



WASH

March 2020

Agenda

- Background
- WASH indicators
- Data sources
- WASH maps
- Trends/findings
- Limitations

Background

- Access to safe drinking water and sanitation are human rights, conferring benefits to human wellbeing beyond their substantial impact on health.
- Unsafe water and sanitation were the first and second leading risk factors for under-5 mortality from diarrhoeal diseases, respectively, and contributed to over 530 000 under-5 child diarrhoeal deaths globally in 2017.
- These risks increase vulnerability to the spread of infectious agents that cause diarrhoea, including *Vibrio cholera*.
- Despite substantial expansion of access during the MDG era, less than 75% of the population in many countries in sub-Saharan Africa and south and southeast Asia had access to improved facilities in 2017.

WASH Indicators

- Water and sanitation indicators are defined by the WHO-UNICEF Joint Monitoring Programme
- Water:
 - Piped
 - Improved
 - Unimproved
 - Surface
- Sanitation:
 - Sewer or Septic
 - Improved
 - Unimproved
 - Open Defecation
- This schema yields mutually exclusive and collectively exhaustive indicators

Facility Types	Indicators		
Piped water to inside household or to yard	Piped On Premises	Piped	Improved
Piped water to neighbor's household, public stand pipe	Piped Off Premises		
Protected well, protected spring, rainwater, bottled water	Other Improved		
Unprotected well, unprotected spring, tanker truck	Unimproved		
River, lake, canal, dam, surface water	Surface Water		

Facility Types	Indicators		
Sewer	Sewer	Sewer or Septic	Improved
Septic tank	Septic		
Improved latrines, Ventilated improved latrines, Compost toilets	Other Improved		
Unimproved latrines, bucket, hanging toilet	Unimproved		
No facility, bush	Open Defecation		

Data sources

Country	Source	Year	Source	GHDxID	Sampled Households	Geo-positioned Clusters	Polygons
Kenya	2000	UNICEF MICS	7387	8947	8947	0	
Kenya	2003	MACRO DHS	20145	8542	8542	0	
Kenya	2005	KHBS	7375	13212	13212	0	
Kenya	2007	AIDS INDICATOR SURVEY	133219	19957	19957	0	
Kenya	2007	HOUSEHOLD HEALTH EXPENDITURE UTILIZATION SURVEY	157635	8572	8572	69	
Kenya	2007	MALRIA INDICATORY SURVEY	57990	6719	6719	0	
Kenya	2007	UNICEF MICS	155335	1170	1170	0	
Kenya	2008	MACRO DHS	21365	9033	9033	0	
Kenya	2008	UNICEF MICS	7401	15600	15600	0	
Kenya	2011	UNICEF MICS	135416	7300	7300	0	
Kenya	2012	AIDS INDICATOR SURVEY	133304	9275	9275	0	
Kenya	2013	UNICEF MICS	203654	1500	1500	0	
Kenya	2013	UNICEF MICS	203663	1440	1440	0	
Kenya	2013	UNICEF MICS	203664	1680	1680	0	
Kenya	2014	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	197910	5040	5040	9	
Kenya	2014	MACRO DHS	157057	36199	36199	0	
Kenya	2015	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	256366	5039	5039	9	
Kenya	2015	MACRO MIS	218579	6481	6481	0	
Kenya	2016	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	347047	26018	26018	11	
Kenya	2010	MACRO MIS	58006	6800	6800	0	
Kenya	2014	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	256338	5038	5038	9	
Kenya	2015	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	256365	5040	5040	9	
Kenya	2009	UNICEF MICS	56420	1080	1080	1	

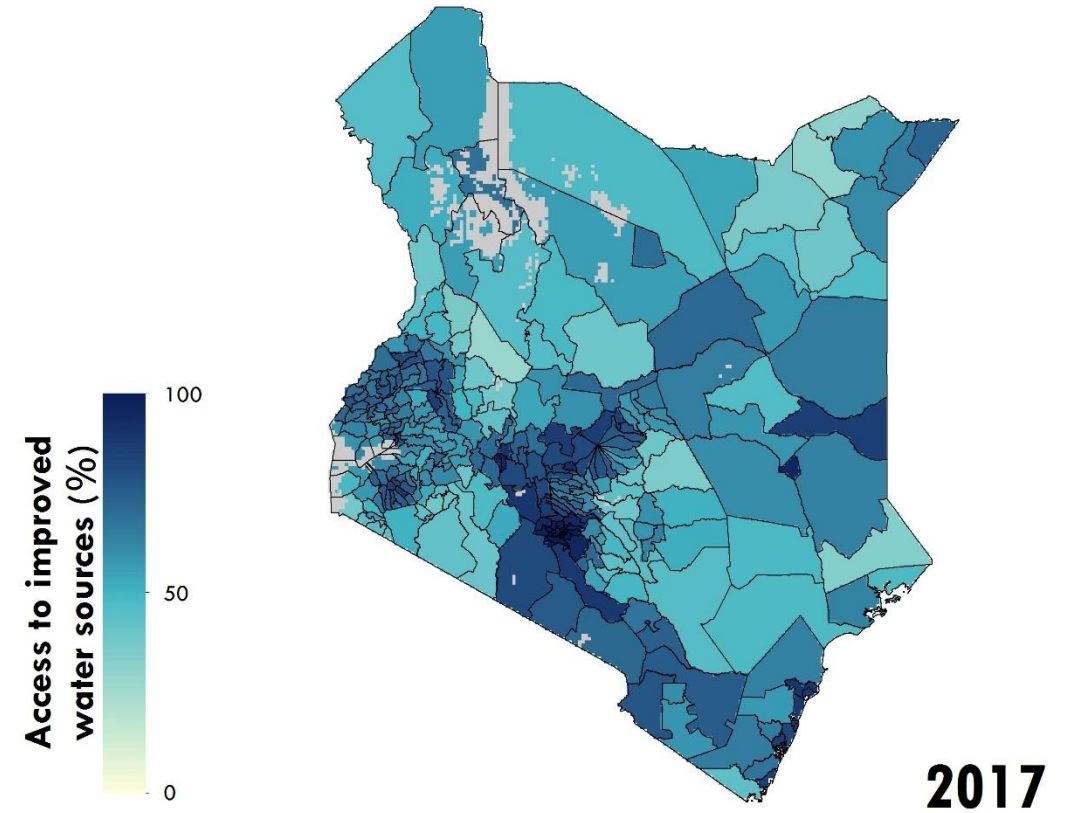
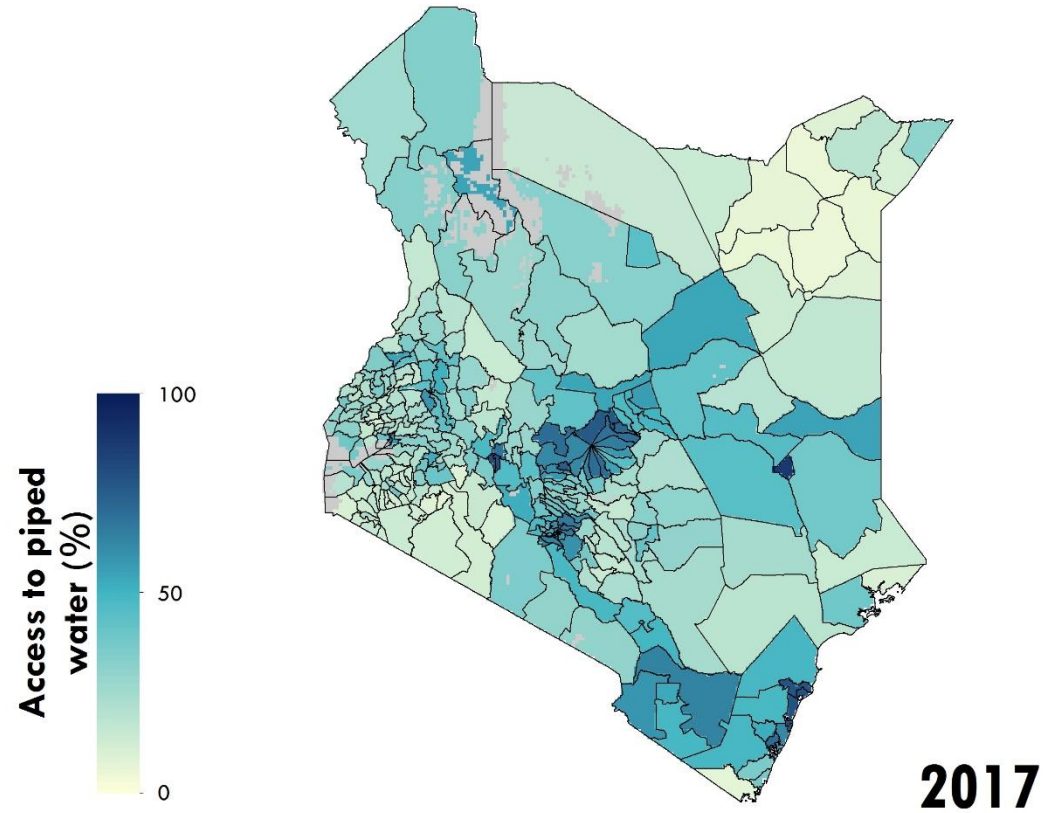
Country	Source	Year	Source	GHDxID	Sampled Households	Geo-positioned Clusters	Polygons
Ethiopia	2000	MACRO DHS	19571	13914	13914	0	
Ethiopia	2004	WELFARE MONITORING SURVEY	34085	8526	8526	10	
Ethiopia	2010	MACRO DHS	21301	16037	16037	0	
Ethiopia	2011	WB LSMS ISA	93848	3969	3969	0	
Ethiopia	2014	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	256175	6997	6997	11	
Ethiopia	2014	MACRO DHS	153507	8475	8475	11	
Ethiopia	2015	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	256176	7735	7735	11	
Ethiopia	2016	MACRO DHS	218568	16157	16157	0	
Ethiopia	2017	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	347050	31264	31264	11	
Ethiopia	2005	MACRO DHS	19557	13550	13550	0	
Ethiopia	2007	IPUMS CENSUS	227133	7434086	68726	632	
Ethiopia	2013	WB LSMS ISA	235215	5281	5281	0	
Ethiopia	2016	JHSPH PERFORMANCE MONITORING ACCOUNTABILITY SURVEY PMA2020	285891	7732	7732	11	

Country	Source	Year	Source	GHDxID	Sampled Households	Geo-positioned Clusters	Polygons
Tanzania	2000	HOUSEHOLD BUDGET SURVEY	31740	22178	22178	0	20
Tanzania	2004	MACRO DHS	20875	9735	9735	0	26
Tanzania	2004	WB CWIQ	31786	19736	19736	0	7
Tanzania	2005	WB CWIQ	31797	1785	1785	0	4
Tanzania	2006	WB CWIQ	31831	12600	12600	0	28
Tanzania	2007	MACRO AIS	12644	8350	8350	0	0
Tanzania	2007	HOUSEHOLD BUDGET SURVEY	31887	10594	10594	0	21
Tanzania	2008	WB LSMS ISA	27297	3265	3265	0	124
Tanzania	2015	MACRO DHS	218593	12563	12563	0	0
Tanzania	2009	MACRO DHS	21331	9282	9282	0	0
Tanzania	2011	MACRO AIS	77395	9862	9862	0	0
Tanzania	2014	INTEGRATED LABOR FORCE SURVEY (ILFS)	280228	11472	11472	0	25
Tanzania	2002	IPUMS CENSUS	43212	3732735	3732735	0	129
Tanzania	2003	MACRO AIS	12630	6499	6499	0	0
Tanzania	2012	IPUMS CENSUS	294725	4498022	4498022	0	169

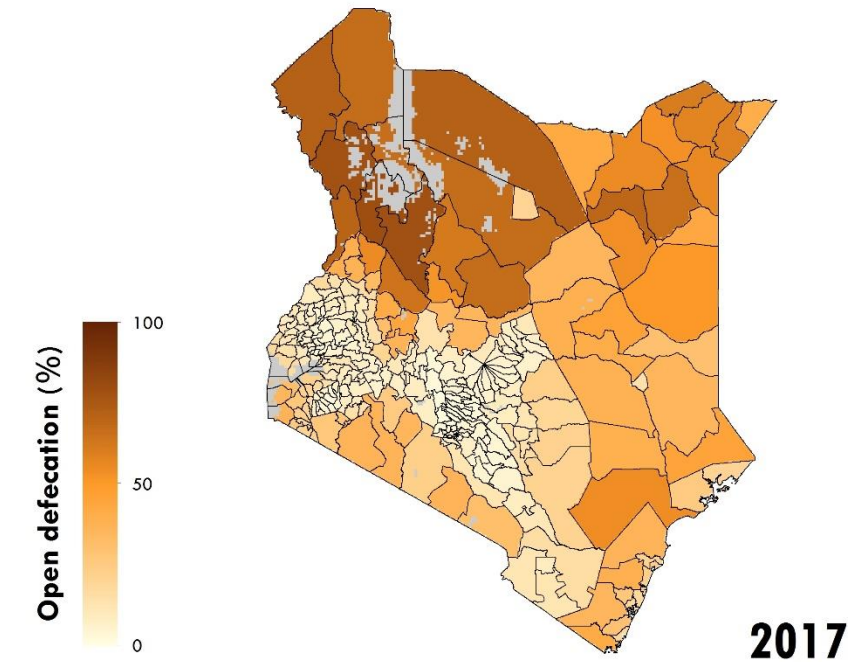
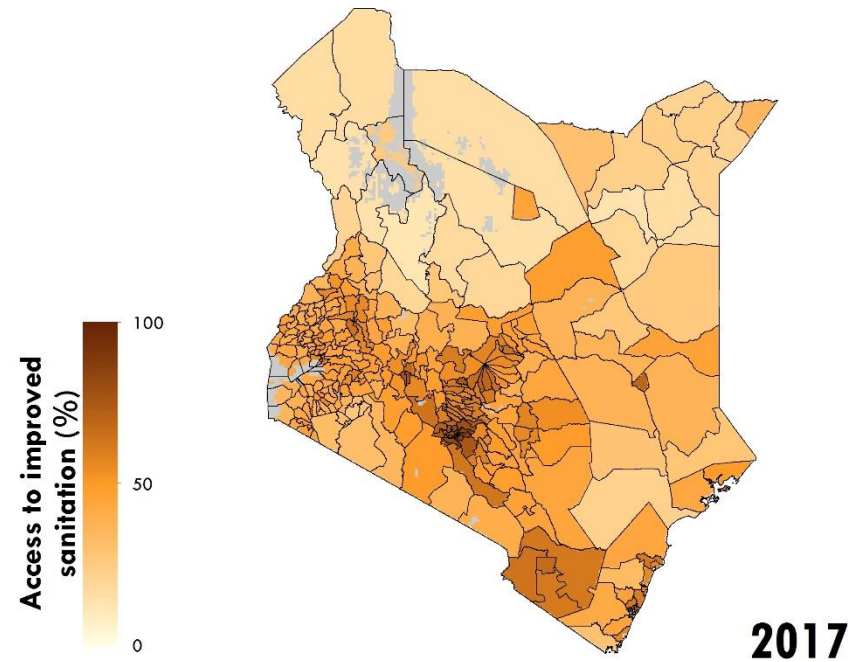
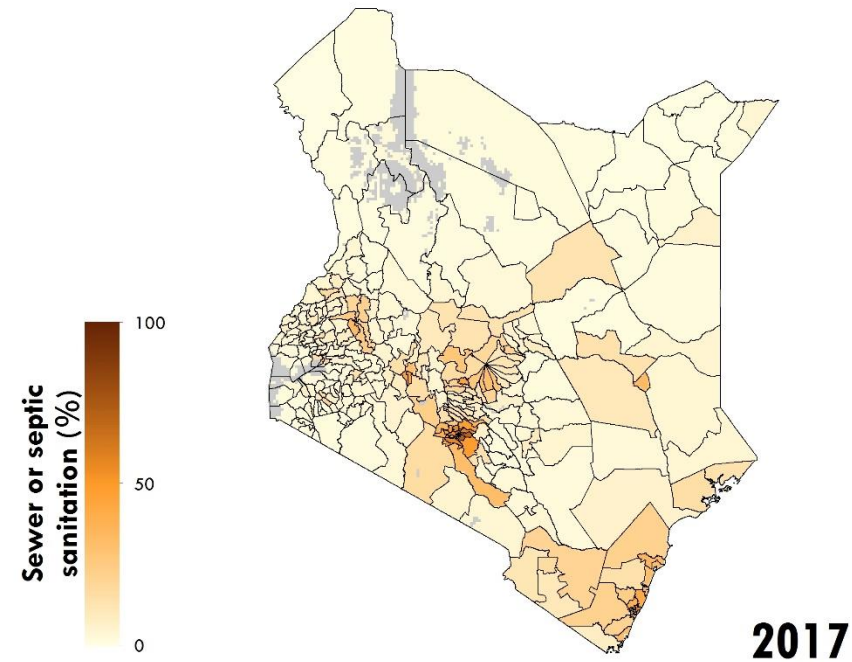
Country	Source	Year	Source	GHDxID	Sampled Households	Geo-positioned Clusters	Polygons
Zimbabwe	2005	MACRO DHS	21163	9234	9234	0	0
Zimbabwe	2010	MACRO DHS	55992	9442	9442	0	0
Zimbabwe	2014	UNICEF MICS	152720	17047	17047	0	10
Zimbabwe	2015	MACRO DHS	157066	10534	10534	0	0
Zimbabwe	2009	UNICEF MICS	35493	12500	12500	0	10

- Kenya: 22 water sources, 20 sanitation sources
- Ethiopia: 9 water sources, 13 sanitation sources
- Tanzania: 12 water sources, 12 sanitation sources
- Zimbabwe: 5 water sources, 4 sanitation sources

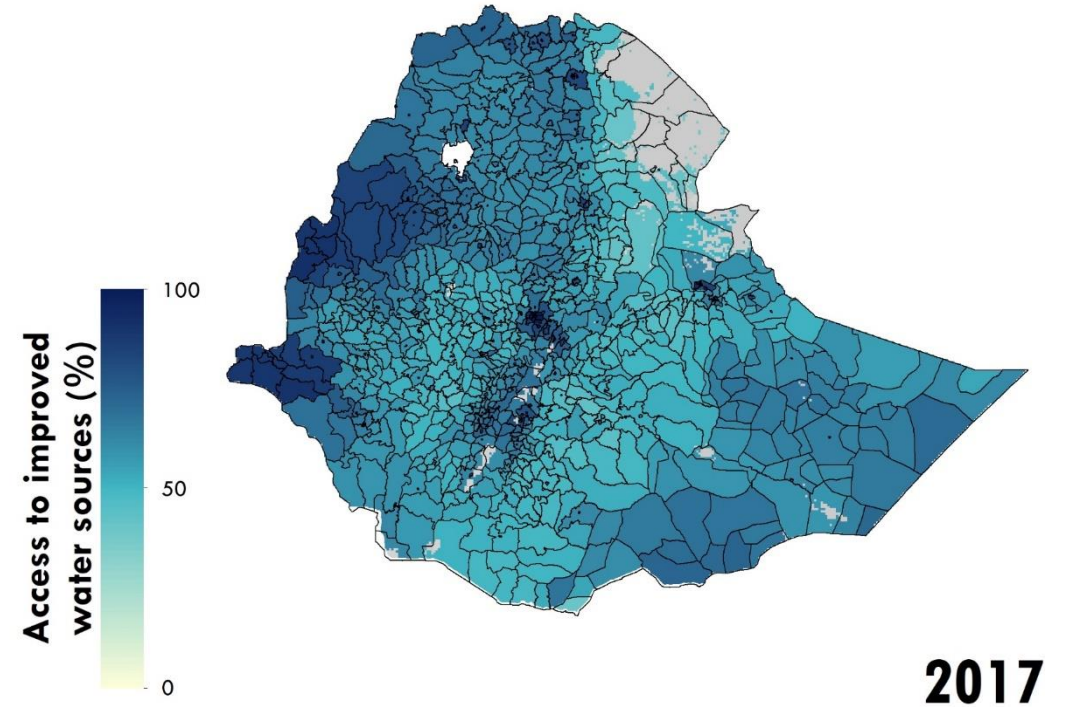
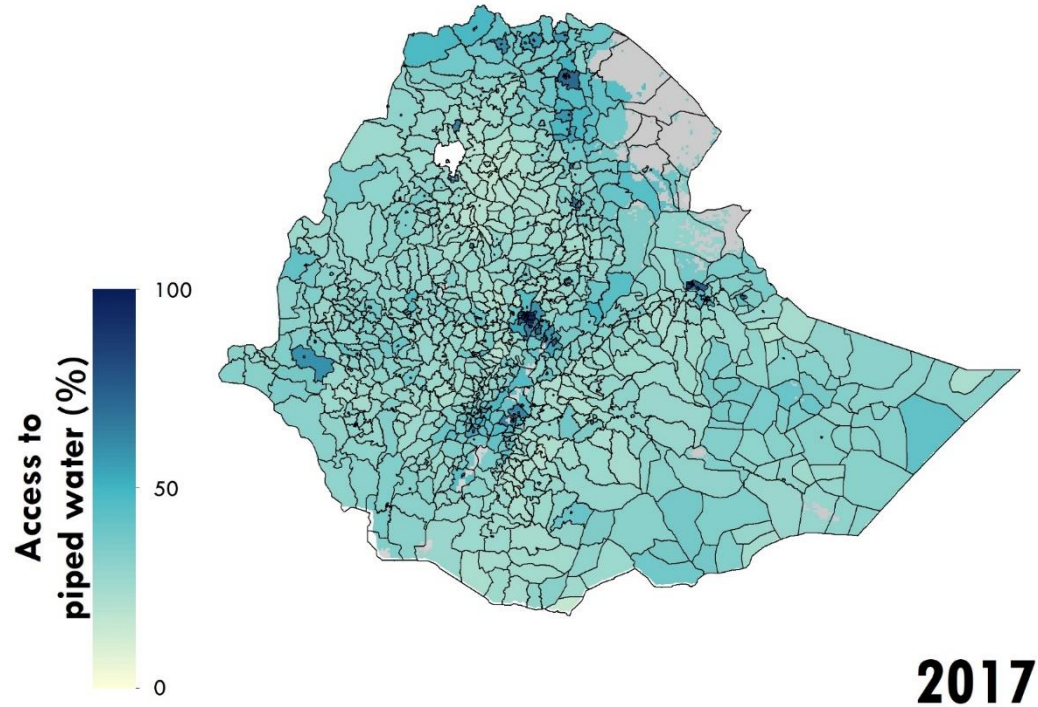
Water Access: Kenya



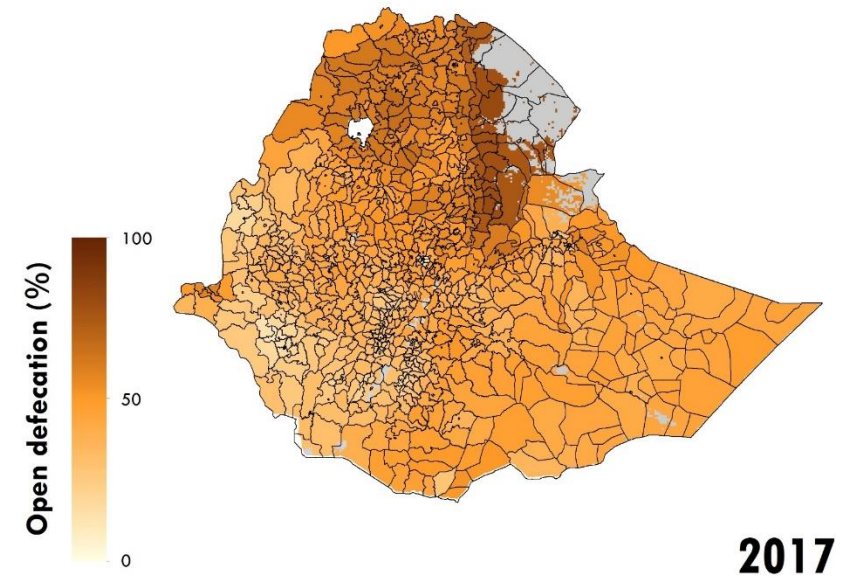
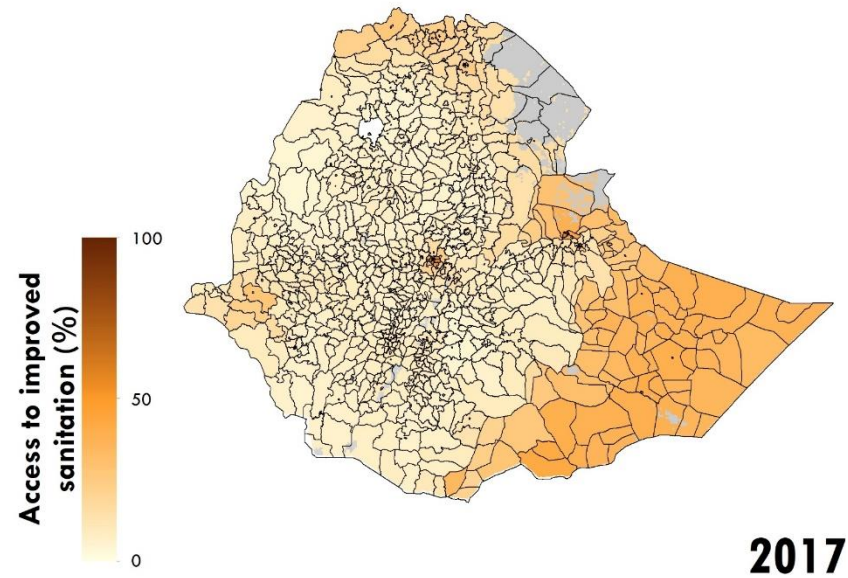
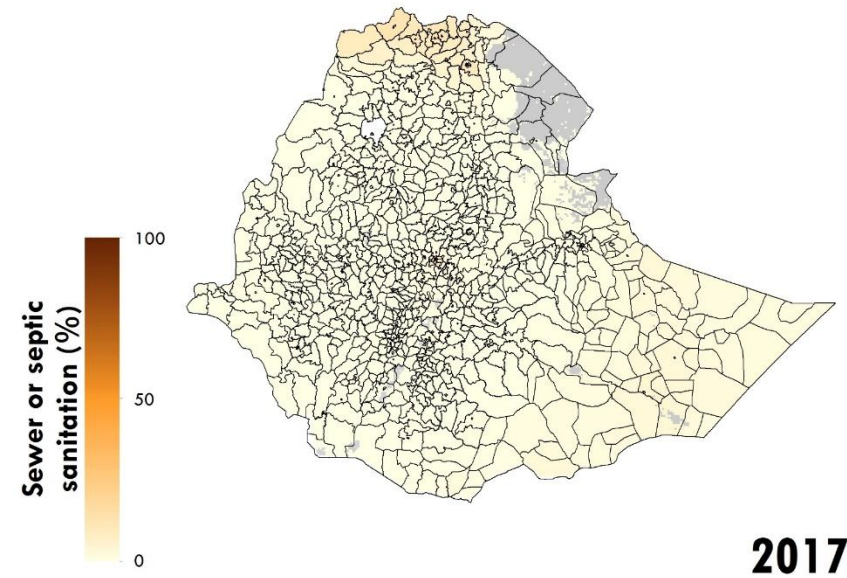
Sanitation Access: Kenya



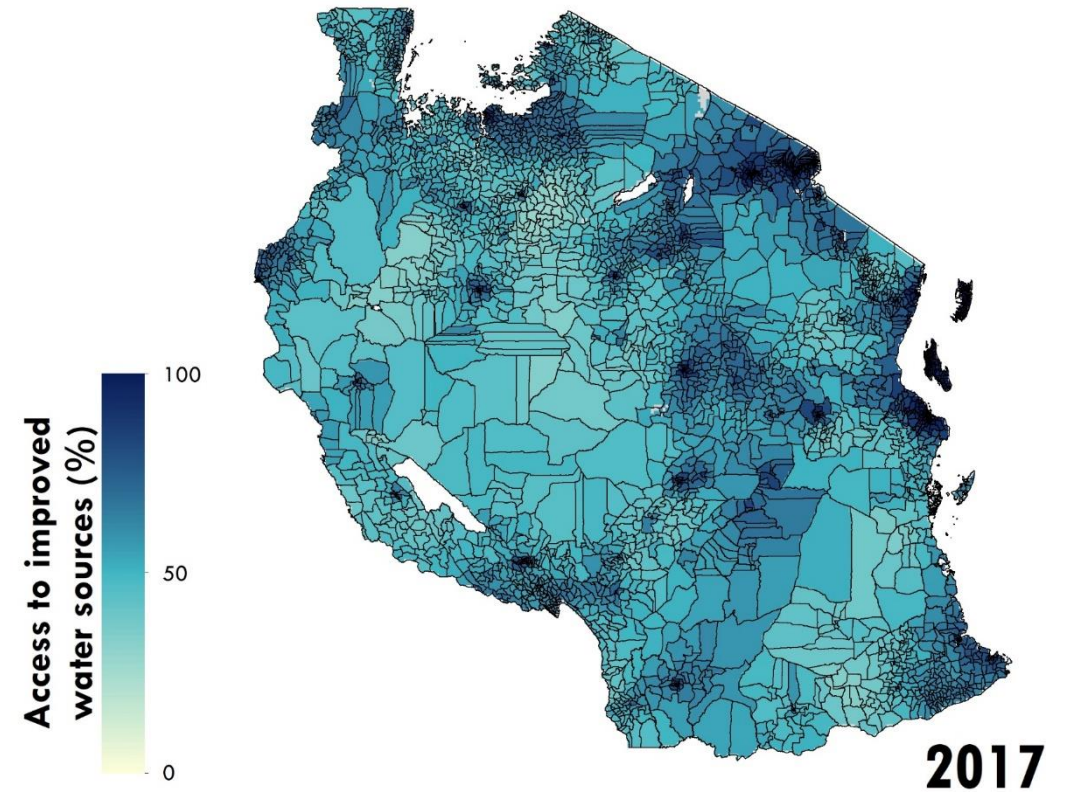
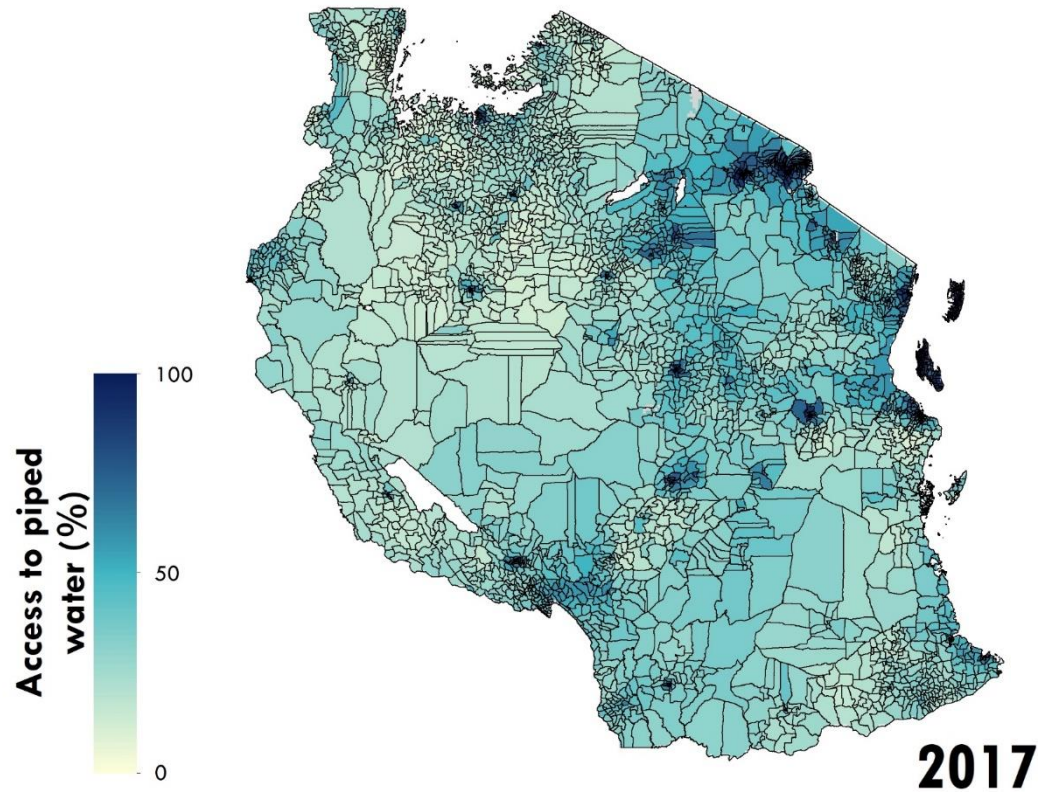
Water Access: Ethiopia



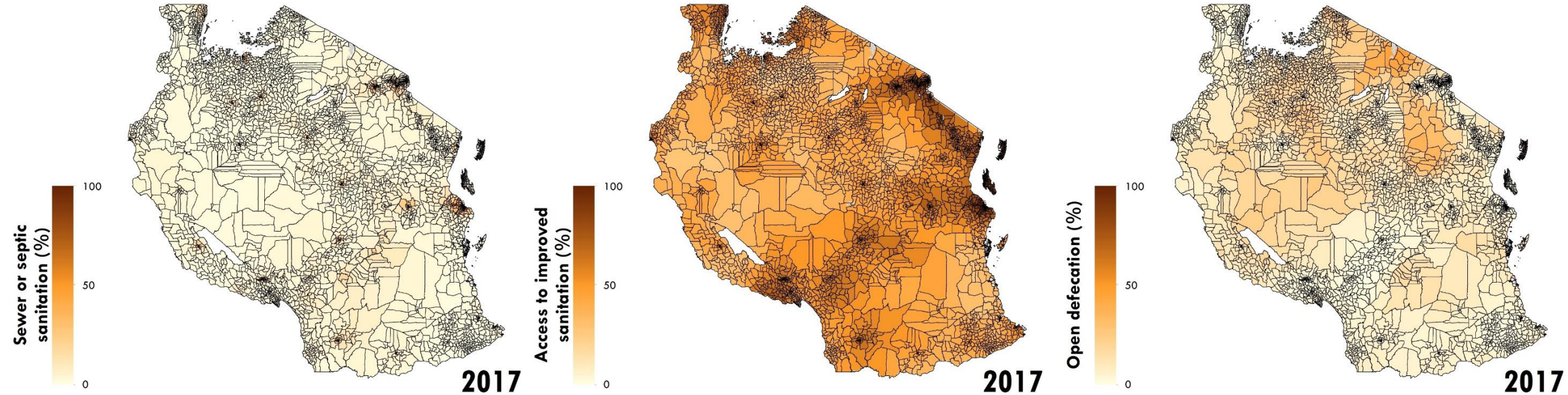
Sanitation Access: Ethiopia



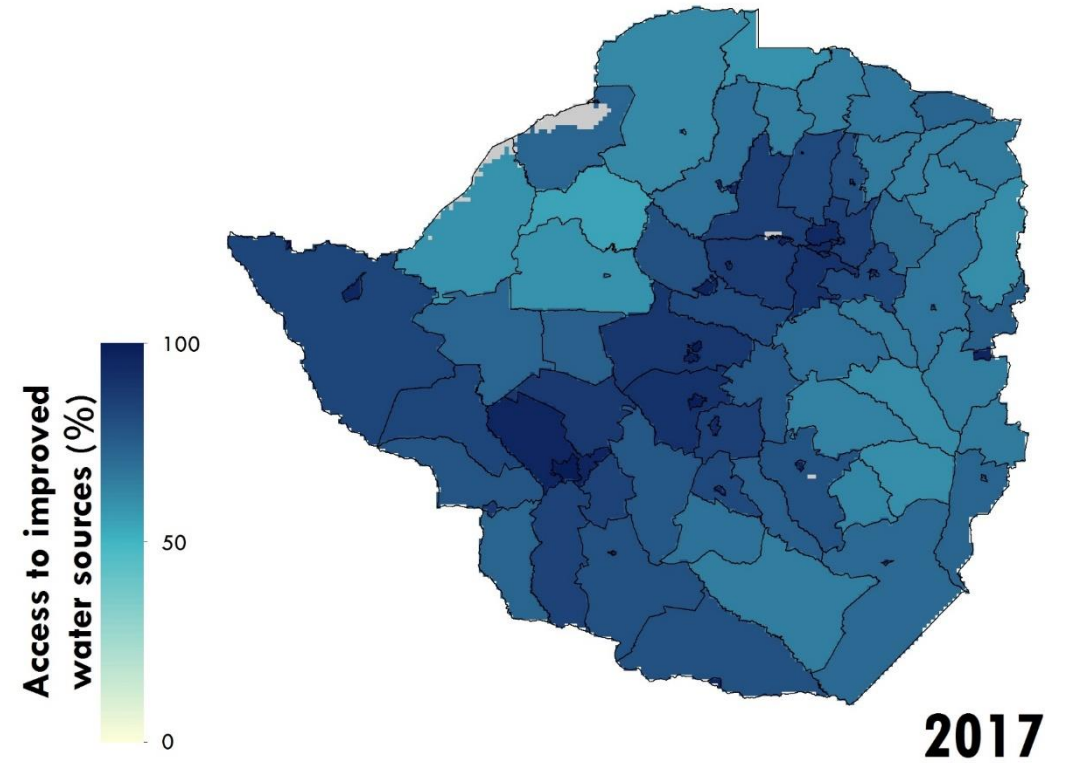
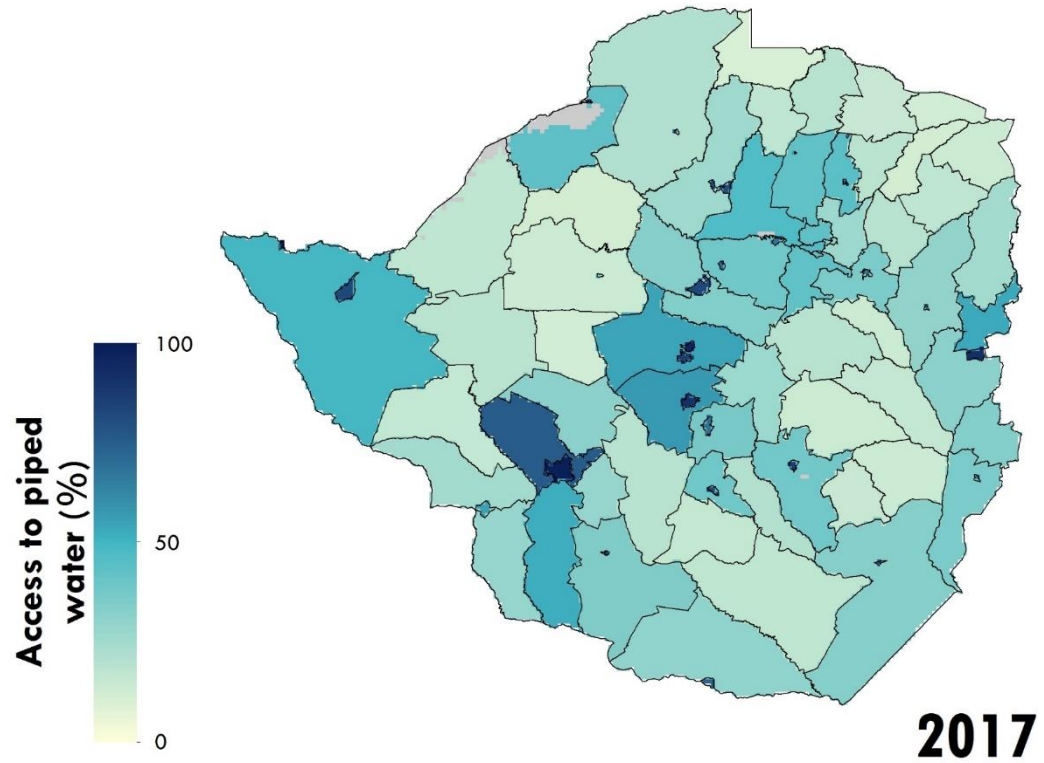
Water Access: Tanzania



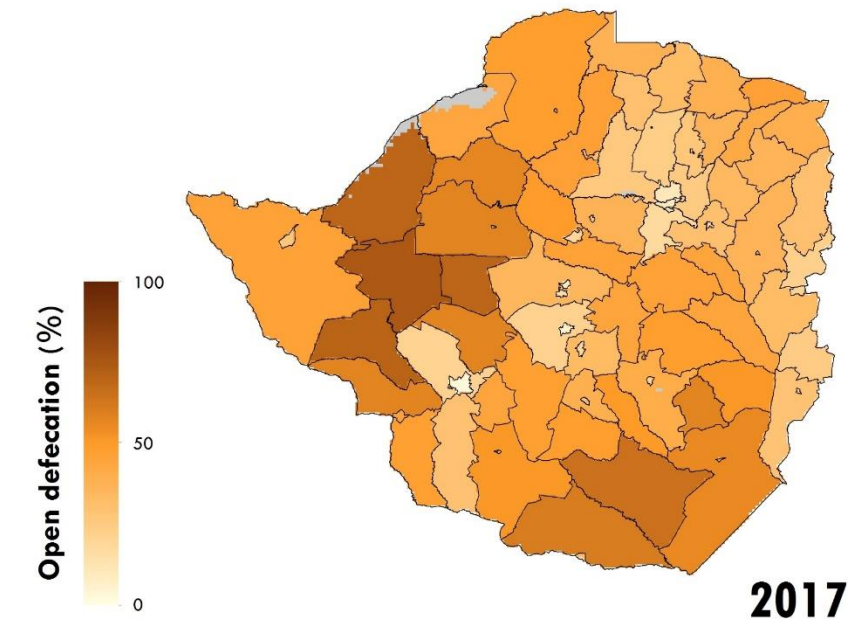
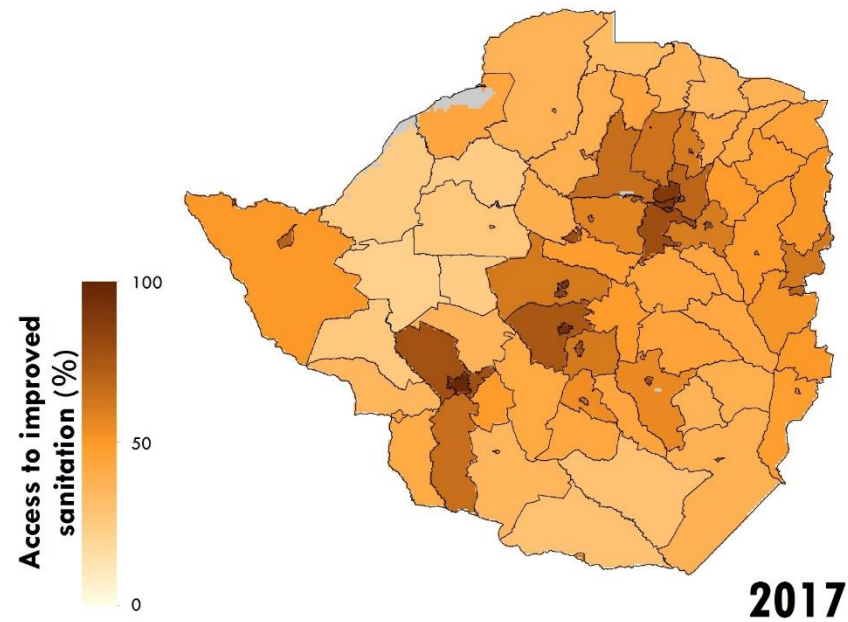
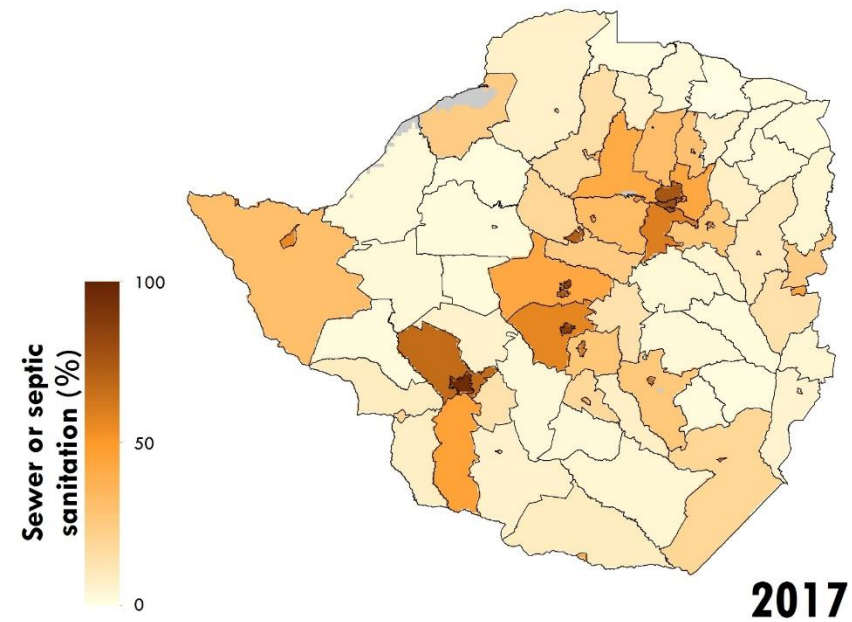
Sanitation Access: Tanzania



Water Access: Zimbabwe

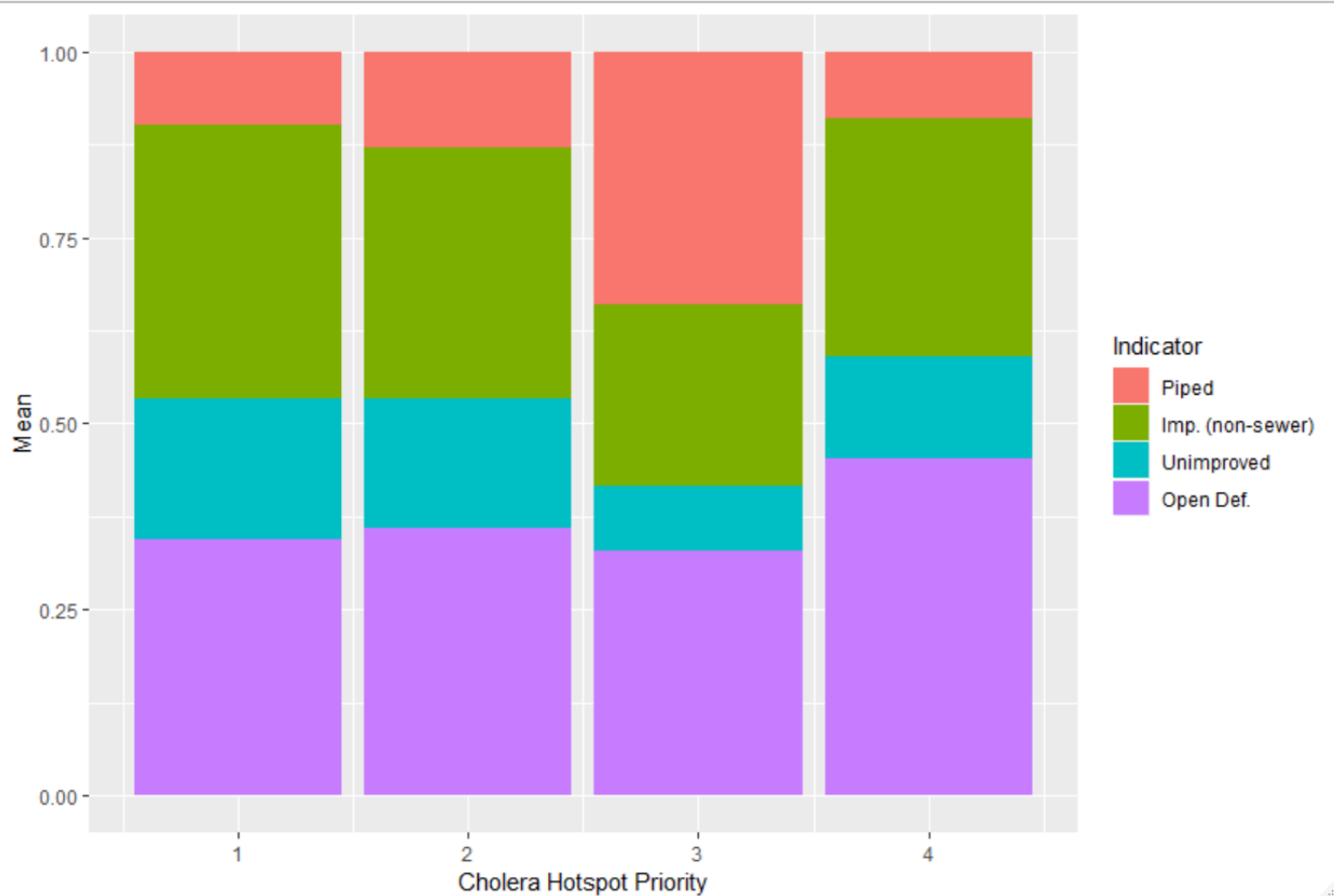


Sanitation Access: Zimbabwe

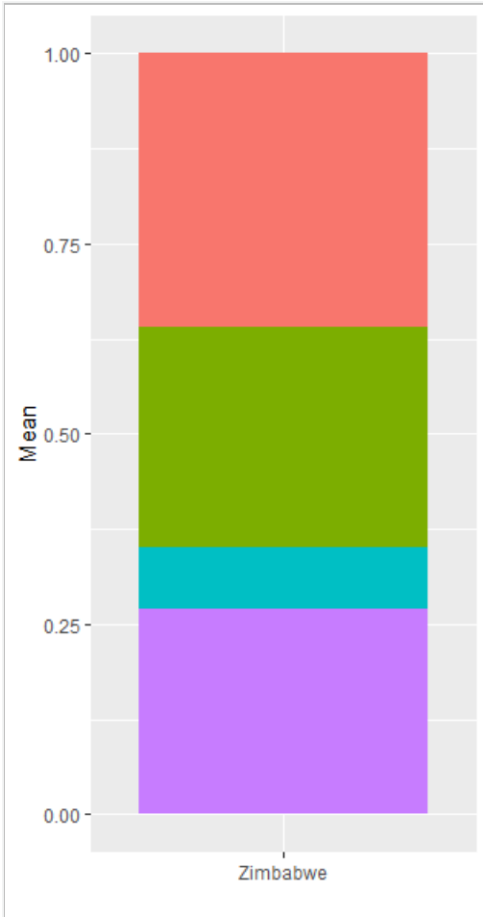


Zimbabwe Sanitation: Cholera Hotspots vs. National Mean

Mean Sanitation by Cholera Hotspot Type

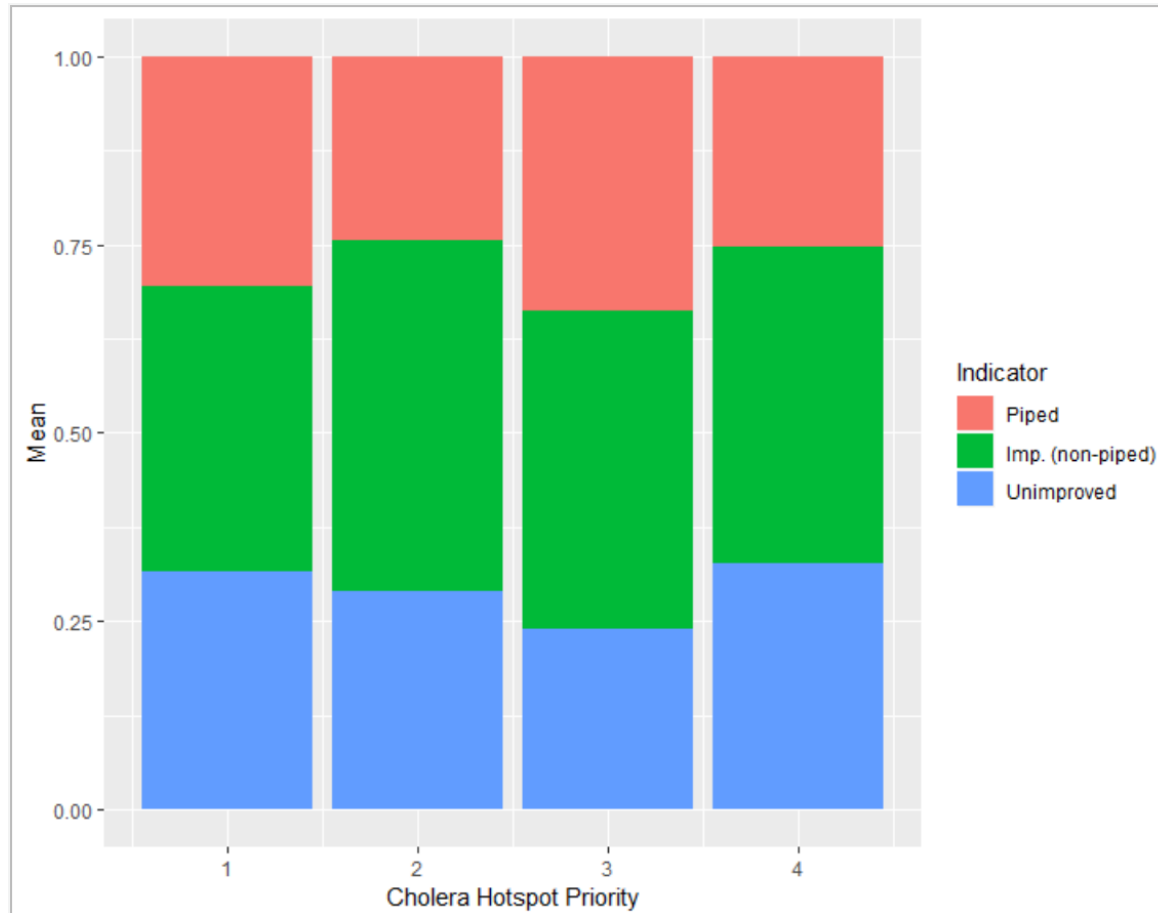


National Mean Sanitation

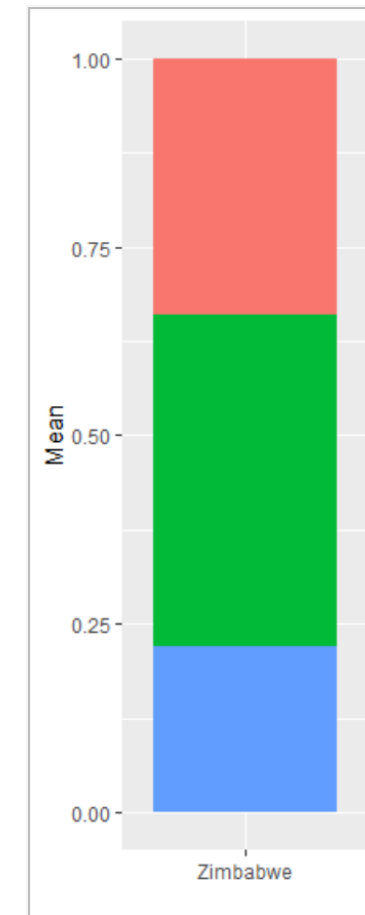


Zimbabwe Water Access: Cholera Hotspots vs. National Mean

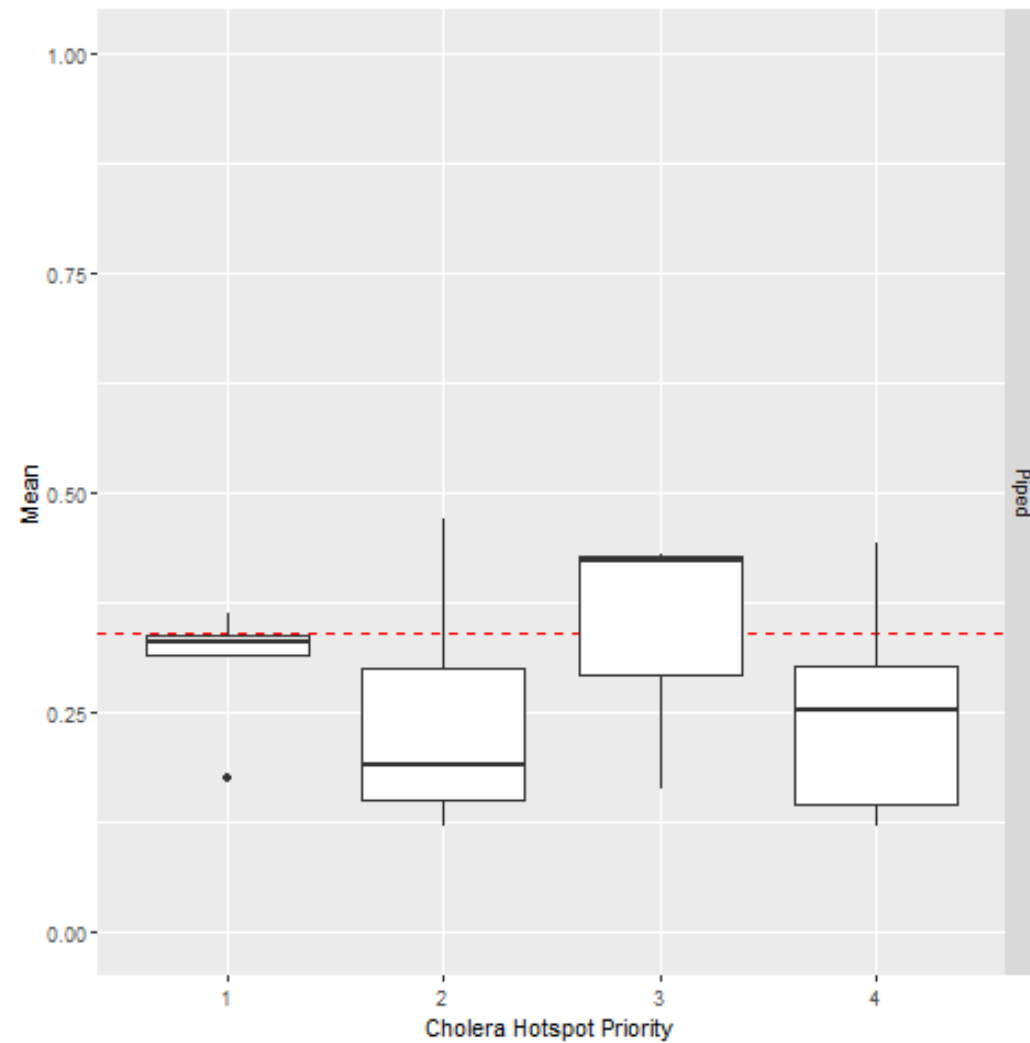
Mean Water Access by Cholera Hotspot Type



National Mean Water Access

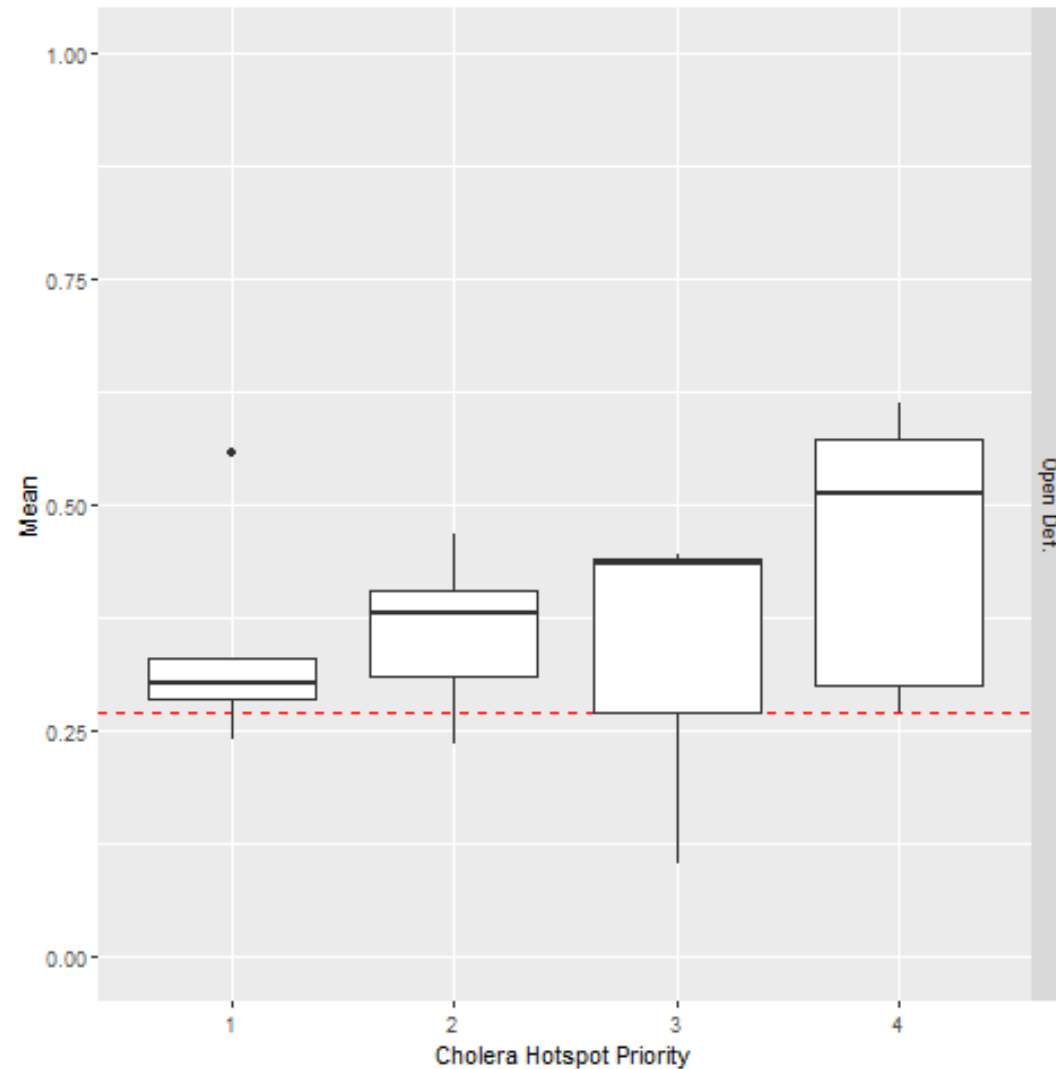


Distribution of Piped Water Access by Hotspot Type, Zimbabwe



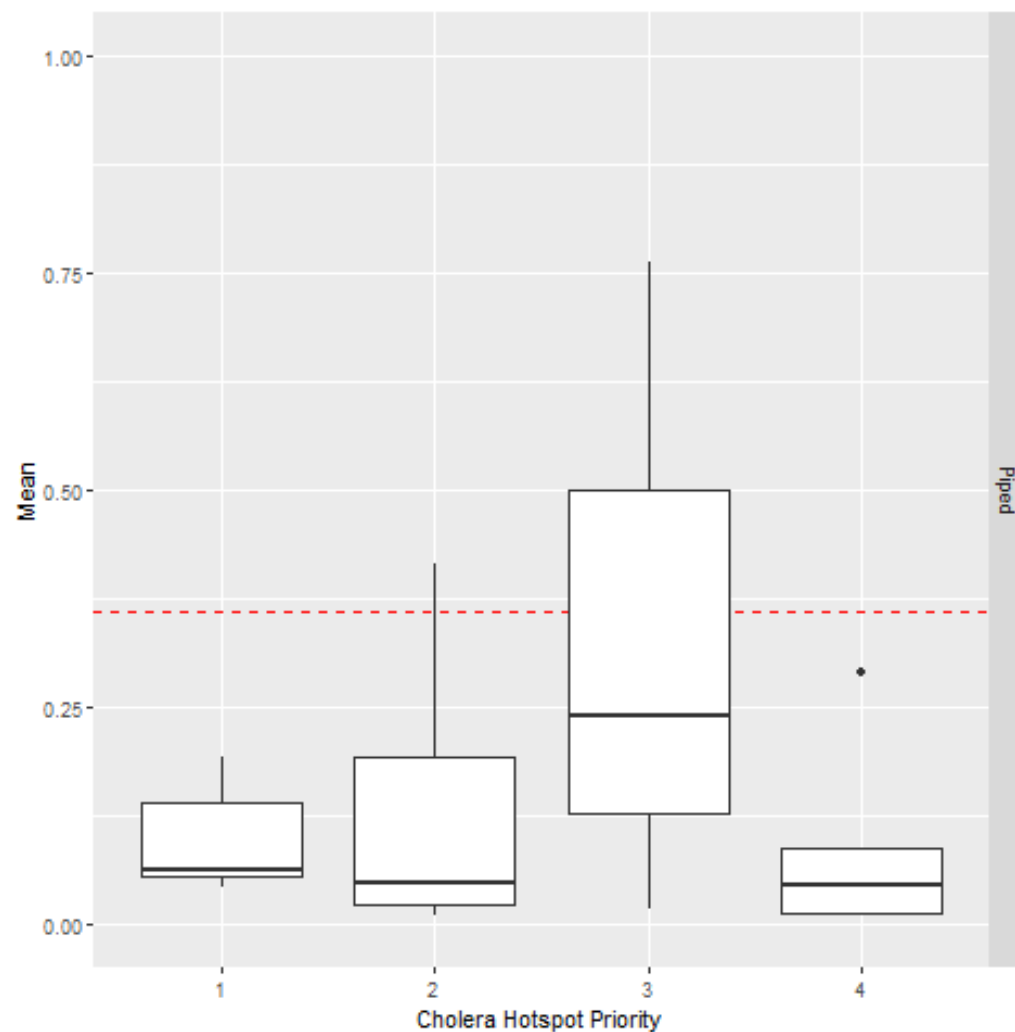
N.B.: Red line denotes the country mean

Distribution of Open Defecation Prevalence by Hotspot Type, Zimbabwe



N.B.: Red line denotes the country mean

Distribution of Sewer or Septic Sanitation Access by Hotspot Type, Zimbabwe



N.B.: Red line denotes the country mean

Limitations

- This analysis focused on access by facility type classification (figure 1), and therefore our estimates provide a best-case scenario for the SDGs (all improved facilities are safely managed and provide basic services).
- These results may not fully represent intra-urban disparities in water and sanitation.
- Resampling polygon data to points could result in smoothed estimates in areas with predominantly areal data.
- Only covariates available at a high-spatial resolution and not strongly correlated with our current suite of covariates were incorporated.
- Our data do not capture the impacts of recent conflicts or climate change-related weather events.
- Survey data in our models are subject to known biases and inaccuracies in reporting, and these issues coupled with data scarcity in some locations may affect the accuracy of our estimates.
- Uncertainty is not explicitly incorporated from the survey data or the intermediate covariates generated from our stacking procedure due to computational limitations.