

Supplementary Information

Self-supplied drinking water in low- and middle-income countries in the Asia-Pacific

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Supplementary Tables

Table S1. Datasets used in analysis

Country	Datasets	Online repository	URL
Pacific			
Fiji	Census 2017	Fiji Bureau of Statistics	https://www.statsfiji.gov.fj/
Kiribati	MICS 2018-19	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Marshall Islands	Census 2011	Pacific Data Hub	https://pacificdata.org/
Micronesia, Fed. Sts	Census 2000	Pacific Data Hub	https://pacificdata.org/
Micronesia, Fed. Sts	Census 2010	Pacific Data Hub	https://pacificdata.org/
Papua New Guinea	DHS 2016-18	Demographic and Health Surveys	https://dhsprogram.com/
Samoa	Census 2011	Pacific Data Hub	https://pacificdata.org/
Samoa	Census 2016	Pacific Data Hub	https://pacificdata.org/
Solomon Islands	Census 2009	Pacific Data Hub	https://pacificdata.org/
Solomon Islands	PS 2011	JMP for Water Supply, Sanitation & Hygiene	https://washdata.org/data/downloads
Solomon Islands	HIES 2012-13	Solomon Island National Statistics Office	https://www.statistics.gov.sb
Tonga	Census 2006	Pacific Data Hub	https://pacificdata.org/
Tonga	Census 2011	Pacific Data Hub	https://pacificdata.org/
Tonga	Census 2016	Pacific Data Hub	https://pacificdata.org/
Tuvalu	Census 2002	Pacific Data Hub	https://pacificdata.org/
Tuvalu	Census 2012	Pacific Data Hub	https://pacificdata.org/
Vanuatu	HIES 2006	Vanuatu National Statistics Office	https://vnso.gov.vu/
Vanuatu	MICS 2007	Vanuatu National Statistics Office	https://vnso.gov.vu/
Vanuatu	Census 2009	Vanuatu National Statistics Office	https://vnso.gov.vu/
Vanuatu	HIES 2010	Vanuatu National Statistics Office	https://vnso.gov.vu/
Vanuatu	Census 2016	Vanuatu National Statistics Office	https://vnso.gov.vu/
South Asia			
Afghanistan	DHS 2015	Demographic and Health Surveys	https://dhsprogram.com/
Bangladesh	MICS 2006	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Bangladesh	DHS 2011	Demographic and Health Surveys	https://dhsprogram.com/
Bangladesh	MICS 2012-13	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Bangladesh	DHS 2014	Demographic and Health Surveys	https://dhsprogram.com/
Bangladesh	MICS 2019	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Bhutan	MICS 2010	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
India	Census 2001	Census of India - ORGCC	https://www.censusindia.gov.in/
India	DHS 2005-06	Demographic and Health Surveys	https://dhsprogram.com/
India	Census 2011	Census of India - ORGCC	https://www.censusindia.gov.in/
India	DHS 2015-16	Demographic and Health Surveys	https://dhsprogram.com/
Maldives	MICS 2001	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Maldives	DHS 2009	Demographic and Health Surveys	https://dhsprogram.com/
Maldives	DHS 2016-17	Demographic and Health Surveys	https://dhsprogram.com/
Nepal	DHS 2001	Demographic and Health Surveys	https://dhsprogram.com/
Nepal	DHS 2006	Demographic and Health Surveys	https://dhsprogram.com/
Nepal	DHS 2011	Demographic and Health Surveys	https://dhsprogram.com/
Nepal	MICS 2014	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Nepal	DHS 2016	Demographic and Health Surveys	https://dhsprogram.com/
Pakistan	DHS 2006-7	Demographic and Health Surveys	https://dhsprogram.com/
Pakistan	DHS 2012-13	Demographic and Health Surveys	https://dhsprogram.com/

Pakistan	DHS 2017-18	Demographic and Health Surveys	https://dhsprogram.com/
Sri Lanka	DHS 2000	JMP for Water Supply, Sanitation & Hygiene	https://washdata.org/data/downloads
Sri Lanka	Census 2001	Sri Lank Statistical Information Service	http://sis.statistics.gov.lk/
Sri Lanka	CRI 2004	JMP for Water Supply, Sanitation & Hygiene	https://washdata.org/data/downloads
Sri Lanka	HIES 2007	JMP for Water Supply, Sanitation & Hygiene	https://washdata.org/data/downloads
Sri Lanka	Census 2012	Sri Lank Statistical Information Service	https://sis.statistics.gov.lk
Southeast Asia			
Cambodia	DHS 2000	Demographic and Health Surveys	https://dhsprogram.com/
Cambodia	DHS 2005	Demographic and Health Surveys	https://dhsprogram.com/
Cambodia	Census 2008	National Institute of Statistics (Cambodia)	https://www.nis.gov.kh/
Cambodia	DHS 2010	Demographic and Health Surveys	https://dhsprogram.com/
Cambodia	DHS 2014	Demographic and Health Surveys	https://dhsprogram.com/
Indonesia	DHS 2003-03	Demographic and Health Surveys	https://dhsprogram.com/
Indonesia	DHS 2007	Demographic and Health Surveys	https://dhsprogram.com/
Indonesia	DHS 2012	Demographic and Health Surveys	https://dhsprogram.com/
Indonesia	DHS 2017	Demographic and Health Surveys	https://dhsprogram.com/
Lao PDR	MICS 2000	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Lao PDR	MICS 2006	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Lao PDR	MICS 2011-12	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Lao PDR	MICS 2017	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Myanmar	MICS 2000	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Myanmar	DHS 2015-16	Demographic and Health Surveys	https://dhsprogram.com/
Philippines	DHS 2003	Demographic and Health Surveys	https://dhsprogram.com/
Philippines	DHS 2008	Demographic and Health Surveys	https://dhsprogram.com/
Philippines	DHS 2013	Demographic and Health Surveys	https://dhsprogram.com/
Philippines	DHS 2017	Demographic and Health Surveys	https://dhsprogram.com/
Thailand	MICS 2005-06	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Thailand	MICS 2012-13	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Thailand	MICS 2015-16	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Timor-Leste	DHS 2009-10	Demographic and Health Surveys	https://dhsprogram.com/
Timor-Leste	DHS 2016	Demographic and Health Surveys	https://dhsprogram.com/
Vietnam	DHS 2002	Demographic and Health Surveys	https://dhsprogram.com/
Vietnam	DHS 2005	Demographic and Health Surveys	https://dhsprogram.com/
Vietnam	MICS 2006	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Vietnam	MICS 2011	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys
Vietnam	MICS 2013-14	Multiple Indicator Cluster Surveys	https://mics.unicef.org/surveys

Note: HIES = Household income and expenditure survey, DHS = Demographic and Health Survey, MICS = Multiple Indicator Cluster Survey, PS = People's Survey, CRI = Country Report on Indicator for the Goals, ORGCC = Office of the Registrar General & Census Commissioner

Table S2. Crude estimates for urban and rural population using self-supply as main drinking water source in 2018 (based on most recent data)

	Total population in 2018		Percentage of population with self-supply as main drinking water source (%)		Estimated population with self-supply as main drinking water source in 2018 ^a	
	Urban	Rural	Urban	Rural	Urban	Rural
Pacific						
Fiji	496,942	386,541	<1	9	2,215	36,477
Kiribati	62,623	53,224	32	49	20,161	26,231
Marshall Islands ^b	44,996	13,417	71	98	32,037	13,175
Micronesia	25,573	87,067	47	42	12,045	36,568
Papua New Guinea	1,133,366	7,472,950	21	13	237,144	1,003,767
Samoa	35,780	160,350	2	6	674	9,750
Solomon Islands	155,047	497,811	18	13	27,266	63,981
Tonga ^b	23,870	79,327	55	62	13,156	48,868
Tuvalu	7,179	4,329	99	98	7,128	4,263
Vanuatu	73,972	218,708	10	24	7,105	52,240
Sub-total	2,059,348	8,973,724	17	14	358,931	1,295,320
Southeast Asia						
Cambodia	3,800,503	12,449,295	14	41	523,971	5,059,751
Indonesia	148,084,795	119,578,640	28	37	41,212,897	44,723,124
Lao PDR	2,471,810	4,589,697	6	20	146,630	938,518
Myanmar	16,423,490	37,284,905	18	31	3,024,339	11,492,644
Philippines	50,027,217	56,624,705	2	14	1,143,722	7,798,706
Thailand	34,678,853	34,749,671	7	29	2,512,297	9,946,003
Timor-Leste	387,720	880,252	17	7	63,981	62,036
Vietnam	34,317,154	61,223,241	18	63	6,274,694	38,747,421
Sub-total	290,191,542	327,380,406	19	36	54,902,531	118,768,203
South Asia						
Afghanistan	9,477,100	27,695,286	47	24	4,466,337	6,658,052
Bangladesh	59,107,944	102,248,095	49	77	29,068,123	78,451,613
Bhutan	308,509	445,885	<1	<1	0	1,722
India	460,295,677	892,321,651	17	33	76,690,298	294,136,583
Maldives	205,288	310,408	<1	75	566	232,221
Nepal	5,544,546	22,543,325	29	33	1,590,272	7,389,642
Pakistan	77,810,763	134,404,267	25	53	19,428,780	70,747,131
Sri Lanka ^c	4,003,749	17,666,251	18	34	708,763	6,051,107
Sub-total	616,753,576	1,197,635,168	21	39	131,953,139	463,668,071
Grand total	909,004,466	1,533,989,298	21	38	187,214,601	583,731,594

^aCrude estimates for urban and rural populations using self-supply may not sum exactly to the total self-supply estimates in Table 1 as the urban-to-rural population ratio in the most recent survey or census may differ from the ratio in 2018. ^bData constraints prevented inclusion of groundwater-based self-supply for Tonga and Marshall Islands. ^cData constraints prevented inclusion of rainwater-based self-supply for Sri Lanka.

Table S3. Annual change in population using self-supply as main drinking water source in 2018

	Urban	Rural	Total
Pacific			
Fiji	n/a	n/a	n/a
Kiribati	n/a	n/a	n/a
Marshall Islands ¹	n/a	n/a	n/a
Micronesia, Fed. Sts.	n/a	n/a	-419
Papua New Guinea	n/a	n/a	n/a
Samoa	14	-423	-409
Solomon Islands	-903	5,187	4,284
Tonga ¹	-328	-1088	-1,416
Tuvalu	183	-45	138
Vanuatu	334	2,690	3,024
Sub-total	-700	6,321	5,202
Southeast Asia			
Cambodia	-2,094	225,427	223,333
Indonesia	-1,377,546	-1,138,548	-2,516,094
Lao PDR	-9,040	50,530	41,490
Myanmar	-89,853	322,479	232,626
Philippines	-213,503	-649	-214,152
Thailand	-63,101	-948,068	-1,011,169
Timor-Leste	3,759	669	4,428
Vietnam	-8,724	-570,901	-579,625
Sub-total	-1,760,102	-2,059,061	-3,819,163
South Asia			
Afghanistan	n/a	n/a	n/a
Bangladesh	781,576	837,189	1,618,765
Bhutan	n/a	n/a	n/a
India	2,304,105	7,252,839	9,556,944
Maldives	0	12,189	12,189
Nepal	40,023	335,315	375,338
Pakistan	657,987	885,839	1,543,826
Sri Lanka ²	11,032	80,845	91,877
Sub-total	3,794,723	9,404,216	13,198,939
Grand total	2,033,921	7,351,476	9,384,978

Note: 'n/a' indicates countries where temporal trends could not be calculated due to a lack of data. ¹ Data constraints prevented inclusion of groundwater-based self-supply for Tonga and Marshall Islands. ² Data constraints prevented inclusion of rainwater-based self-supply for Sri Lanka.

Supplementary Methods

Datasets for some countries did not clearly or consistently delineate between on/off premises or private/communal for groundwater sources (Solomon Islands, Vanuatu, Fiji, Marshall Islands, Tonga) and rainwater sources (Sri Lanka). Where these sources were used by <1% of the population (Tonga, Marshall Islands, Sri Lanka), they were not considered in the prevalence calculations. For Solomon Islands and Vanuatu, at least one dataset allowed for the calculation of a private/public ratio for groundwater sources, and this ratio was applied to the most recent prevalence estimate. For Fiji, the private/public ratio for groundwater sources from neighbouring Vanuatu was applied. Because the ratios for Solomon Islands, Vanuatu and Fiji were not available for multiple points in time, they were assumed to be static for the purposes of prevalence estimates taking into account temporal trends.