SAMOA
BUREAU OF STATISTICS

Water Accounts Samoa

2023-24

9th Edition

Foreword

This report presents information on the physical supply and use of water in Samoa for the financial year 2023-24. It also includes some monetary information. The report is the 9th edition of the Water Accounts Samoa (WAS) since its first compilation in 2015.

This compilation marks a new milestone by the bureau for stringing together a data series of eleven years of water statistics and indicators from 2013-14 up to 2023-24 (Refer Tables 12 & 13). On that note, we acknowledged the pioneer work done by Dr. Michael Vardon who assisted the bureau in compiling Samoa's first ever water accounts in 2015.

The water accounts are compiled in alignment with the United Nation System of Environmental-Economic Accounting 2012 (UN SEEA 2012) central framework and SEEA-Water 2012. The SEEA conceptual framework is a standardized information system, which is capable of harmonizing information from different sources and is used for derivation of water statistics and indicators. It generally records the flow of water from the environment into the economy, its uses in the economy and return flows back into the environment.

The report provides useful and basic water statistics and water-related indicators that can be used to inform water policies and monitoring purposes. Some of the basic water statistics and aggregates are abstracted water, water use, distributed water use, wastewater discharged to treatment plant and water losses. The water-related indicators include implicit prices, water productivity, water use per capita, water use per household and distributed water use expenditure by industry and households.

I am hopeful that this report will provide the necessary statistical information for the betterment of water management and development in Samoa through informed policies and strategic planning.

I would like to acknowledge the usual contributions of our valued water partners and all stakeholders for sharing and providing the water data and information for our water accounts compilation. A special word of thank you goes out to Mr. Sokol Vako of SIAP and Ms. Lisa Green of SPC for their technical expert assistance for this work.

Leota Aliielua Salani
Government Statistician/CEO

Contents

Abbreviations and Acronyms

-	nil or not available
$	Samoan Tala
$m	million Tala
%	percentage
Act.	Activities
DWU	Distributed Water Use
EPC	Electric Power Corporation
Est.	Estimated
FAO	Food and Agriculture Organization of the United Nations
FY	Financial Year (June – July)
HHs	Households
ISIC Rev.4	International Standard Industrial Classification, Revision 4
IRWS	International Recommendations for Water Statistics
IWSA	Independent Water Scheme Association
m^3	cubic meter (1,000 litres)
ML	megalitres (1,000 cubic meters)
MNRE	Ministry of Natural Resources and Environment
NRW	Non-Revenue Water
PHC	Population and Household Census
SBS	Samoa Bureau of Statistics
SEEA-CF	System of Environmental-Economic Accounting Central Framework
SEEA-Water	System of Environmental-Economic Accounting for Water
SWA	Samoa Water Authority
UN	United Nations
Vol.	Volume
WAS	Water Account Samoa
WWTP	Wastewater Treatment Plant

Executive Summary

The Water Account Samoa for the financial year 2023-24 presents information on the physical supply and use of water in Samoa with some monetary information also included. This is the 9th edition of the Physical Supply and Use of Water Account for Samoa and it provides the highlights of water statistics, aggregates and indicators with comparison to the previous years. This account compilation closely follows the United Nation System of Environmental-Economic Accounting Central Framework 2012 (UN-SEEA CF 2012) and SEEA-Water 2012 guidelines and principles.

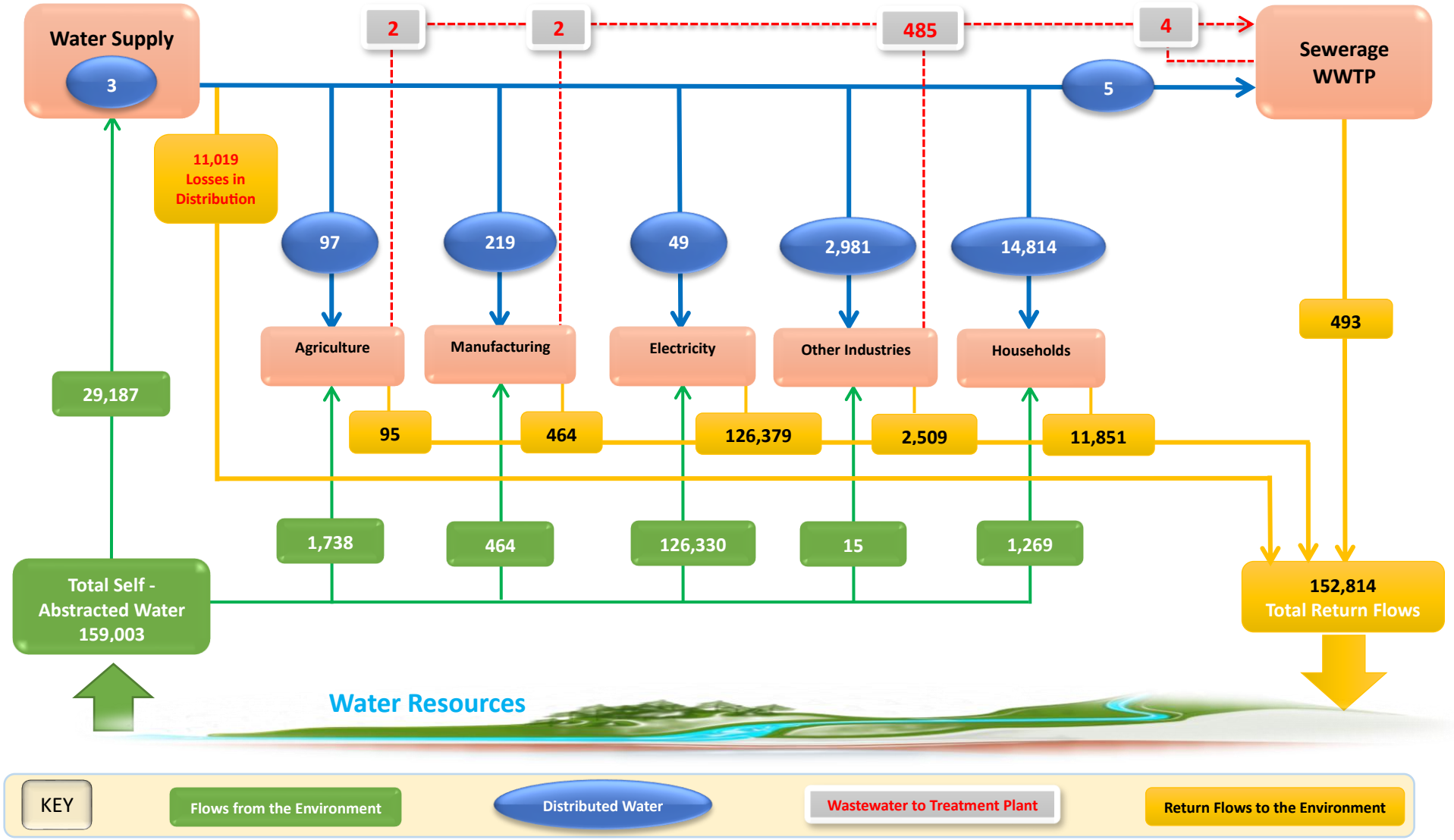
Key Statistics

In 2023-24,

- Total Self-abstracted water was 159,003 ML, an increase of 10.4% from 2022-23. Most come from surface water and is abstracted to generate electricity.
- Households water use increased by 7.9% to 16,083 ML from 14,911 ML in 2022-23. This corresponds to an average daily water use per person of 281 liters.
- Total Distributed water use increased by 8.2% to 18,168 ML from 16,796 ML in 2022-23.
- Total expenditure on distributed water use was $23.0 million Tālā, an increase of 18.6% from 2022-23.
- Average price per cubic meter of distributed water used by Households increased by 5.8% to $1.10 from $1.04 in 2022-23. On average, household spent $512 on distributed water use in 2023-24.
- Samoa's water productivity slightly increased by 3.2% to $20.43 per cubic meter of abstracted water from $19.80 in 2022-23.
- Each person used an average of 103 m^3 of water, an increase of 7.3% from 96 m^3 calculated in 2022-23.
- Total wastewater discharged to the Wastewater Treatment Plant increased by 30.4% to 493 ML from 378 ML recorded in 2022-23. Total expenditure also increased by 32.5% from $2.06 million in 2022-22 to $2.73 million in 2023-24.

The following flow diagram summarises the physical supply and use flow of water from the environment into the economy, its flows within the economy and the return flows back to the environment.

Physical Water Flows, Samoa 2023-24 (ML)



1.0 Account Results and Findings

1.1 Self-Abstracted Water

Self-Abstracted Water *refers to water that is removed from the environment, either permanently or temporarily for consumption or production activities (SEEA-Water, 2012). Water used for hydroelectricity is also abstracted water. SEEA identifies the environment as the supplier and the industry/households as the water users. Self-abstracted water for Samoa is mainly sourced from surface water, groundwater and rainwater.*

Rainwater *is estimated only for households that are not connected to a piped water supply.*

In 2023-24, an estimated total of 159,003 ML of water was abstracted from the environment into Samoa's economy, an increase of about 10.4% compared to 144,069 ML of abstracted water in 2022-23.

Self-Abstracted Water by Source

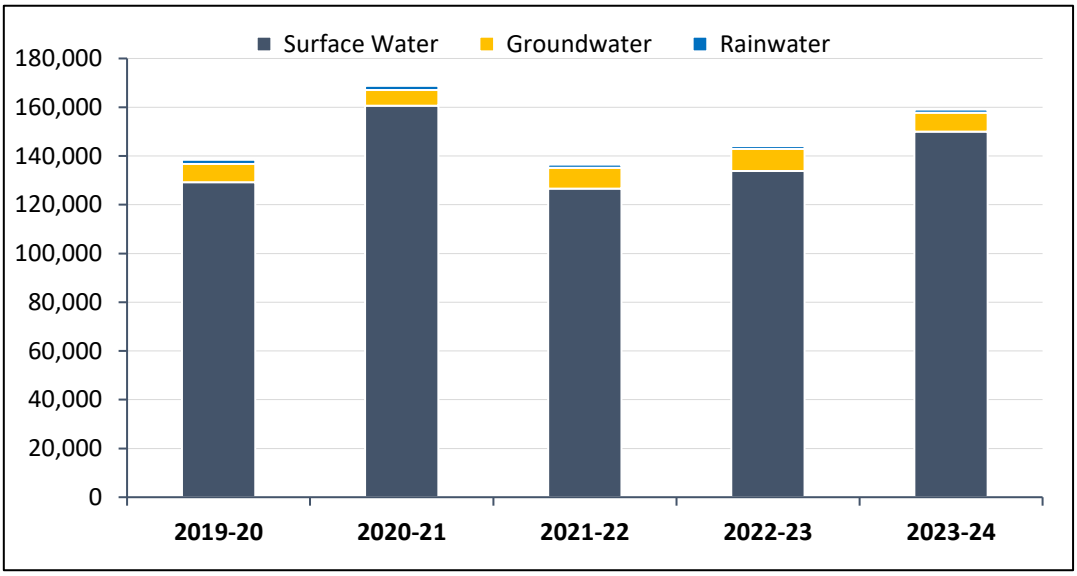
Surface water constituted most of the total self-abstracted water with 94.4% or 150,041 ML, groundwater accounts for 4.8 % or 7,692 ML while rainwater accounts for the remaining 0.8% or 1,269-ML. Surface water remained as the main source for self-abstracted water use for the last 5 years as depicted below in Table 1 & Chart 1.

Table 1: Self-Abstracted Water by Source, Samoa 2019-20 to 2023-24 (ML)

FY	Surface Water	Groundwater	Rainwater	Total
2019-20	129,212.2	7,448.3	1,737.2	**138,397.7**
2020-21	160,573.4	6,504.7	1,736.0	**168,814.1**
2021-22	126,662.9	8,465.7	1,270.3	**136,398.9**
2022-23	133,851.4	9,010.2	1,207.1	**144,068.7**
2023-24	150,041.3	7,692.9	1,269.0	**159,003.2**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding

Chart 1: Self-Abstracted Water by Water Source, Samoa 2019-20 to 2023-24 (ML)



Source: Samoa Bureau of Statistics

Self-Abstracted Water Use by Purpose of Use, FY 2023-24

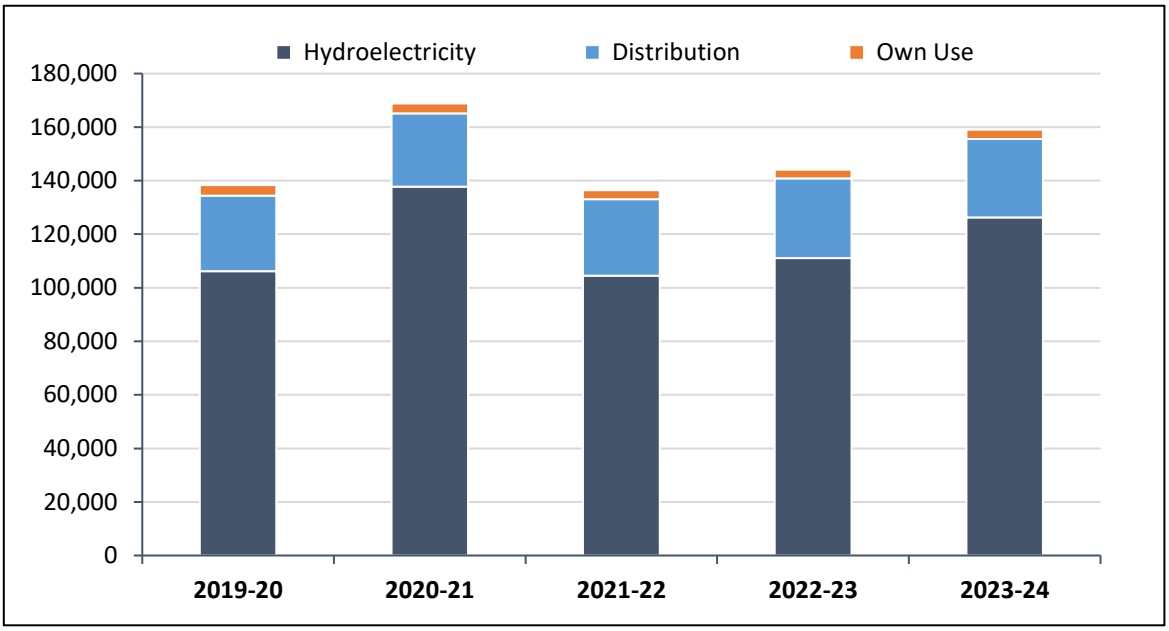
- ***for* Electricity**: an estimated 126,330 ML or 79.5% of total self-abstracted water was abstracted for hydroelectricity. This is non-consumptive use of water as almost all of the abstracted water is returned immediately into the environment.
- ***for* Distribution**: 18.4% or 29,187ML of water was abstracted mainly by the Water Supply Industry for the purpose of supplying other industries and households as distributed water.
- ***for* Own Use**: The remaining 2.2% or 3,486 ML was abstracted for own use by industries and households (Table 2 & Chart 2).

Table 2: Self-Abstracted Water by Purpose of Use, Samoa 2019-20 to 2023-24 (ML)

FY	Hydroelectricity	Distribution	Own Use	Total
2019-20	106,230.0	28,180.0	3,987.6	**138,397.7**
2020-21	137,700.0	27,415.3	3,698.8	**168,814.1**
2021-22	104,570.0	28,536.2	3,292.8	**136,398.9**
2022-23	111,070.0	29,789.4	3,209.3	**144,068.7**
2023-24	126,330.0	29,187.3	3,485.9	**159,003.2**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding

Chart 2: Self-Abstracted Water by Purpose of Use, Samoa 2019-20 to 2023-24 (ML)



Source: Samoa Bureau of Statistics

Self-Abstracted Water by Industry

Electricity and the Water Supply industries are the main users of total self-abstracted water. In 2023-24, both abstracted a total of 156,786 ML or 98.6% of total abstracted water use as shown in Table 3.

Table 3: Self-Abstracted Water by Industries and Source, Samoa 2023-24 (ML)

Water Sources	Agriculture	Manuf. & Construction	Electricity	Water Supply	Other Industries	Total
Surface Water	1,738.3	439.0	126,330.0	21,533.9	-	**150,041.3**
Groundwater	-	24.5	-	7,653.4	15.0	**7,692.9**
Rainwater	-	-	-	1,269.0	-	**1,269.0**
TOTAL	**1,738.3**	**463.5**	**126,330.0**	**30,456.3**	**15.0**	**159,003.2**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding
Sewerage Industry not shown due to no self-abstracted water of any kind.

Over the last 5 years, both Electricity and Water Supply industries accounted for most of the self-abstracted water use as portrayed in Table 4.

Table 4: Self-Abstracted Water by Industries and Households, Samoa 2019-20 to 2023-24 (ML)

FY	Electricity	Agriculture	Manuf. & Construction	Other Industries	Water Supply	Households	Total
2019-20	106,230.0	1,899.2	297.3	53.9	28,180.0	1,737.2	**138,397.7**
2020-21	137,700.0	1,796.8	153.5	12.5	27,415.3	1,736.0	**168,814.1**
2021-22	104,570.0	1,779.0	231.0	12.5	28,536.2	1,270.3	**136,398.9**
2022-23	111,070.0	1,758.6	231.0	12.5	29,789.4	1,207.1	**144,068.7**
2023-24	126,330.0	1,738.3	463.5	15.0	29,187.3	1,269.0	**159,003.2**

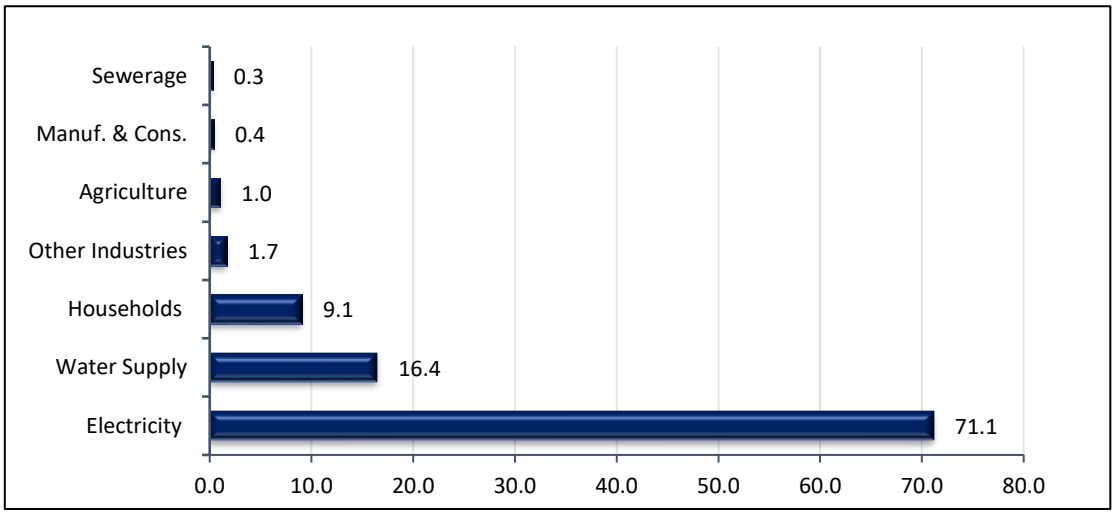
Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding

1.2 Water Use

Water Use refers to water intake by an economic unit, or the economy. Total Water use is the sum of the amount of self-abstracted water use from the environment and water use within the economy (i.e. water received from other economic units as distributed water, reuse water and wastewater collected) (SEEA-Water, 2012).

In 2023-24, total water use was estimated to be 177,664 ML, where most of it was used by the Electricity Industry accounting for 71.1% or 126,379 ML. This was followed by the Water Supply Industry with 16.4% or 29,190 ML (Chart 3).

Chart 3: Percentage Share of Total Water Use by Industries and Households, Samoa 2023-24



Source: Samoa Bureau of Statistics

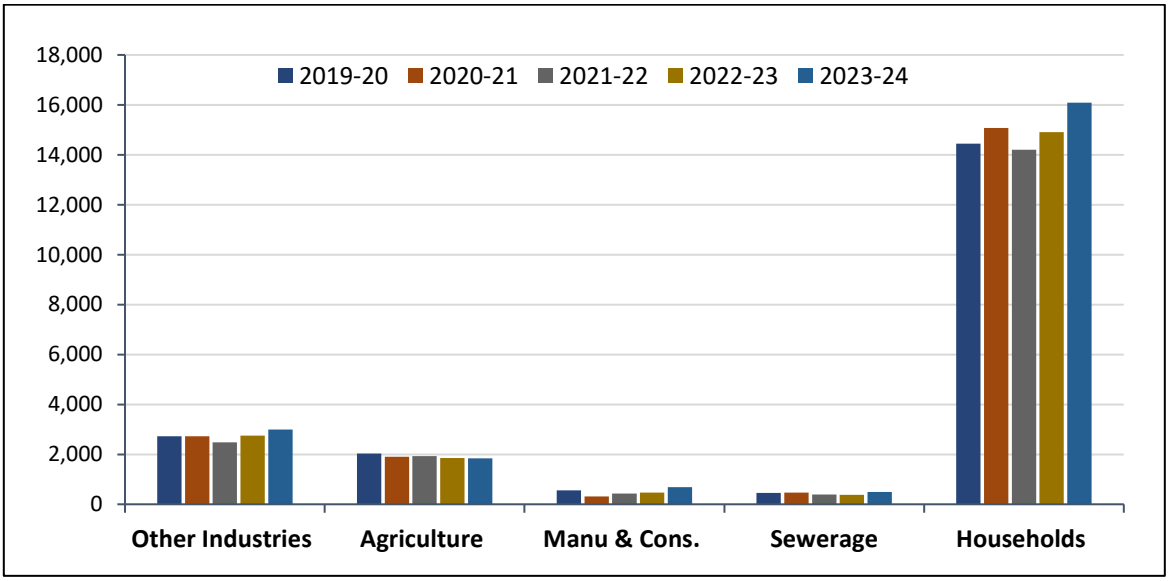
Table 5 and Chart 4 below show the total water use for the last 5 years, depicting Electricity as the main user of water. Most of the Electricity water use is non-consumptive water use as it is used for hydropower.

Table 5: Total Water Use by Industries and Households, Samoa 2019-20 to 2023-24

FY	Electricity	Water Supply	Households	Other Industries	Agriculture	Manuf. & Cons.	Sewerage	Total
2019-20	106,291	28,184	14,443	2,721	2,033	556	449	**154,678**
2020-21	137,716	27,423	14,800	2,728	1,898	311	466	**185,342**
2021-22	104,611	28,540	14,203	2,486	1,931	428	397	**152,297**
2022-23	111,092	29,794	14,911	2,749	1,849	464	384	**161,243**
2023-24	126,379	29,190	16,083	2,996	1,836	682	498	**177,664**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding

Chart 4: Total Water Use by Industry and Households (excluding Electricity and Water Supply)**, Samoa 2019-20 to 2023-24 (ML)**



Source: Samoa Bureau of Statistics

1.3 Distributed Water Use

Distributed Water Use (DWU) refers to water flows from one user to another user after abstraction, excluding self-abstracted water use such as rainwater harvesting. It is simply the water supplied by the water suppliers through pipe water systems like the Samoa Water Authority, the Independent Water Scheme Association and also the Self-managed Village and Community Water Scheme (SEEA-Water, 2012).

Total Distributed Water Use: From a total abstracted water of 29,187 ML for distribution by the Water Supply industry, 18,168 ML (62%) was distributed and used by industries and households. The remaining 11,019 ML or 38% was Non-Revenue Water (NRW) or losses.

At a Glance!

Non-Revenue Water (NRW): refers to all water losses including real losses (e.g. leakages & overflows from storage), apparent losses (e.g. illegal connections), unbilled authorised consumption (e.g. water carting, firefighting and other use for operational purposes) (SWA Annual Report, 2014-15).

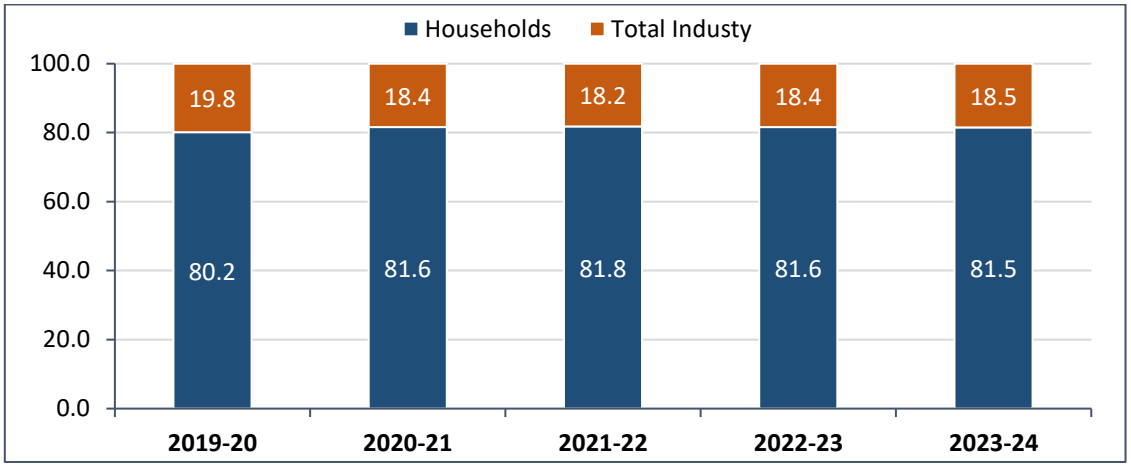
In 2023-24, distributed water use increased by 8.2%, with a total of 18,168 ML compared to 16,796 ML recorded in the previous financial year. Households use accounted for most of the distributed water use with 14,814 ML or 81.5% and the remaining 3,354 ML or 18.5% by total industry. Households remain as the predominant user of distributed water use from 2019-20 to 2023-24 as shown in Table 6 and Chart 5.

Table 6: Total Distributed Water Use, Samoa 2019-20 to 2023-24 (ML).

FY	Households	Total Industry	Total
2019-20	12,706	3,144	**15,850**
2020-21	13,342	3,012	**16,354**
2021-22	12,933	2,876	**15,809**
2022-23	13,704	3,091	**16,796**
2023-24	14,814	3,354	**18,168**

Source: SWA, IWS & SBS
Note: Totals may not add up due to rounding

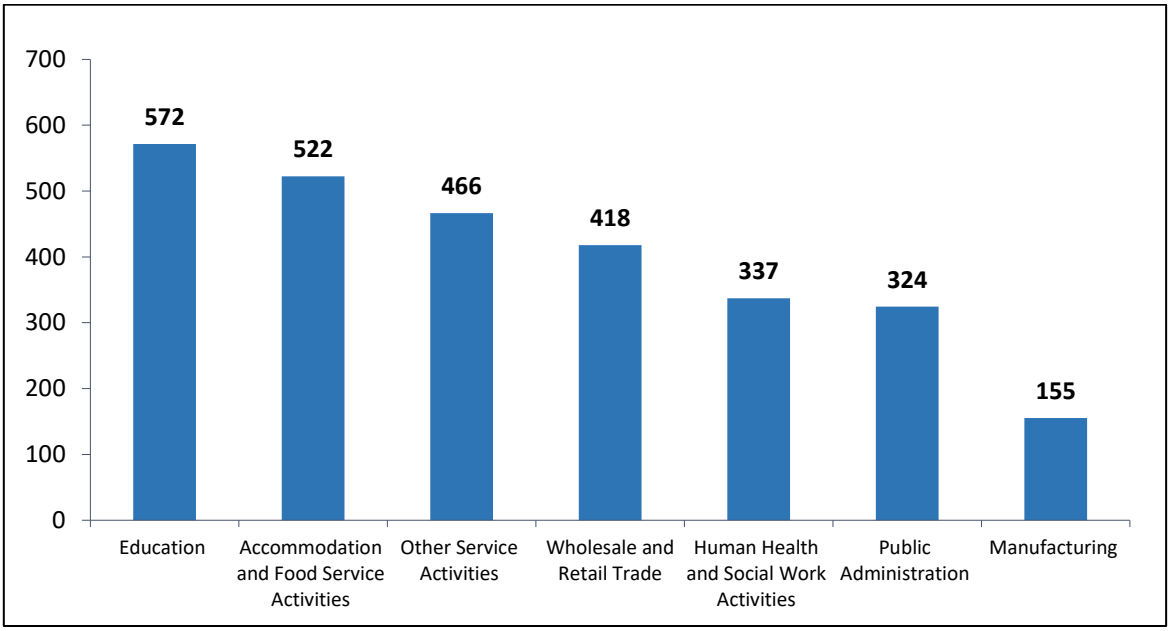
Chart 5: Percentage Share of Distributed Water Use by Total Industry and Households, Samoa 2019-20 to 2023-24



Source: SWA, IWS & SBS

For detailed industries, Chart 6 depicts the top 7 industries using most of the distributed water. Education is the industry with the highest water use with 572 ML in 2023-24.

Chart 6: **Top 7 Industries Using the Most Distributed Water, Samoa 2023-24 (ML).**



Source: Samoa Bureau of Statistics

Metered and Unmetered Distributed Water Use**:** In 2023-24, distributed metered water use accounted for 87.2% or 15,841 ML of total distributed water use. This represents an increase of about 9.3% or 1,349 ML reported when compared with 2022-23.

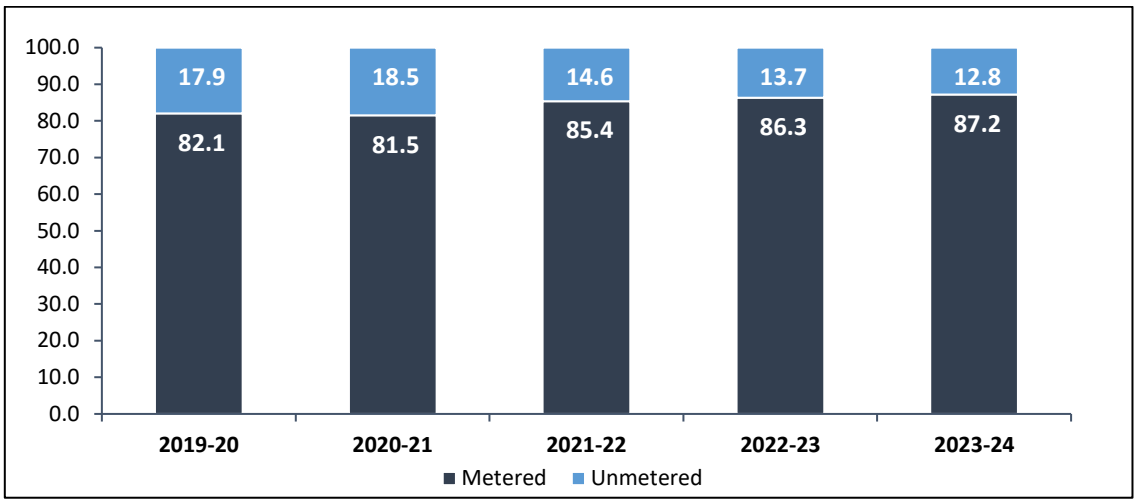
The remaining 2,327 ML or 12.8% was distributed unmetered water use. Table 7 and Chart 7 depict the distribution of water from 2019-20 to 2023-24.

Table 7: **Metered and Unmetered Distributed Water Use, Samoa 2019-20 to 2023-24 (ML)**

FY	Metered	Unmetered	Total
2019-20	13,005	2,844	**15,850**
2020-21	13,325	3,029	**16,354**
2021-22	13,502	2,307	**15,809**
2022-23	14,492	2,303	**16,796**
2023-24	15,841	2,327	**18,168**

Source: SWA, IWSA & SBS
Note: Totals may not add up due to rounding

Chart 7: Percentage Distribution of Metered and Unmetered Water Use, Samoa 2019-20 to 2023-24



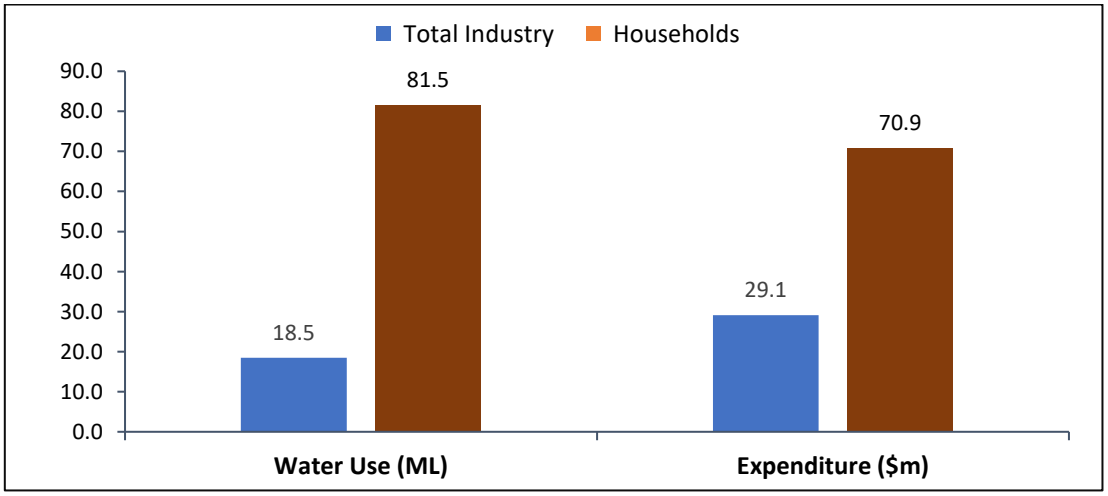
Source: Samoa Bureau of Statistics

1.4 Monetary Supply and Use

Monetary Information: *Coverage of financial information is still limited to the expenditure paid for the use of distributed water. Expenditure does not include any water-related subsidies that might have been received by the supplier of water or use of water. Furthermore, expenditure does not necessarily cover all costs of supplying water. All values are in Samoan Tala.*

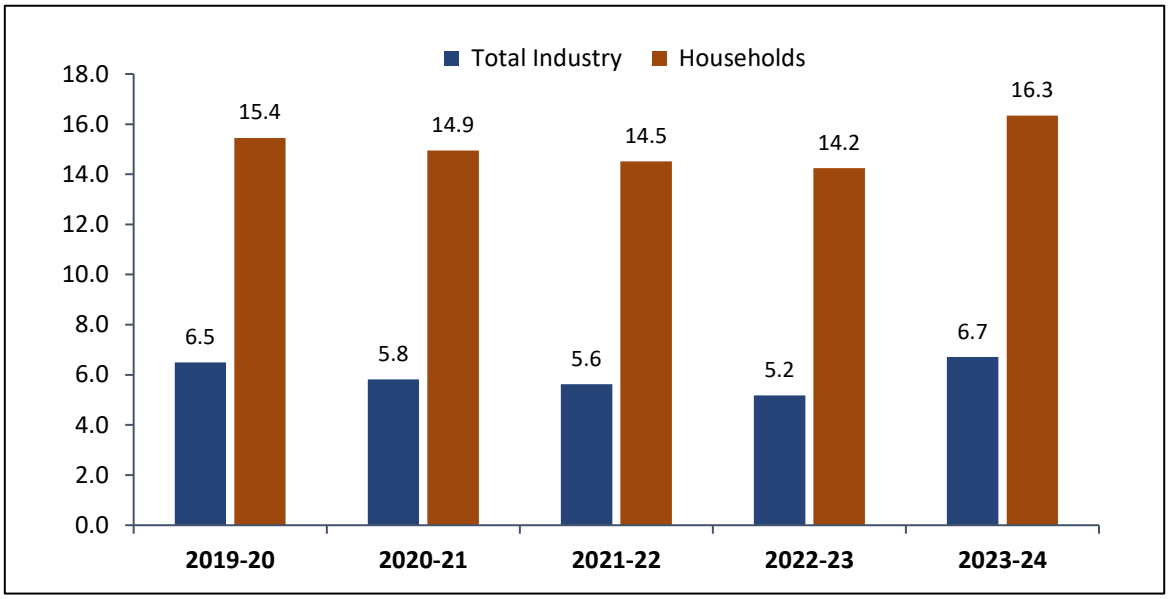
In 2023-24, the total expenditure on distributed water was $23.0 million, an increase of 18.6% from $19.4 million in 2022-23. Households paid $16.3 million or 70.9 % while the remaining $6.7 million or 29.1 % of total expenditure was paid by Total Industry as presented in Charts 8 & 9.

Chart 8: Percentage Share of Distributed Water Use and Expenditure by Total Industry and Households, Samoa 2023-24



Source: Samoa Bureau of Statistics

Chart 9: Expenditure by Total Industry and Households, Samoa 2019-20 to 2023-24 ($m)

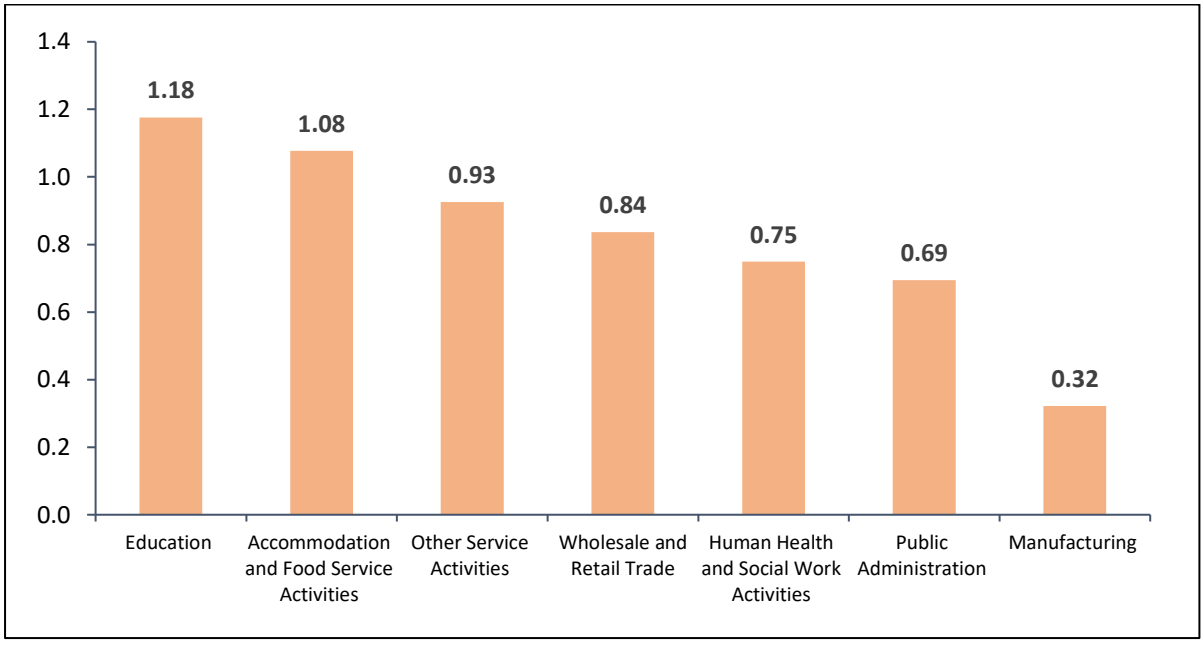


Source: Samoa Bureau of Statistics

A detailed analysis by industry reveals that Education spent about $1.18 million on distributed water, representing 17.6% of total expenditure on water by all industries.

Accommodation and Food service activities is next with about $1.08 million and representing 16.1% then followed by Other Service Activities with $0.93 million representing 13.9% of total expenditure (Chart 10).

Chart 10: Distributed Water Use Expenditure by the Top 7 industries, Samoa 2023-24 ($m)



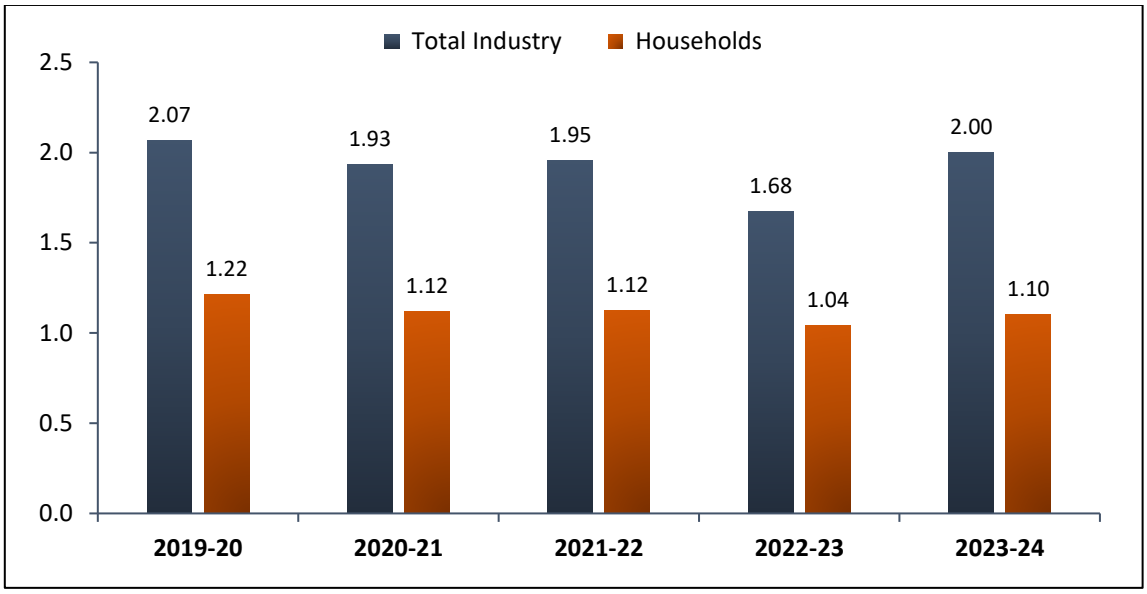
Source: Samoa Bureau of Statistics

1.5 Implicit Price

Implicit Price is an imputed price where water expenditure is divided by water supplied ($/m³). Expenditure does not include any water-related subsidies that might have been received by the supplier of water or user of water. Furthermore, expenditure does not necessarily cover all costs of supplying water

In 2023-24, the average price per cubic meter of distributed metered water use by industry was calculated to be $2.00 while household was $1.10 per cubic meter as shown in Chart 11.

Chart 11: **Implicit Prices for Distributed Water Use, Samoa 2019-20 to 2023-24 ($/m³)**



Source: Samoa Bureau of Statistics

1.6 Water Productivity

Water Productivity is the amount of Gross Domestic Product (GDP) generated per cubic meter of water abstracted, calculated by GDP (nominal GDP/at current prices) divided by Total Abstracted Water. It gives an indication of how much GDP can be produced from every cubic meter of water abstracted (SEEA-Water, 2012).

In 2023-24, Samoa produced $20.43 of GDP from every cubic meter of total abstracted water, an increase of 3.2% compared to $19.80 calculated in 2022-23.

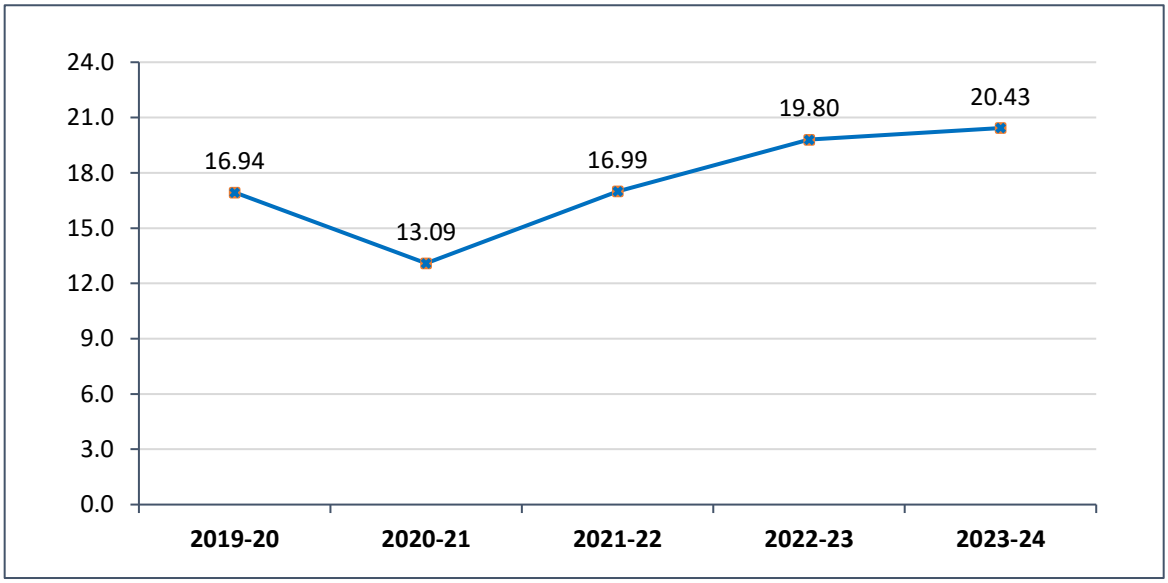
Overall, Samoa's water productivity has increased from $16.94 in 2019-20 to $20.43 in 2023-24 implying that the amount of GDP generated by every cubic meter of abstracted water has increased (Table 8 and Chart 12).

Table 8: Water Productivity, Samoa 2019-20 to 2023-24

FY	TOTAL ABSTRACTED WATER (m^3)	GDP ($ million) [R]	WATER PRODUCTIVITY ($/$m^3$) [R]
2019-20	138,397,651	2,344.13	**16.94**
2020-21	168,814,083	2,210.05	**13.09**
2021-22	136,398,950	2,317.66	**16.99**
2022-23	144,068,652	2,853.06	**19.80**
2023-24	159,003,167	3,248.38	**20.43**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding
R: Revised figures using GDP Report September 2025 Quater.

Chart 12: Water Productivity, Samoa 2019-20 to 2023-24 ($/$m^3$)



Source: Samoa Bureau of Statistics

1.7 Wastewater and Treatment Plant

Wastewater as it is treated in the Water Accounts Samoa refers only to the sewage discharged to the Wastewater Treatment Plant (WWTP) in Sogi, Apia.

A total of 493 megalitres of wastewater was generated and discharged to the WWTP in 2023-24, an increase of about 30.4 % compared to 378 ML reported in 2022-23.

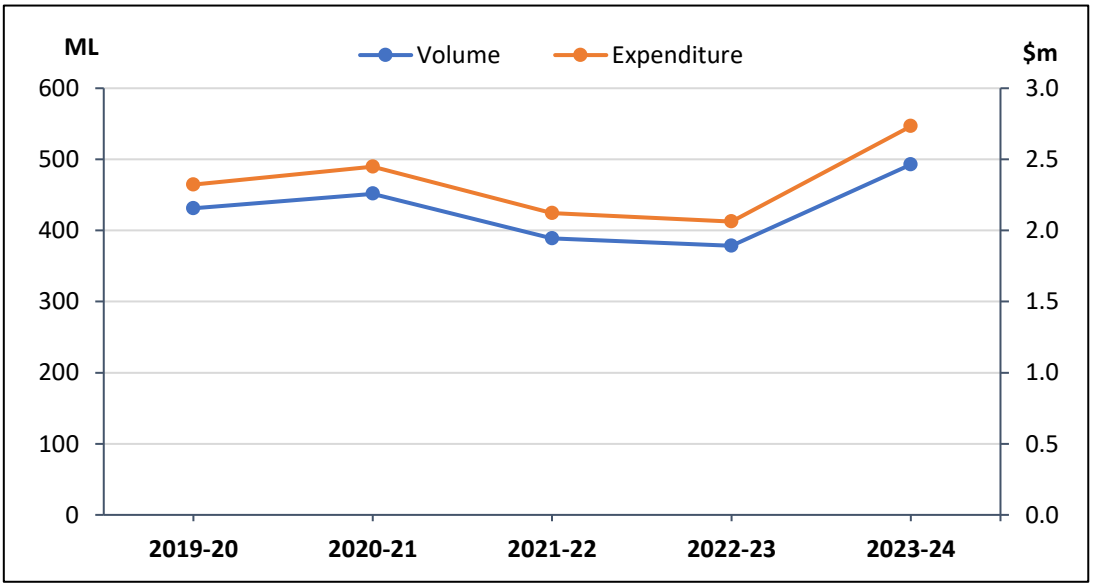
Total expenditure also increased by 32.5% from $2.06million in 2022-23 to $2.73 million in 2023-24. The 2023-24 values for both volume and expenditure were the highest recorded for the five-year period (Table 9 and Chart 13).

Table 9: **Volume and Expenditure of Wastewater Discharged to the WWTP, Samoa 2019-20 to 2023-24**

FY	VOLUME (ML)	EXPENDITURE ($m)
2019-20	431	2.32
2020-21	452	2.45
2021-22	389	2.12
2022-23	378	2.06
2023-24	493	2.73

Source: Samoa Water Authority

Chart 13: **Total Volume and Expenditure of Wastewater Discharged to the WWTP, Samoa 2019-20 to 2023-24**



Source: Samoa Water Authority

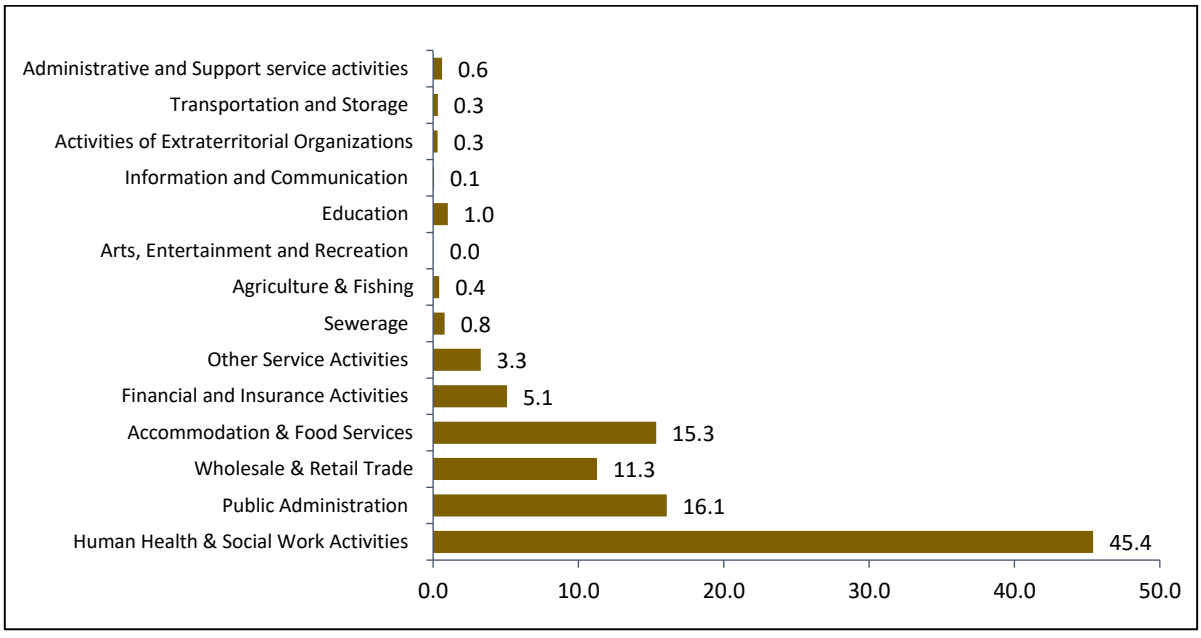
Human health and social work activities accounted for most of the wastewater discharged throughout the five-year period from 2019-20 up to 2023-24. In 2023-24, Human health and social work activities recorded a 223.8 ML of wastewater discharged to the WWTP, a significant increase of 60.5% from 139.4 ML recorded in 2022-23. It also accounted for 45.4% of total wastewater discharged to the WWTP in 2023-24 (Table 10 and Chart 14).

Table 10: Volume of Wastewater Discharged to the WWTP by Industries, Samoa 2019-20 to 2023-24 (ML)

Industries	2019-20	2020-21	2021-22	2022-23	2023-24
Human health & social work activities	117.0	138.5	131.8	139.4	223.8
Public administration	119.7	136.5	123.8	84.6	79.1
Wholesale & retail trade	70.0	75.5	49.1	63.0	55.5
Accommodation & food services	42.7	27.2	34.7	50.5	75.6
Financial and insurance activities	41.1	25.1	16.1	16.4	25.0
Other service activities	12.7	15.6	9.5	13.4	16.2
Sewerage	4.8	2.7	3.0	3.3	3.9
Agriculture & fishing	5.2	6.4	3.5	1.9	2.1
Arts, entertainment and recreation	6.2	3.7	0.4	0.5	0.2
Education	7.1	9.2	11.7	2.1	4.9
Information and communication	0.7	0.6	0.5	0.3	0.3
Activities of extraterritorial organizations	2.2	0.7	1.3	1.3	1.6
Transportation and storage	1.6	9.7	3.4	1.6	1.6
Administrative and support service activities	0.0	0.0	0.0	0.4	3.0
Total Wastewater	**431.0**	**451.6**	**388.8**	**378.5**	**492.7**

Source: Samoa Water Authority
Note: Totals may not add up due to rounding

Chart 14: **Percentage distribution of Wastewater Discharged by Industries, Samoa 2023-24**



Source: Samoa Water Authority

During the reference period, Human health and social work activities paid the highest expenditure for the wastewater discharged with a total of $1.3 million, accounting for 47.9% of total wastewater expenditure. Table 11 and Chart 15 below give a clear account of the

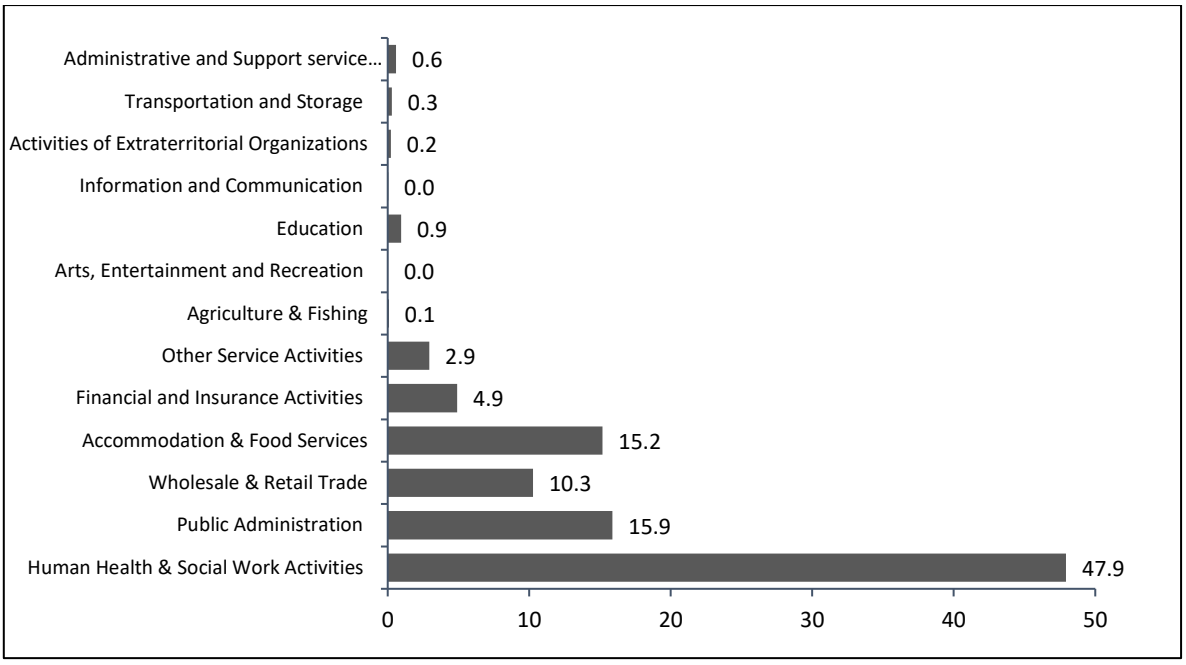
expenditure by industry and its relevant percentage distribution to total expenditure discharged to the WWTP.

Table 11: **Expenditure on Wastewater Discharged to the WWTP by Industries , Samoa 2019-20 to 2023-24 ($ 000's)**

Industries	2019-20	2020-21	2021-22	2022-23	2023-24
Human health & social work act.	677.5	803.0	763.7	811.3	1,309.9
Public administration	663.3	762.2	695.6	465.7	434.1
Wholesale & retail trade	333.3	372.7	239.0	322.8	280.6
Accommodation & food services	229.7	145.7	182.0	270.6	414.7
Financial & insurance activities	232.1	134.0	80.8	84.7	134.3
Other service activities	60.0	76.3	47.7	63.7	80.1
Sewerage	24.7	12.7	13.9	15.2	18.8
Agriculture & fishing	17.0	21.2	11.2	2.0	2.4
Arts, entertainment & recreation	27.0	14.1	1.2	2.3	0.5
Education	38.3	46.2	61.3	9.8	25.7
Information & communication	2.5	2.2	1.8	1.1	1.0
Act. Of extraterritorial organizations	9.2	2.5	4.8	4.6	6.3
Transportation & storage	7.5	55.2[a]	18.0	7.3	8.0
Administrative & support service activities	0.0	0.0	0.0	1.4	16.3
Total Expenditure	**2,322.0**	**2,448.1**	**2,121.3**	**2,062.4**	**2,732.6**

Source: Samoa Water Authority
Note: Totals may not add up due to rounding
[a] Samoa Post Office was the administration centre for the Disaster Management Office during the COVID-19 pandemic.

Chart 15: **Percentage Distribution of Expenditure on Wastewater Discharged by Industries, 2023-24**



Source: Samoa Water Authority

1.8 Other Key Water Indicators

a) Indicators for Water Use

Table 12: Indicators for Water Use, Samoa 2013-14 to 2023-24

	Water Use by Industry	Water Use by Industry (Excl. Ele & Water Supply)	Water Use by Households	Total Water Use	Total Water Use (Excl. Ele & Water Supply)	Est. Population (Jun) [a]	Est. No of Households (Jun)	Est. No. of Metered Households	Annual Water Use per Capita (Excl. Ele & Water Supply) [b]	Daily Water Use per person	Annual Household Water Use per Household [c]	% of Households with Metered Water Use [d]
Unit	**ML**	**ML**	**ML**	**ML**	**ML**	**Persons**	**Households**	**Households**	**m^3 per person**	**litres per person**	**m^3 per Households**	**%**
2013-14	123,090.0	4,500.0	16,668.0	139,758.0	21,168.0	192,134	27,448	17,255	110.2	301.8	607.3	62.9
2014-15	116,478.3	5,788.3	15,077.4	131,555.7	20,865.7	193,766	27,681	17,267	107.7	295.0	544.7	62.4
2015-16	104,802.6	6,942.6	16,000.9	120,803.6	22,943.6	195,398	28,735	18,768	117.4	321.7	556.8	65.3
2016-17	85,348.1	6,998.1	17,356.7	102,704.9	24,354.9	197,030	28,975	19,686	123.6	338.7	599.0	67.9
2017-18	116,113.1	5,700.0	14,160.1	130,273.2	19,860.1	198,661	29,215	19,832	100.0	273.9	484.7	67.9
2018-19	165,340.0	5,934.8	14,272.6	179,612.5	20,207.3	200,293	29,455	20,737	100.9	276.4	484.6	70.4
2019-20	140,235.4	5,310.9	14,442.8	154,678.2	19,753.8	201,925	29,695	22,793	97.8	268.0	486.4	76.8
2020-21	170,541.9	4,936.6	15,077.7	185,619.5	20,014.3	204,841	30,124	25,982	97.7	267.7	500.5	86.3
2021-22	138,393.2	4,845.3	14,203.4	152,596.6	19,048.6	206,730	31,323	27,447	92.1	252.4	453.5	87.6
2022-23	146,331.3	5,062.0	14,911.4	161,242.6	19,973.3	208,628	31,610	28,002	95.7	262.3	471.7	88.6
2023-24	161,581.0	5,513.9	16,083.0	177,664.0	21,596.9	210,507	31,895	28,380	102.6	281.1	504.2	89.0

Source: Samoa Bureau of Statistics

Note: Excl. = excluding.
Totals may not add up due to rounding

a. Projected population numbers based on the latest Population and Household Census 2021 by the Samoa Bureau of Statistics
b. Calculated by total water use excluding Electricity, Water Supply and Sewage divided by the total population multiplied by 1000
c. Calculated by water use by households divided by the total number of households multiplied by 1000
d. Calculated by total number of metered households divided by the total number of households

b) Indicators for Water Expenditure

Table 13: Indicators for Water Expenditure on Distributed Water Use, Samoa 2013-14 to 2023-24

	Exp. by Industry	Exp. by Households	Total Expenditure	Water Used by Industry	Water Used by Households	Exp. Per Cubic Meter of Water Used by Industry [a]	Exp. Per Cubic Meter of Water Used by Households [b]	Estimated Population (June)	Annual Exp. Per Capita [C]	Estimated Number of Households (June)	Annual Exp. Per Household [d]
Unit	**$m**	**$m**	**$m**	**ML**	**ML**	**$/m³**	**$/m³**	**Persons**	**$ per Person**	**Households**	**$ per household**
2013-14	3.5	8.1	11.6	2,090.0	15,060	1.68	0.54	192,134	60.6	27,448	296.2
2014-15	4.3	10.2	14.5	2,174.3	13,456	1.97	0.76	193,766	74.7	27,681	368.3
2015-16	6.5	10.8	17.4	3,555.6	14,366	1.84	0.75	195,398	88.9	27,914	388.5
2016-17	7.2	11.6	18.8	3,455.1	15,608	2.09	0.74	197,030	95.6	28,975	401.1
2017-18	8.2	12.4	20.6	3,778.9	12,397	2.18	1.00	198,661	103.6	29,215	422.7
2018-19	8.6	12.8	21.4	3,877.9	12,512	2.22	1.02	200,293	106.7	29,455	433.9
2019-20	6.5	15.4	21.9	3,143.9	12,706	2.07	1.22	201,925	108.7	29,695	520.2
2020-21	5.8	14.9	20.8	3,012.3	13,342	1.93	1.12	204,841	101.4	30,124	496.1
2021-22	5.2	14.5	19.7	2,875.9	12,933	1.81	1.12	206,730	95.3	31,323	462.7
2022-23	5.2	14.2	19.4	3,091.2	13,704	1.70	1.04	208,628	93.5	31,610	450.7
2023-24	6.7	16.3	23.0	3,354.2	14.814	2.00	1.10	210,507	109.5	31,895	512.3

Source: Samoa Bureau of Statistics

Note: Exp. = Expenditure

Totals may not add up due to rounding

a. Calculated by Expenditure by Industry divided by Volume of Water used by Industry divided by 1000

b. Calculated by Expenditure by Households divided by Volume of water use by Households

c. Calculated by Total expenditure divided by Total population

d. Calculated by Expenditure by Households divided by the estimated number of households

2.0 Accounts Methodology

The Water Account, Samoa 2023-24 (WAS) is produced by the Samoa Bureau of Statistics and it closely followed the methodology outlined in the System of Environmental-Economic Accounting Central Framework 2012 (SEEA-CF 2012) and the SEEA-Water 2012. The account focused on the Physical Supply and Use of water and some monetary supply and use information for Samoa. The methodology for this compilation is similar to the previous water accounts with few changes to some of the data and methods.

2.1 Concepts

The WAS 2023-24 was developed using the SEEA Central Framework and it started in 2013 with Samoa's first account published in 2015 for the financial years 2011-12 to 2013-14. The WAS supply and use tables represent the flows of water from the environment to the economy, within the economy and going back to the environment.

The monetary supply and use information are limited to distributed water use by industries and households. It includes the monetary value associated with the use of distributed water and using of the Waste Water Treatment Plant for sewage discharge. The key concepts are as followed;

Self-Abstracted Water (flows from the environment)

Self-Abstracted water refers to water that is removed from any source or the environment, either permanently or temporarily for consumption and production activities (SEEA Water, s 3.26). Water used for hydroelectricity is also abstracted water. Abstracted water is disaggregated according to purpose (for hydroelectricity, for distribution and for own use) and type of water source.

Water Use

Total water use of an industry is computed as the sum of the amount of abstracted water and the amount of water received from other economic units (distributed water and wastewater collected). Although it might be perceived that water abstracted for distribution is counted twice-first as a use when water is abstracted by the distributing industry and second when it is delivered to other users – water abstracted for distribution is a water use of the distributing industry even though that industry is not the end-user of the water (SEEA Water, s 3.31).

Water Supply

Water leaving or flowing out from an economic unit. It is computed as the sum of water supply to other economic units (distributed water and wastewater) and water supply to the environment or return flows (SEEA Water, s 3.40).

Expenditure

Refers only to the cost paid by economic units and households for distributed water use and water discharged to the wastewater treatment plant. It does not include any water-related subsidies that might have been received by the supplier of water or use of water. Furthermore, expenditures do not necessarily cover all the costs of supplying water.

Classification of Industries

The WAS uses the International Standard Industrial Classification Revision 4 (ISIC Rev.4) for its industry classification.

Wastewater

Wastewater represents water that is no longer needed by an economic unit and is discharged to the wastewater treatment plant. The SWA only recorded wastewater treated by the wastewater treatment plant.

Return Flows

Represents the flows of water from industries and households to the environment. It does not include the flows of water to wastewater treatment plant (WWTP) but includes wastewater from economic units that flows directly to the environment.

2.2 Data Sources

Data for WAS is sourced from different sources such as government ministries and corporations, non-governmental organizations, private sector and existing census and surveys conducted by the bureau.

Water Supply Industries

The two main water suppliers provide the core data for the WAS compilation through administrative data. The administrative data provided the following information;

- water production (abstracted water) by sources of water (surface & groundwater)
- number of connections (metered & unmetered)
- estimated coverage by population and households
- metered water supply by volume (m^3) and value ($)
- unmetered water by value
- wastewater collected/discharged to the treatment plant and value by individual industry

- water losses as non-revenue water (distribution losses)

Water Abstraction Licensing

The Ministry of Natural Resources and Environment (MNRE) administered the licensing of water abstraction for all types of water use. Most of these licenses are issued to Construction Companies, Water Supply Industry, Electricity Industry, Manufacturing Companies and some to Other Service Activities. The administrative data includes;

- water user
- purpose of abstraction
- rate of abstraction and operational time
- duration of license

Hydroelectricity Water Use

The Electric Power Corporation (EPC) provides the administrative data on the water use for hydropower. The hydroelectricity water use is provided by quarter. The administrative data includes:

- name and location of stations
- amount of water abstracted by month or quarter

Agriculture, Forestry and Fishing

The core data for Agriculture and Livestock is the number of livestock. The Agriculture Census Data and Agriculture Survey provided this information. There is no information on the water use for livestock in Samoa, hence documented water requirements by FAO (FAO, 1995, *Water requirement Livestock* [Fact Sheet]) was used to estimate the abstracted water use by livestock such as;

- number of livestock by type of livestock
- average water consumption by livestock type

Population and Housing Census

The bureau conducts its Population and Housing Census every five years. This provides demographic information for the accounts such as;

- census household number
- average household size

2.3 Methods

Physical Water Supply and Use

Self-Abstracted water use for different industries is calculated using different data sources. All the abstracted water is used to calculate the amount of water that is taken off the

environment (flows from the environment). The following provides the methods used for each industry;

Water Supply Industry

Water production by surface water and groundwater (boreholes) provides the backbone of abstracted water for the water supply industry. For the unmetered community-managed water supply systems, the average metered water use for households and individual industry is used to estimate the water production or abstracted water.

Agriculture, Livestock and Fishing

Abstracted water for Agriculture is only estimated for livestock. Most of the agricultural crops in Samoa are mainly rainfed, hence making it difficult to estimate abstracted water use due to lack of data.

The abstracted water by livestock presented in this report is slightly different to the data presented in the previous account in 2019-20 but quite similar to 2021-22. This is due to a large difference between the number of livestock estimated for the years where no Agriculture census was conducted, compared with the Agriculture census years. Because of this, a simple straight-line method was used to estimate the number of livestock using the Agriculture Census 1999 as the base year.

The livestock numbers were then multiplied by the average water requirements for each livestock type to estimate the abstracted water by livestock.

Manufacturing and Construction

The abstraction licensing data provided by MNRE, is the sole information available and used to estimate the abstracted water by manufacturing and construction. The abstraction rate and operational time were used to estimate annual figures for each industry.

Hydroelectricity

The Electric Power Corporation's water abstraction is used to compute the amount of abstracted water for hydropower which is provided to the bureau on a monthly and a quarterly basis.

Households abstracted water

According to the 2021 Population and Household Census, a proportion of about 8.5% of total population or 2,656 households depend on other sources other than distributed water by the water suppliers. For this account, that percentage is assumed to be self-abstracting water from other sources, mainly rainwater. The estimated abstracted water use by these households is computed using the average metered household water use multiplied by the number of households not supplied by piped water.

Distributed Water Use

The detailed customer use data from one of the main water suppliers was classified into relevant industries using the International Standard Industry Classification (ISIC Rev.4) before tabulation and analysis. The bulk of water users (industry & households) have metered water supply. The average water use for metered individual industries and metered households is used to estimate the unmetered water use by industry and households.

On the other hand, the community-managed water supply systems are mostly unmetered except in one scheme where meters were installed for monitoring water use and losses. Water fees are paid based on households' consumption with very low rates. Proportions from that scheme were used to estimate production and supply for the other self-managed schemes.

Monetary Supply and Use

Abstracted water use and return flows are not valued as there is a lack of available information and data. The monetary information is limited to only the distributed water use and wastewater to treatment plant. The value of distributed metered and unmetered water use are provided as well as expenditure paid by industry for their wastewater discharged to the wastewater treatment plant.

For community-managed water supply systems, monthly maintenance fee paid by households is used to estimate the value of distributed water use for the unmetered water schemes.

3.0 Industries Classification

Industry is a group of establishments engaged in the same or similar activities. The bureau classified establishments according to relevant industry based on the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev.4). With data sets and information scattered across different data sources and custodians, the classification task was challenging. However, the following industries are the major ones used throughout this report for the purpose of water accounts.

Agriculture: Includes Agriculture, Forestry and Fishing. Livestock Is also included (ISIC A).

Electricity: Includes Electricity, Gas and Air Conditioning (ISIC D).

Manufacturing and Construction: Includes Manufacturing, Mining and Quarrying and Construction (ISIC B, C & F).

Water Supply Industry: Only includes Division 36 of ISIC E.

Sewerage: Refers to Division 37 of ISIC E.

Other Industries refers to the following industries;

- Accommodation and Food Service Activities
- Activities of Extraterritorial Organizations and bodies
- Administrative and Support Service Activities
- Arts, Entertainment and Recreation
- Education
- Financial and Insurance Services
- Human Health and Social Work Activities
- Information and Communication
- Other Service Activities
- Professional, Scientific and Technical Activities
- Public Administration and Defence
- Real Estate Activities
- Transportation and Storage
- Waste Management
- Wholesale and Retail Trade; repair of motor vehicles

4.0 Feedback on the Accounts

For more information or any feedback on any issue with the Water Accounts, Samoa 2023-24 please don't hesitate to contact;

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5.0 Acknowledgement

This edition of the Water Account Samoa 2023-24 would not be possible without the usual assistance and valuable contribution of our partners and stakeholders through the provision of the required data and information for the account compilation.

On that note, we would like to record our sincere gratitude to our colleagues at SWA, EPC, MNRE and IWSA. We would also like to acknowledge the technical expertise of Mr. Sokol Vako from UN-SIAP and Ms. Lisa Green from SPC for their valuable feedback and assistance.

In addition, we sincerely commend the contribution of our pioneering consultant, Dr. Michael Vardon for the initial effort in compiling the first Water Accounts for Samoa in 2015 and the opportunity offered by the Australian Bureau of Statistics for the first ever attachment training for our environment statistics officer in 2014, which laid the foundation for the SEEA development in Samoa.

6.0 Appendices

6.1 Physical Supply Table, Samoa 2023-24 (ML)

PHYSICAL SUPPLY TABLE	Industries (by ISIC)							Households	Accumulation	Flows from the Environment	TOTAL SUPPLY
	Agriculture, Forestry & Fishery (ISIC A)	Manufacturing & Construction (ISIC B,C & F)	Electricity (ISIC D)	Water collection, treatment & supply (ISIC 36)	Sewerage (ISIC 37)	Other Industries	**Total Industry**				
1. Sources of Abstracted Water:											
Inland Water Resources										157,734.1	157,734.1
Surface water										150,041.3	150,041.3
Groundwater										7,692.9	7,692.9
Other Water Sources (Rainwater)										1,269.0	1,269.0
TOTAL SUPPLY ABSTRACTED WATER										**159,003.2**	**159,003.2**
2. Water:											
For distribution				18,168.1			**18,168.1**				**18,168.1**
For own use	1,738.3	463.5	126,330.0	1,269.0	-	15.0	**129,815.9**				**129,815.9**
3. Wastewater and reused water:											
Total Wastewater	2.1	-	-	-	3.9	486.7	**492.7**	-			492.7
of which: wastewater to treatment	2.1	-	-	-	3.9	486.7	**492.7**	-			492.7
of which: own treatment	-	-	-	-	-	-	**-**	-			-
TOTAL WASTEWATER AND REUSED WATER	2.1	-	-	-	3.9	486.7	**492.7**	**-**			**492.7**
4. Return flows of water:											
To inland water resources	95.4	463.5	126,379.0	11,022.4	409.0	2,509.1	**140,878.5**	11,851.1			152,729.6
To other sources	-	-	-	-	84.6	-	**84.6**	-			84.6
TOTAL RETURN FLOWS	95.4	463.5	126,379.0	11,022.4	493.6	2,509.1	**140,963.1**	11,851.1			**152,814.3**
of which: losses in distribution	-	-	-	11,019.1	-	-	**11,019.1**	-			11,019.1
5. Evaporation of abstracted water, transpiration and water incorporated into products:											
TOTAL WATER EVAPORATED, TRANSPIRED AND INCORPORATED INTO PRODUCTS	1,738.3	218.8	-	1,269.0	-	-	**3,226.1**	2,962.8			**6,188.9**
6. TOTAL SUPPLY	**1,835.8**	**682.3**	**126,379.0**	**29,190.5**	**497.5**	**2,995.9**	**161,581.0**	**16,083.0**		**159,003.2**	**177,664.0**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding

6.2 Physical Water Use Table, Samoa 2023-24

PHYSICAL USE TABLE	Industries (by ISIC)							Households	Accumulation	Flows to the Environment	TOTAL USE
	Agriculture, Forestry & Fishery (ISIC A)	Manufacturing & Construction (ISIC B,C & F)	Electricity (ISIC D)	Water collection, treatment & supply (ISIC 36)	Sewerage (ISIC 37)	Other Industries	**Total Industry**				
1. Sources of Abstracted Water:											
Inland Water Resources	1,738.3	463.5	126,330.0	29,187.3	-	15.0	**157,734.1**				157,734.1
Surface water	1,738.3	439.0	126,330.0	21,533.9	-	-	**150,041.3**				150,041.3
Groundwater	-	24.5	-	7,653.4	-	15.0	**7,692.9**				7,692.9
Other Water Sources (Rainwater)	-	-	-	1,269.0	-	-	**1,269.0**				1,269.0
TOTAL USE ABSTRACTED WATER	1,738.3	463.5	126,330.0	30,456.3	-	15.0	**159,003.2**				**159,003.2**
2. Water (use):											
Distributed water	97.4	218.8	49.0	3.3	4.8	2,980.9	**3,354.2**	14,813.9			**18,168.1**
Own use of water	1,738.3	463.5	126,330.0	1,269.0	-	15.0	**129,815.9**	-			**129,815.9**
3. Wastewater and reused water:											
Total Wastewater				-	492.7		**492.7**				492.7
of which: wastewater received from other units				-	492.7		**492.7**				492.7
of which: own treatment	-	-	-	-	-	-	-	-			-
TOTAL WASTEWATER AND REUSED WATER	-	-	-	-	492.7	-	**492.7**	-			**492.7**
4. Return flows of water:											
To inland water resources										152,729.6	152,729.6
To other sources										84.6	84.6
TOTAL RETURN FLOWS										152,814.3	**152,814.3**
5. Evaporation of abstracted water, transpiration and water incorporated into products:											
TOTAL WATER EVAPORATED, TRANSPIRED AND INCORPORATED INTO PRODUCTS									6,188.9	-	**6,188.9**
6. TOTAL USE	**1,835.8**	**682.3**	**126,379.0**	**29,190.5**	**497.5**	**2,995.9**	**161,581.0**	**16,083.0**	**6,188.9**	**152,814.3**	**177,664.0**

Source: Samoa Bureau of Statistics
Note: Totals may not add up due to rounding

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