (b)	58,834	62,597	65,960	70,178	38,233	75
Horses	1,259	na	na	na	809	45
Pigs	170,046	172,981	175,966	179,004	92,369	23
Chickens	535,711	583,601	635,772	692,608	375,797	0.30
Sheep and goats	451	494	541	592	2,064	18

Source: FAO AGRI FACTS Water Requirements for Livestock (Upper limit)

Note:

(a) Livestock number estimates from GDP were used except for 2019-20, the Agriculture Census year.

(b) Beef cattle water requirement used.

A5: Estimated Total Water Use by Livestock, Samoa 2015-16 to 2019-20 (ML)

Livestock	2015-16	2016-17	2017-18	2018-19	2019-20
Cattle-beef	1,611	1,714	1,806	1,921	1 047
Pigs	1,428	1,452	1,477	1,503	775
Chickens	59	64	70	76	41
Horses, sheep and goats	29	24	38	38	27
Total	3,127	3,254	3391	3,391	1 890

A6: Hydro Electricity Water Abstraction, FY2014-15 to 2019-20 (ML)

Hydro Stations	Total Abstraction	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2015-16					
Vaisigano	7,090	1,310	3,000	1,160	1,620
Lalomauga	37,150	7,260	8,830	9,250	11,810
Afulilo	23,890	8,610	6,640	4,420	4,220
Total	68,180	17,180	18,470	14,830	17,650
2016-17					
Vaisigano	8,280	500	510	2,140	5,130
Lalomauga	23,770	4,640	6,830	9,050	3,250
Afulilo	18,130	4,780	4,250	4,880	4,220
Total	50,180	9,920	11,590	16,070	12,600
2017-18					
Vaisigano	24,150	2,980	6,090	440	14,640
Lalomauga	31,290	8,730	11,310	3,290	7,960
Afulilo	24,610	5,740	7,710	1,460	9,700
Total	80,050	17,450	25,110	5,190	32,300
2018-19					
Vaisigano	52,540	7,730	11,670	20,080	13,060
Lalomaugaa	33,280	5,960	12,720	12,240	2,360
Afulilo	34,150	9,630	7,080	9,750	7,690
Fausaga/Tafitoala (a)	10,090	-	-	8,150	1,940
Total	130,060	23,320	31,470	50,220	25,050
2019-20					
Alaoa	13,860	3,200	2,860	4,710	3,090
Fale-o le Fee	4,910	-	770	2,740	1,400
Samasoni	33,360	4,910	6,540	11,600	10,310
Lalomaugaa	-	-	-	-	-
Ta'elefaga (Afulilo)	31,800	9,750	8,250	8,270	5,570
Tafitoala (a)	9,780	2,570	2,060	2,920	2,230
Fuluasou	12,480		1,130	7,720	3,630
Total	106,230	20,430	21,610	37,960	26,230

Source: Electric Power Cooperation

Note:

(a) Started commissioning in 2018-19

A7: Total Estimates of Water Use by Households, FY2015-16 to 2019-20 (ML).

	2015-16	2016-17	2017-18	2018-19	2019-20
Est. water use by households - SWA	10,566.8	11,756.0	9,548.7	10,023.8	10,276.1
<i>Metered</i>	7,709.6	8,617.7	9,156.3	9,732.5	10,030.2
<i>Unmetered</i>	2,857.2	3,138.3	392.3	291.3	245.9
Est. water use by households supplied by IWS	2,417.9	2,600.5	2,848.0	2,487.8	2,429.6
Est. water use by households self-abstracted	588.8	637.4	662.3	271.6	290.9
Total Estimated water use by households	13,573.7	14,993.9	13,059.0	12,783.2	12,997.6

Source: Samoa Bureau of Statistics.

A8: Tariff Rates for Water Supply by Samoa Water Authority

	Consumption/month	Before July 2019	Effective Jul 2019
Metered	m³	\$/m³	\$/m³
Households	1 to 15	0.50	0.77
	15 to 40	1.40	1.67
	More than 40	1.90	2.17
Commercial	Less than 40	1.50	1.77
	More than 40	2.00	2.27
Flat Rates	m³	\$/m³	\$/m³
Residential/Domestic	-	20.00	20.00
Non-Households/Commercial	-	32.00	32.00

Source: Samoa Water Authority

A9: Physical Water Supply Table, Samoa 2019-20 - Megalitres (ML)

	Agriculture, Livestock & Fishing	Manufacturing & Construction	Electricity	Water Collection, Treatment & Supply	Sewerage	Other Industries	Households	Flows from the Environment	Total Supply
1. Sources of abstracted water									
Inland water resources									
Surface water								129,212	129,212
Ground water								7,448	7,448
Soil water								-	-
Total								136,660	136,660
Other water sources									
Precipitation								291	291
Total								291	291
Total abstracted water								136,951	136,951
2. Abstracted Water									
For distribution				15,850					15,850
For own use	1,899	297	106,230	291	-	54			108,771
of which: Abstraction by Households	-	-	-	291	-	-			291
3. Wastewater and reused water									
Wastewater									
Wastewater to treatment	5	2	-	-	5	419	-		431
Own treatment	-	-	-	-	-	-	-		-
Reused water									
For distribution	-	-	-	-	-	-	-		-
For own use	-	-	-	-	-	-	-		-
Total	5	2	-	-	5	419	-		431
4. Return flows of water									
To inland water resources									
Surface water	-	-	106,230	-	-	-	-		136,230
Ground water	2,028	528	61	12,330	360	2,303	12,997		30,606
Soil water	-	-	-	-	-	-	-		-
Total	2,028	528	106,291	12,330	360	2,303	12,997		136,836
To other sources	-	-	-	-	85	-	-		85
Total return flows	2,028	528	106,291	12,330	445	2,303	12,997		136,921
of which: Losses in distribution	-	-	-	12,330	-	-	-		12,330
5. Evaporation, transpiration, water incorporated into products									
Evaporation of abstracted water	-	-	-	-	-	-	-		-
Transpiration	-	-	-	-	-	-	-		-
Water Incorporated into products	-	27	-	4	-	-	-		31
TOTAL Supply	3,932	854	212,521	28,475	449	2,775	12,997	136,951	398,955

Source: Samoa Bureau of Statistics

Note: -: Nil or not available

A10: Physical Use Table, Samoa 2019-20 - Megalitres (ML)

	Agriculture, Livestock & Fishing	Manufacturing & Construction	Electricity	Water Collection, Treatment & Supply	Sewerage	Other Industries	Households	Accumulation	Flows to the Environment	Total Use
1. Sources of abstracted water										
Inland water resources										
Surface water	1,899	-	106,230	21,083	-	-				129,212
Ground water	-	297	-	7,097	-	54				7,448
Soil water	-	-	-	-	-	-				-
Total	1,899	297	106,230	28,180	-	54				136,660
Other water sources										
Precipitation	-	-	-	291	-	-				291
Total	-	-	-	291	-	-				291
Total abstracted water	1,899	297	106,230	28,471	-	54				136,951
2. Abstracted Water										
Distributed water	134	259	61	4	18	2,668	12,706			15,850
For own use	1,899	297	106,230	-	-	54	291			108,771
<i>of which: Abstraction by households</i>	-	-	-	-	-	-	291			291
3. Wastewater and reused water										
Wastewater										
From other units				-	431					431
Own treatment	-	-	-	-	-	-	-			-
Reused water										
Distributed reuse	-	-	-	-	-	-	-			-
For own use	-	-	-	-	-	-	-			-
Total	-	-	-	-	431	-	-			431
4. Return flows of water										
To inland water resources										
Surface water										
Ground water										
Soil water										
Total									136,836	136,836
To other sources									85	85
Total return flows									136,921	136,921
<i>of which: Losses in distribution</i>										
5. Evaporation, transpiration, water incorporated into products										
Evaporation of abstracted water									-	-
Transpiration									-	-
Water Incorporated into products								31		31
Total Use	3,932	854	212,521	28,475	449	2,775	12,997	31	136,921	398,955

Source: Samoa Bureau of Statistics

Note: - Nil or not available

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