Supplementary Materials

The principal data sources used for this analysis are the Multiple Indicator Cluster Survey (MICS) (http://mics.unicef.org), and Performance Monitoring for Action (PMA) (https://www.pmadata.org). Permission was granted to access and analyse the MICS 2016-2017 and PMA 2018 datasets for the purposes of this work in early 2020. We also make reference to summary results reported separately by the statistical authorities. Contextual data is sourced from the UNICEF/WHO Joint Monitoring Programme, available at https://washdata.org/.

Section A. Data for Lagos State, Nigeria
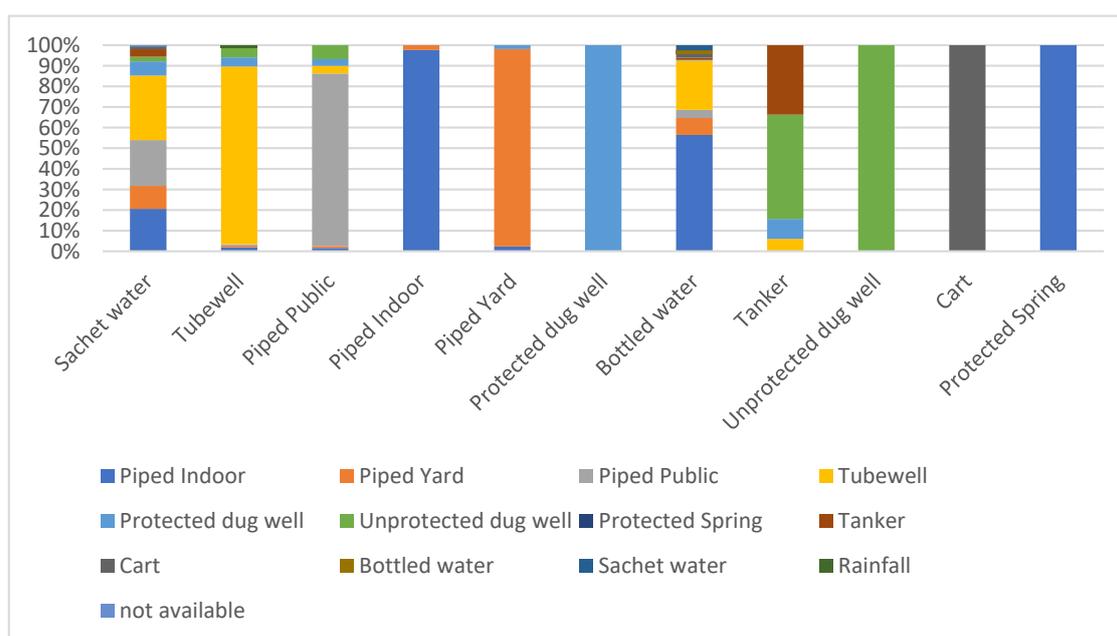
Table S1. Main source of drinking water in Lagos State.

	MICS 2016–2017 (%)		PMA 2018 (%)	
Total Sample Size (households)	1681		6486	
Mode of Delivery	**Main Source of Drinking Water (%)**		**Main Source of Drinking Water (%)**	
Sachet (pure) water	57.3		58.9	
Bottled water	5.8		4.3	
Tube well, Borehole	26.0		15.6	
Protected well	2.0		0.4	
Unprotected well	1.4		0.1	
Public tap / standpipe	1.8		8.6	
Piped into dwelling	1.7	Total Piped supply 6.5	6.6	Total Piped supply 19.2
Piped into compound, yard or plot	1.3		4.0	
Piped to neighbour	1.7		n/a	
Tanker-truck	0.4		1.3	
Rainwater collection	0.2		-	
Cart with small tank / drum	0.2		0.2	
Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	0.1		-	
Protected spring	n/a		0.1	
Other	0.1		n/a	

Source: adapted from MICS 2016–2017 and PMA 2018 surveys.

Table S2. Secondary drinking water source where packaged water reported as main source used for drinking water in Lagos State.

	MICS 2016–2017		PMA 2018	
No of respondents	1061		4057	
Mode of Delivery	**Respondents (%)**		**Respondents (%)**	
Tube well, Borehole	57.7		31.1	
Protected well	9.8		6.6	
Unprotected well	3.9		2.1	
Piped into dwelling	6.5		23.2	
Public tap / standpipe	7.1	Total piped supply = 19.7	21.2	Total piped supply = 55.4
Piped into compound, yard or plot	6.1		11.0	
Piped to neighbour	3.8		n/a	
Cart with small tank / drum	2.6		1.2	
Tanker-truck	2.1		3.5	
Other	0.5		n/a	

Source: adapted from MICS 2016–2017 and PMA 2018 surveys.

Figure S1. Source of water for other domestic uses according to main drinking water source (Lagos State, % of respondents). Source: adapted from MICS 2016–2017.

Table S3. Analysis of drinking water sources according to urban wealth quintiles.

Urban Wealth Index Quintile	Proportion of Responses (%)					
	Poorest	Second	Middle	Fourth	Richest	Average
Main Source of Drinking Water						
Piped into dwelling	0.0	1.1	0.0	0.4	**3.2**	1.8
Piped into compound, yard or plot	0.0	1.1	1.6	1.8	1.1	1.4
Piped to neighbour	0.0	5.3	3.3	1.3	0.9	1.7
Public tap / standpipe	0.0	9.5	4.1	2.2	0.1	1.9
Tube well, Borehole	71.4	34.7	27.0	31.5	21.2	26.0
Protected well	0.0	4.2	0.8	1.1	1.1	1.3
Unprotected well	0.0	0.0	0.0	0.2	0.0	0.1
Rainwater collection	0.0	1.1	0.0	0.0	0.0	0.1
Tanker-truck	0.0	0.0	0.4	0.9	0.3	0.4
Cart with small tank / drum	0.0	0.0	0.8	0.2	0.0	0.2
Bottled water	0.0	0.0	0.4	1.3	11.2	6.0
Sachet (pure) water	28.6	43.2	61.1	58.9	60.7	59.0
Other specify	0.0	0.0	0.4	0.0	0.1	0.1
Respondents (No.)	7	95	244	445	783	1574

Source: Authors' calculation from MICS2016–2017.

Table S4. Location of water supply by Educational Attainment of Respondent (% respondents).

Location of Water Supply source	Educational Attainment						TOTAL
	None	Primary	Secondary/Secondary-technical	Higher	Non-formal	Missing	
In own dwelling	17.3	12.8	15.1	33.1	33.3	0.0	20.4
In own yard / plot	19.8	15.2	23.7	26.9	25.0	0.0	23.1
Elsewhere	63.0	71.6	61.0	40.0	41.7	100.0	56.3

2

Missing	0.0	0.5	0.1	0.0	0.0	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: authors' calculations based on MICS 2016–2017. n=1428.

Table S5. Location of water supply by number of rooms used for sleeping (% respondents).

Location of the Water Source	Number of Rooms Used for Sleeping				Total
	1	2	3	>3	
In own dwelling	14.5	28.0	51.8	48.1	20.4
In own yard / plot	23.0	25.6	15.7	18.5	23.1
Elsewhere	62.4	46.1	32.5	33.3	56.3
Missing	0.1	0.3	0.0	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0

Source: authors' calculations based on MICS 2016–2017. n=1428.

Table S6. Location of water supply by tenure (% respondents).

Location of the Water Source	Owned	Rent	Other (not Owned or Rented)	Total
In own dwelling	30.6	16.8	31.5	20.4
In own yard / plot	20.5	23.5	25.2	23.1
Elsewhere	48.8	59.5	43.2	56.3
Missing	0.0	0.2	0.0	0.1
Total	100	100	100	100

Source: authors' calculations based on MICS 2016–2017. n=1428.

Section B. Data for Nigeria

Table S7. Water Use Surveys for Nigeria, Collated by JMP.

	Code	Survey Name	Year	Comments
1	DHS90	Demographic and Health Survey	1990	
2	MICS95	Multiple Indicator Cluster Survey	1995	No urban disaggregation
3	CEN96	Census	1996	
4	MICS99	Multiple Indicator Cluster Survey	1999	
5	DHS99	Demographic and Health Survey	1999	
6	CLS00	Child Labour Survey	2000	
7	CWIQ02	Core Welfare Indicator Survey 2002 conducted in six States only	2002	Not nationwide
8	DHS03	Demographic and Health Survey	2003	
9	NLSS04	Nigerian Living Standards Survey	2004	
10	RADWQ05	Rapid Assessment of Drinking Water Quality	2005	Water quality only
11	CWIQ06	Core Welfare Indicator Questionnaire	2006	
12	GHS06	General Household Survey	2006	
13	MICS07	Multiple Indicator Cluster Survey	2007	
14	BLS08	Nigeria Water Supply and Sanitation Baseline Survey	2008	
15	DHS08	Demographic and Health Survey	2008	
16	LSS09	Nigeria Living Standards Survey	2009	
17	MIS10	Malaria Indicators Survey (MIS)	2010	
18	CEN10	Census	2010	
19	IBNET11	The International Benchmarking Network for Water and Sanitation Utilities	2011	Availability only
20	LSMS11	Living Standards Measurement Study (LSMS)	2011	
21	MICS11	Multiple Indicator Cluster Survey	2011	
22	IBNET12	The International Benchmarking Network for Water and Sanitation Utilities	2012	Availability only
23	IBNET13	The International Benchmarking Network for Water and Sanitation Utilities	2013	Availability only
24	GHS13	General Household Survey	2013	
25	DHS13	Demographic and Health Survey	2013	
26	IBNET14	The International Benchmarking Network for Water and Sanitation Utilities	2014	Availability only
27	NNHS14	Nutrition and Health Survey	2014	No urban disaggregation
28	MIS15	Malaria Indicators Survey (MIS)	2015	
29	GHS16	General Household Survey	2016	
30	PMA16	Performance Monitoring and Accountability	2016	
31	PMA17	Performance Monitoring and Accountability	2017	
32	MICS17	Multiple Indicator Cluster Survey	2017	
33	PMA18	Performance Monitoring and Accountability	2018	
34	NORM18	National Outcome Routine Mapping	2018	

Table S8. Location of main source of drinking water (Urban Nigeria).

	Location of the Water Source				Total %	Total No.
	In own dwelling	In own yard / plot	Elsewhere	Missing		
Public tap / standpipe	5.8	6.7	87.0	0.4	100.0	684
Tube well, Borehole	12.3	10.2	77.4	0.1	100.0	3905
Protected well	29.1	25.0	45.7	0.2	100.0	1262
Unprotected well	37.0	15.2	47.9	0.0	100.0	349
Protected spring	15.4	13.8	70.8	0.0	100.0	65
Unprotected spring	15.4	7.7	76.9	0.0	100.0	26
Rainwater collection	57.2	38.7	3.4	0.8	100.0	388
Tanker-truck	7.2	9.9	82.5	0.4	100.0	223
Cart with small tank / drum	6.6	1.8	90.7	0.9	100.0	226
Surface water	3.1	7.8	89.1	0.0	100.0	321
Bottled water	51.8	18.4	29.8	0.0	100.0	141
Sachet (pure) water	21.3	23.3	54.9	0.5	100.0	2228
Other specify	30.0	6.0	62.0	2.0	100.0	50
All sources	18.8	15.9	65.0	0.3	100.0	9868
Total	1857	1572	6411	28		9868

Source: Authors' analysis of MICS 2016–2017.

Table S9. Location of main source of drinking water supplies (urban: Nigeria).

Location of the water source	Public tap / standpipe	Tubewell, Borehole	Protected well	Unprotected well	Protected spring	Unprotected spring	Rainwater collection	Tanker-truck	Cart with small tank / drum	Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	Bottled water	Sachet (pure) water	Other specify	Total
In own dwelling	40	481	367	129	10	4	222	16	15	10	73	475	15	1857
In own yard / plot	46	397	316	53	9	2	150	22	4	25	26	519	3	1572
Elsewhere	595	3022	577	167	46	20	13	184	205	286	42	1223	31	6411
Missing	3	5	2	0	0	0	3	1	2	0	0	11	1	28
Total	684	3905	1262	349	65	26	388	223	226	321	141	2228	50	9868

Source: MICS 2016–2017.

Section C. Data for Sub-Saharan Africa

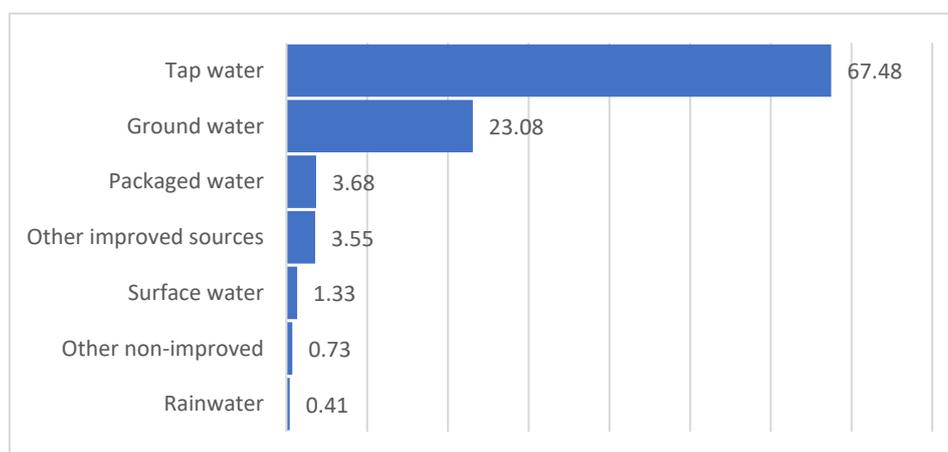**Table S10.** Sources of Data for SSA Country-level analysis.

Country	Source 1	Source 2
Angola	CEN 14	IIMS 16
Benin	CEN13	MICS14
Burkina Faso	PMA16	PMA17
Burundi	MIS12	DHS17
Botswana	MTHS16	BDS17
Central African Republic	MICS10	na
Democratic Republic of the Congo	ENQ12	DHS14
Comoros	DHS-MICS12	na
Cabo Verde	IMC16	IMC17
Cote d'Ivoire	MICS16	PMA17
Cameroon	DHS11	MICS14
Congo	DHS12	MICS15
Djibouti	EDSESIC 15	EDAM 17
Eritrea	PHS10	na
Ethiopia	PMA16	PMA17
Gabon	DHS12	CEN13
Gambia	DHS13	CEN13
Ghana	MHS17	GMS17
Guinea	CEN14	MICS16
Guinea-Bissau	MICS14	na
Equatorial Guinea	EDSGE11	na
Kenya	PMA16	PMA 17
Lesotho	CMS14	CMS15
Liberia	HIES15	MIS16
Madagascar	LTM15	MIS16
Mali	EMOP17	EMOP18
Mauritania	EPCV14	MICS15
Mauritius	CEN11	na
Malawi	IHS17	MIS17
Mozambique	IOF 15	AIS15
Namibia	NIDS 16	HIES 16
Niger	PMA16	PMA17
Nigeria	PMA18	NORM18
Chad	EDS-MICS15	na
Rwanda	MIS17	EICV17
Senegal	DHS16	DHS17
Sierra Leone	MIS16	MICS17
Somalia	HFS17	na
South Sudan	HFSU15	HFS17
Sao Tome and Principe	CEN12	MICS14
Eswatini	ICEN12	MICS14
Seychelles (national)	HSS12	HBS13
South Africa	GHS17	NIDS 17
Togo	QUIBB15	MIS17
Tanzania	DHS16	MIS17
Uganda	PMA16	PMA17

| Zambia | DHS14 | LCMS15 |
| Zimbabwe | MICS14 | DHS15 |

Table S11. Variations between surveys of over 10 percentage points.

Country	Source	Variation (in percentage points)	Comments
Angola	Tapwater	23.4	2014 data is from the census and a survey
Ghana	Tapwater	10.4	The difference is mainly caused by major differences in estimates in the use of public taps/standpipe between surveys
Mauritania	Tapwater	10.4	Two different surveys, one year apart
Malawi	Tapwater	13.8	Two different surveys in the same year
Togo	Tapwater	10.7	Two different surveys, two years apart
Côte d'Ivoire	Groundwater	10.6	Significant differences between use of traditional and protected wells between the two surveys
Liberia	Groundwater	25.1	Significant difference in reported use of boreholes between the two surveys (one year apart)
Niger	Groundwater	32.1	PMA Survey, one year apart. Significant differences in reporting of protected well and traditional wells between the surveys.
Nigeria	Groundwater	29.7	Different surveys, same year. Significant differences in reporting of use of borehole protected well and traditional wells between the surveys
Liberia	Packaged water	18.3	Different surveys, one year apart. Sachet water does not seem to have been measured in one survey.

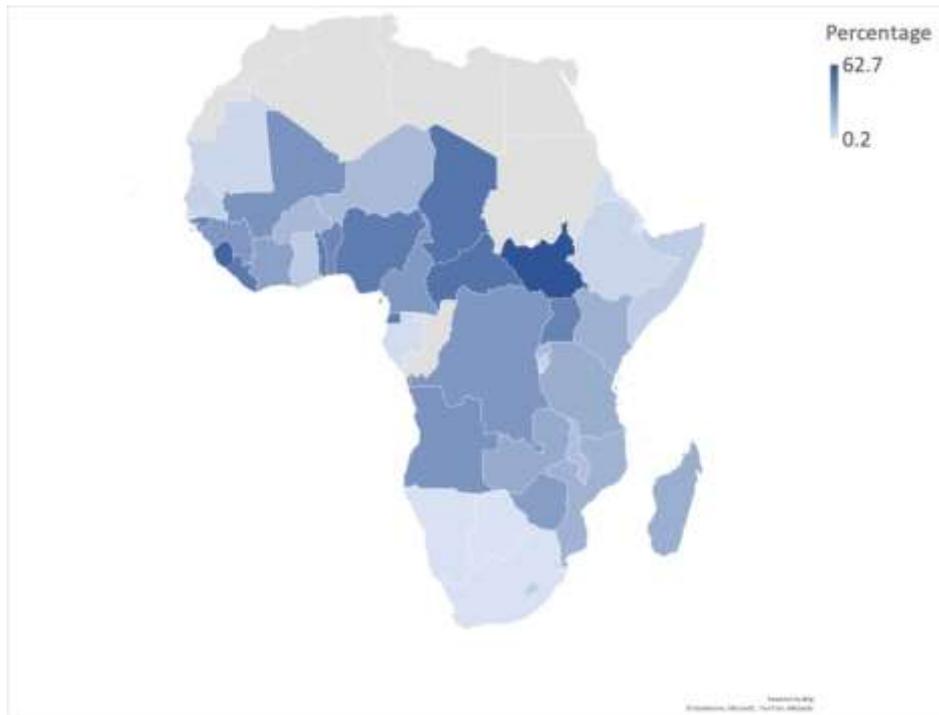Source: Calculated from JMP Country Data (https//:washdata.org).

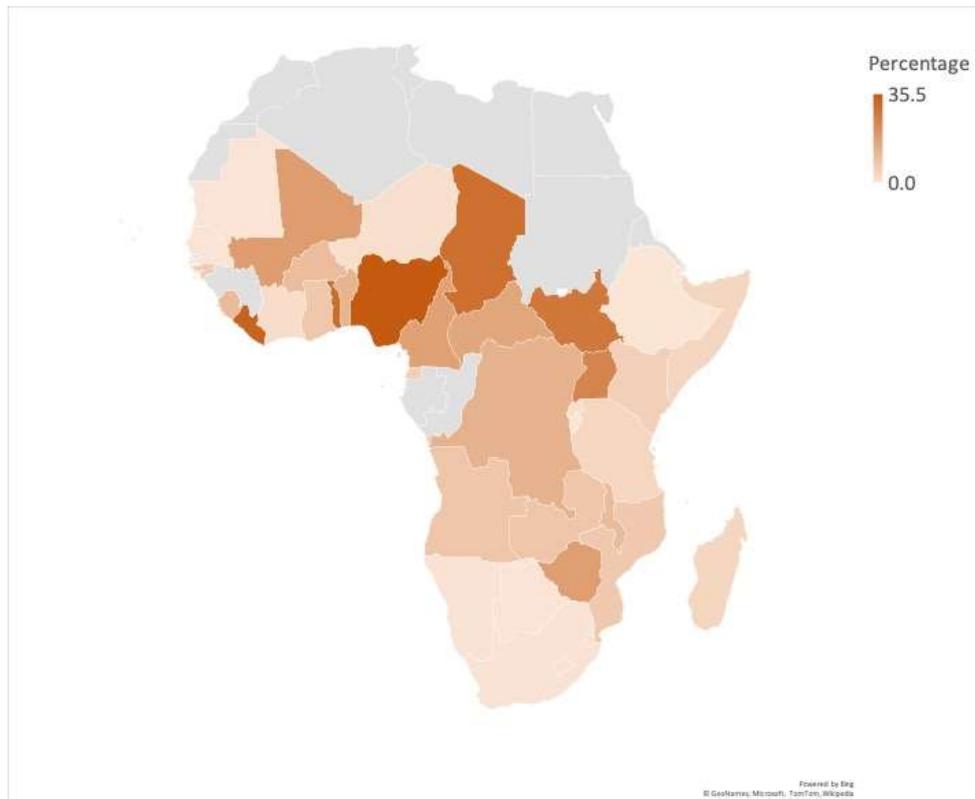**Figure S2.** Main sources of urban drinking water supplies in SSA (% urban population).

Source: adapted from JMP data sources (Table S11). n=45 countries.

Table S12. Percentage of the urban population relying on groundwater in 44 countries with available survey data.

Country	Percentage of the Urban Population
South Sudan	62.7
Sierra Leone	55.1
Central African Republic	49.1
Chad	48
Liberia	46.1
Nigeria	45.3
Equatorial Guinea	44.7
Togo	44.5
Uganda	42
Guinea-Bissau	41
Benin	39.7
Mali	34.7
Angola	34.5
Democratic Republic of the Congo	33.5
Guinea	33.1
Cameroon	32.8
Zimbabwe	30.7
Côte d'Ivoire	28.7
Zambia	24.8
Tanzania	23.7
Madagascar	23.2
Kenya	22.3
Mozambique	21.4
Congo	20.7
Burkina Faso	18.6
Niger	17.9
Rwanda	17.2
Malawi	16.3
Gambia	14.4
Ghana	11.3
Somalia	9.5
Lesotho	8.2
Senegal	8.2
Burundi	7.5
Ethiopia	6.2
Mauritania	5.3
Comoros	5.1
Eritrea	3.4
Eswatini	3.2
Gabon	2.7
Djibouti	0.6
Namibia	0.6
South Africa	0.5
Botswana	0.2

Figure S3. Percentage of the urban population using groundwater point sources as the main drinking water supply (Table S13).

Figure S4. Percentage of the urban population with a borehole as their main drinking water supply (Table S14).

Table S13. Percentage of the urban population relying on boreholes/tubewells in 40 countries with available survey data.

Country	Percentage of the Urban Population
Nigeria	35.5
Liberia	33.0
Togo	30.7
Chad	30.0
South Sudan	27.7
Uganda	24.4
Mali	18.4
Zimbabwe	17.7
Cameroon	17.4
Central African Republic	15.8
Congo	12.9
Benin	12.4
Malawi	10.6
Sierra Leone	10.4
Burkina Faso	10.2
Zambia	8.0
Angola	7.9
Ghana	7.5
Mozambique	7.0
Guinea-Bissau	6.6
Equatorial Guinea	5.5
Kenya	5.2
Somalia	3.9
Madagascar	3.7
Tanzania	3.6
Democratic Republic of the Congo	3.2
Côte d'Ivoire	2.0
Rwanda	1.7
Niger	1.6
Eswatini	0.9
Lesotho	0.8
Comoros	0.8
South Africa	0.5
Namibia	0.4
Senegal	0.2
Mauritania	0.2
Botswana	0.1
Ethiopia	0.1
Djibouti	0.1
Burundi	0.0

Source: adapted from JMP (2019).