BOTSWANA ENVIRONMENT STATISTICS

HUMAN SETTLEMENTS REPORT 2018

STATISTICS BOTSWANA

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Preface

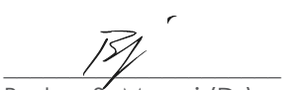
Statistics Botswana presents the second edition of the Botswana Environment Statistics: Human Settlements Report as guided by the United Nations Framework for the Development of Environment Statistics (FDES). The report presents statistics and trends on the environment on which people live and work, as well as diseases and conditions that are largely influenced by environmental factors.

Data used in this report are secondary and were drawn from the national Population and Housing Censuses; the intercensal Botswana Demographic Survey as well as administrative reports from various Government departments notably the Ministry of Health and Wellness; and the National Disaster Management Office.

The statistical information provided in this report is intended for use by decision-makers in Government, the private sector and civic society for the management and improvement of conditions related to human settlements, shelter conditions, safe water, sanitation and health. The management of these conditions is important, particularly in light of the rapid urbanization, increasing pollution, environmental degradation and the likely effects of climate change on Botswana. This in turn, will catalyse the nation's achievement of the national development vision and goals enshrined in Vision 2036, National Development Plans and the Sustainable Development Goals.

I wish to acknowledge the Ministry of Health and Wellness as well as the National Disaster Management Office in the Office of the President for their significant contribution by providing the required data. The continued production of this report is dependent on strong collaboration with our key stakeholders.

For more information and further enquiries, contact the Directorate of Stakeholder Relations at 3671300. All Statistics Botswana outputs/publications are available on the website at www.statsbots.org.bw and at the Statistics Botswana Library (Head-Office, Gaborone).



Burton S. Mguni (Dr)
Statistician General
February 2020

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Executive Summary

Component 5 of the United Nations Framework for the Development of Environment Statistics (UNFDES) covers two (2) sub-components being 5.1 on Human Settlements and 5.2 on Environmental Health. The Framework identifies statistical topics and specific indicators for the measurement of the two sub-components as detailed in this report.

Human Settlements

Topics covered under sub component 5.1 on Human Settlements include Total Urban and Rural population; Access to water, sanitation and energy; Housing conditions; and Environmental concerns. Indicators analysed under these Topics are for the census years 1991, 2001, 2011 and the 2017 Botswana Demographic Survey.

It is noted that the population of Botswana experienced an annual average growth rate of 2.37 percent between 1991 and 2001. This growth decreased to 1.86 percent in the period 2001 to 2011; further dropping to 1.04 percent between 2011 and 2017. Even though the growth rate was decreasing over the years, it still remained positive. However, Selibe-Phikwe and Lobatse towns experienced an intercensal negative growth of -0.9 percent and -2.3 percent respectively in the period 2001 to 2011. Likewise, Jwaneng and Lobatse experienced negative growth rates between 2011 and 2017.

On the other hand, population density increased from 2.28 percent in 1991 to 2.89 percent in 2001 and 3.51 percent in 2011 and finally 3.71 in 2017.

The proportion of households with access to improved water through piped/tapped water source was 64.5 percent in cities and towns and 26.1 percent in urban and rural villages in 2011. In 2017 the proportions had slightly declined with 62.3 percent in cities and towns; and 22.9 percent in urban and rural villages.

It is observed that the number of households with access to flush toilets in cities and towns increased from 64.8 percent in 2011 to 79.6 percent in 2017. A similar pattern was observed in urban and rural districts as access increased from 26.8 percent in 2011 to 38.8 percent in 2017. At the same time the use of pit latrines in cities and towns decreased from 31.8 percent in 2011 to 19.3 percent in 2017. It decreased from 57 percent to 53 percent in urban and rural districts.

The report indicates that in 2017 about 50.9 percent of households received regular waste collection services followed by 20.5 percent of those who disposed of waste through burning; and 18.6 percent who disposed waste through a rubbish pit. The mining towns of Orapa, Jwaneng and Sowa had a 100 percent regular waste collection.

The main source of energy for lighting in 2011 and 2017 was electricity. On the other hand wood was the main source of energy for cooking in rural areas followed by gas; while the urban areas had gas as the main source. The use of wood for space heating is found to be decreasing over the period in both urban and rural areas.

In relation to types of housing units it is noted that proportion of households occupying traditional housing units followed a downward trend in the period 2001 to 2017; while detached housing units and rooms had an upward movement.

In Botswana natural extreme events are a common occurrence with hailstorms and heavy rains affecting most villages in 2017, as a result more than 2,600 individuals were affected and 228 tents, 191 food baskets issued.

Environmental Health

Sub-component 5.2 focuses on environmental health, it examines the trends in disease cases, prevalence, incidence and deaths related to environment factors. The diseases and conditions are grouped into five (5) categories being:

1. Airborne diseases and conditions such as tuberculosis (TB)
2. Water-related diseases and conditions with example of diarrhoea
3. Vector borne diseases like malaria
4. Health problems associated with excessive UV radiation exposure such as cancer
5. Toxic substance- and nuclear radiation-related diseases and conditions like pneumonia

This report shows that there was a general falling trend in the number of TB cases for Botswana. The highest number of annual TB cases recorded between 2012 and 2016 was for Kweneng East at 1,207 cases in 2012.

The high number of cases in Kweneng East and Gaborone may be the result of higher populations.

Indications are that TB prevalence is falling in the country. The highest prevalence per 100 000 was recorded in Ghanzi at 706.7 in the year 2012, followed by Kgalagadi North, which recorded 689.6 cases per 100 000 of the population, also in the year 2012.

There is an indication of rising incidence of TB in the country. The highest incidence of TB per 100,000 of the population is that of Jwaneng, followed by Ghanzi and Kgalagadi North. Jwaneng recorded the highest incidence of TB for the year 2016, followed by Francistown, Lobatse and Kgalagadi South.

Moreover, the trend indicates falling numbers of TB deaths. The highest number of TB deaths for the period under study were recorded in Kweneng East, followed by Gaborone. Kweneng East also recorded the highest number of TB deaths in a single year, 2012; however, the numbers are seen to be going down over the years. Gaborone recorded the highest number of deaths for the latest available year, 2016.

The report further shows that the number of diarrhoea cases per year has gradually fallen during the period under study. Kweneng East recorded the highest number of cases over the period, followed by Gaborone and Palapye. The high numbers of cases in the districts may be the result of higher populations residing in these districts. Gaborone recorded the highest number of cases recorded for the year 2017.

Prevalence trends indicate a rapid fall in diarrhoea cases per 100,000 of the population over the years. The highest single annual prevalence of diarrhoea is for Jwaneng town in 2011, followed by that of Chobe in the same year. Boteti recorded the highest prevalence for the year 2016.

Deaths from diarrhoea have decreased during the period under study. Diarrhoea deaths were mostly recorded in Ngamiland, Gaborone and Mahalapye. The highest number of deaths recorded in one year were for Ngamiland in 2012, followed by Gaborone and Mahalapye in 2011. The latest highest recorded deaths were for Ghanzi in 2017. The year 2012 recorded the highest number of deaths in the period.

The highest number of malaria cases recorded in a single year were for the year 2017, followed by 2014 and then 2016. There was a rapid increase in malaria cases between 2011 and 2017. Okavango had the highest number of cases of malaria for one year in 2017, and for the whole period under study.

The prevalence of malaria was highest for the year 2017, followed by the year 2014. The overall trend for the period shows a rapid increase in the prevalence of malaria. Chobe district recorded the highest prevalence for one year in 2016, and the second highest in 2014. Boteti and Ngamiland followed respectively.

Pneumonia is caused by infection with bacteria and virus. Pneumonia cases were highest in 2013. The overall trend for the period is stable. The highest number of cases for one year were recorded for Ngamiland district for the year 2013. Ngamiland and Mahalapye recorded the highest and second highest number of pneumonia cases respectively for the period under study. The general trend is of a falling prevalence of pneumonia in Botswana.

The year 2015 recorded the highest number of deaths in a year, with most of the deaths recorded at Kanye. The year 2012 followed with most of the deaths recorded at Boteti. The trend in pneumonia deaths is generally increasing.

1.0. Introduction

1.1. The concept of human settlements

Human settlements are a main component of the Action Plan for the Human Environment (UN, 1988). The Action Plan informs planning and management of human settlements for environmental quality.

Human Settlements and Environmental Health constitute Component Five (5) of the United Nations Framework for Development of Environment Statistics (UNFDES, 2013). It is worth noting that the UNFDES guided the production of this report. Statistics on human settlements and environmental health are important for the management and improvement of conditions related to human settlements, shelter conditions, safe water, sanitation, and health, particularly in the context of rapid urbanization, increasing pollution, environmental degradation, disasters, extreme events, and climate change (UNSD, 2013).

Component 5 is composed of two sub-components being Sub-Component 5.1 on Human Settlements which includes relevant statistics on basic services and infrastructure. UNSD further states that Environmental Health which is the second sub-component is defined by the World Health Organisation (WHO) as those aspects of the human health and disease that are determined by factors in the environment.

2.0 Human Settlements

Human settlements comprises of physical elements and services to which these elements provide the material support (UN, 1988). The physical components include shelter (structures of different shape, size, type and materials): and infrastructure (e.g. complex networks designed to deliver goods and information). Services cover those required by the community for the accomplishment of its functions as a social body (e.g. education, health, culture, welfare, recreation and nutrition).

This section of the report is the sub-component on human settlements. The topics discussed include: a) Urban and rural population, b) Access to water, sanitation and energy, c) Housing conditions, and d) Environmental concerns specific to urban settlements.

2.1 Population

Total population of Botswana by census district, urban and rural areas are provided in this subsection. The subsection is further split into: population size by sex, annual growth, Intercensal increase, and population density by census district.

2.1.1 Population Size and Growth

The population of Botswana experienced an Intercensal increase of 26.7 percent between 1991 and 2001 censuses (Table 2a). During the 1991 - 2001 period Botswana's annual average growth rate stood at 2.37 percent. The highest Intercensal increase of 39.4 percent was recorded in Gaborone among the towns/cities.

During the 2001 and 2011 censuses the population of Botswana experienced an Intercensal increase of 20.5 percent (annual average growth rate of 1.86 percent). The annual growth rate of Botswana saw a decline during the twenty years (1991 – 2011) under discussion.

Population Intercensal increase between years 2001 and 2011 by district reveals that South East had the highest increase of 40.2 percent followed by Kweneng East district with 35.3 percent. Despite the fact that the country experienced a positive (low) Intercensal population increase (between 2001 and 2011 censuses), Lobatse and Selibe Phikwe districts saw a negative increase at -2.3 percent and -0.9 percent respectively (Table 2a and Figure 2a.i).

Annual average growth rate was calculated between the 2011 census figures and the 2017 Botswana Demographic Survey figures. It is evident from Table 2a that the national annual average growth rate between the years 2011 and 2017 stood at 1.04 percent. District differentials show that the highest annual average growth rate was recorded in Chobe (2.66 percent), Kgalagadi South (2.64) and South East (2.60), in that order. During the six year period under review, there were only two districts which experienced negative annual average growth rates, Jwaneng and Lobatse with -1.49 percent and -0.30 percent, respectively.

2.1.2. Sex Ratio

Sex Ratio which is defined as the degree of balance between females and males is also presented in this sub section. It is the ratio of males to females in the population per 100. The Sex Ratio in Botswana is generally low.

It has been on the increase during the 1991 (91.6 males per 100 females), 2001 (93.8 males per 100 females) and 2011 (95.5 males per 100 females) censuses, and dropped slightly to 92.3 males per 100 females in 2017 (Figure 2a.ii).

Table 2a: Population by Census District and Sex between 1991, 2001, 2011 & 2017

District:	1991 Census			2001 Census			Intercensal Increase		Annual Average Growth Rate (%)
Urban Cities/Towns	Both Sexes	Male	Female	Both Sexes	Male	Female	Number	Percent	
Gaborone	133,468	68,248	65,220	186,007	91,851	94,156	52,539	39.4	3.32
Francistown	65,244	31,665	33,579	83,023	40,147	42,876	17,779	27.3	2.41
Lobatse	26,052	12,541	13,511	29,689	14,205	15,484	3,637	14	1.31
Selibe Phikwe	39,772	20,343	19,429	49,849	24,336	25,513	10,077	25.3	2.26
Orapa	8,827	4,713	4,114	9,151	4,837	4,314	324	3.7	0.36
Jwaneng	11,188	5,895	5,293	15,179	7,616	7,563	3,991	35.7	3.05
Sowa Town	2,228	1,462	766	2,879	1,571	1,308	651	29.2	2.56
Total City/Town:	**286,779**	**144,867**	**141,912**	**375,777**	**184,563**	**191,214**	**88,998**	**31**	**2.7**
Urban & Rural Districts									
Southern:									
Ngwaketsi South/Kanye/ Moshupa	128,989	59,628	69,361	113,704	53,812	59,892	-15,285	-11.8	-1.26
Barolong	18,400	8,749	9,651	47,477	23,397	24,080	29,077	158	9.48
South East	43,584	20,591	22,993	60,623	29,129	31,494	17,039	39.1	3.3
Kweneng:									
Kweneng East	141,611	66,817	74,794	189,773	91,067	98,706	48,162	34	2.93
Kweneng West	28,826	13,511	15,315	40,562	20,480	20,082	11,736	40.7	3.42
Kgatleng	57,770	27,348	30,422	73,507	35,734	37,773	15,737	27.2	2.41
Central:									
Serowe-Palapye	128,471	59,988	68,483	153,035	73,294	79,741	24,564	19.1	1.75
Mahalapye	95,433	45,442	49,991	109,811	53,322	56,489	14,378	15.1	1.4
Central Bobonong	53,558	25,303	28,255	66,964	32,067	34,897	13,406	25	2.23
Central Boteti	35,459	16,834	18,625	48,057	23,482	24,575	12,598	35.5	3.04
Central Tutume	100,049	45,978	54,071	123,514	57,835	65,679	23,465	23.5	2.11
North East	43,354	19,920	23,434	49,399	23,164	26,235	6,045	13.9	1.31
North West:									
Ngamiland East	55,469	27,960	29,851	72,382	35,276	37,106	16,913	30.5	2.66
Ngamiland West	39,065	16,350	20,373	52,330	24,385	27,945	13,265	34	2.92
Chobe	14,126	7,649	6,477	18,258	9,395	8,863	4,132	29.3	2.57
Ghanzi:									
Ghanzi	24,719	12,401	12,318	33,170	16,916	16,254	8,451	34.2	2.94
Kgalagadi:									
Kgalagadi South	19,794	9,622	10,172	25,938	13,037	12,901	6,144	31	2.7
Kgalagadi North	11,340	5,442	5,898	16,111	8,111	8,000	4,771	42.1	3.51
Total Urban & Rural Districts:	**1,040,017**	**489,533**	**550,484**	**1,305,086**	**629,062**	**676,024**	**265,069**	**25.5**	**2.27**
Total	**1,326,796**	**634,400**	**692,396**	**1,680,863**	**813,625**	**867,238**	**354,067**	**26.7**	**2.37**

Note: **Annual Average Growth Rate= (1/t*LN (Pt/P0))*100**, where **(t)** is number of years between censuses, **(LN)** is the Natural Log, **(Pt)** is population at time t, **(P0)** is population at base year

Table 2a: Population by Census District and Sex between 1991, 2001, 2011 & 2017 Continued…

District:	2001 Census			2011 Census			Intercensal Increase		Annual Average Growth Rate (%)
Urban Cities/Towns	Both Sexes	Male	Female	Both Sexes	Male	Female	Number	Percent	
Gaborone	186,007	91,851	94,156	231,592	113,544	118,048	45,585	24.5	2.19
Francistown	83,023	40,147	42,876	98,961	48,106	50,855	15,938	19.2	1.76
Lobatse	29,689	14,205	15,484	29,007	14,145	14,862	-682	-2.3	-0.23
Selibe Phikwe	49,849	24,336	25,513	49,411	24,733	24,678	-438	-0.9	-0.09
Orapa	9,151	4,837	4,314	9,531	4,730	4,801	380	4.2	0.41
Jwaneng	15,179	7,616	7,563	18,008	9,820	8,188	2,829	18.6	1.71
Sowa Town	2,879	1,571	1,308	3,598	1,960	1,638	719	25	2.23
Total City/Town:	**375,777**	**184,563**	**191,214**	**440,108**	**217,038**	**223,070**	**64,331**	**17.1**	**1.58**
Urban & Rural Districts									
Southern:									
Ngwaketsi South/Kanye/ Moshupa	113,704	53,812	59,892	129,247	62,262	66,985	15,543	13.7	1.28
Barolong	47,477	23,397	24,080	54,831	26,681	28,150	7,354	15.5	1.44
Ngwaketsi West	10,471	5,159	5,312	13,689	6,874	6,815	3,218	30.7	2.68
South East	60,623	29,129	31,494	85,014	40,699	44,315	24,391	40.2	3.38
Kweneng:									
Kweneng East	189,773	91,067	98,706	256,752	125,214	131,538	66,979	35.3	3.02
Kweneng West	40,562	20,480	20,082	47,797	24,402	23,395	7,235	17.8	1.64
Kgatleng	73,507	35,734	37,773	91,660	44,572	47,088	18,153	24.7	2.21
Central:									
Serowe-Palapye	153,035	73,294	79,741	180,500	88,889	91,611	27,465	17.9	1.65
Mahalapye	109,811	53,322	56,489	118,875	57,548	61,327	9,064	8.3	0.79
Central Bobonong	66,964	32,067	34,897	71,936	34,249	37,687	4,972	7.4	0.72
Central Boteti	48,057	23,482	24,575	57,376	28,147	29,229	9,319	19.4	1.77
Central Tutume	123,514	57,835	65,679	147,377	70,340	77,037	23,863	19.3	1.77
North East	49,399	23,164	26,235	60,264	28,595	31,669	10,865	22	1.99
North West:				0					
Ngamiland East	72,382	35,276	37,106	90,334	44,410	45,924	17,952	24.8	2.22
Ngamiland West	52,330	24,385	27,945	61,950	29,201	32,749	9,620	18.4	1.69
Chobe	18,258	9,395	8,863	23,347	12,023	11,324	5,089	27.9	2.46
Ghanzi:									
Ghanzi	33,170	16,916	16,254	43,355	22,461	20,894	10,185	30.7	2.68
Kgalagadi:									
Kgalagadi South	25,938	13,037	12,901	30,016	15,119	14,897	4,078	15.7	1.46
Kgalagadi North	16,111	8,111	8,000	20,476	10,347	10,129	4,365	27.1	2.4
Total Urban & Rural Districts:	**1,305,086**	**629,062**	**676,024**	**1,584,796**	**772,033**	**812,763**	**279,710**	**21.4**	**1.94**
Total	**1,680,863**	**813,625**	**867,238**	**2,024,904**	**989,071**	**1,035,833**	**344,041**	**20.5**	**1.86**

Note: **Annual Average Growth Rate= (1/t*LN (Pt/P0))*100**, where **(t)** is number of years between censuses, **(LN)** is the Natural Log, **(Pt)** is population at time t, **(P0)** is population at base year

Table 2a: Population by Census District and Sex between 1991, 2001, 2011 & 2017 Continued...

District:	2011 Census			2017 BDS			Intercensal Increase		Annual Average Growth Rate (%)
Urban Cities/Towns	Both Sexes	Male	Female	Both Sexes	Male	Female	Number	Percent	
Gaborone	231,592	113,544	118,048	234,775	117,277	117,498	3,183	1.4	0.23
Francistown	98,961	48,106	50,855	107,228	50,995	56,233	8,267	8.4	1.34
Lobatse	29,007	14,145	14,862	28,493	13,917	14,576	-514	-1.8	-0.3
Selibe Phikwe	49,411	24,733	24,678	49,460	23,236	26,224	49	0.1	0.02
Orapa	9,531	4,730	4,801	10,062	4,948	5,114	531	5.6	0.9
Jwaneng	18,008	9,820	8,188	16,470	6,885	9,585	-1,538	-8.5	-1.49
Sowa Town	3,598	1,960	1,638	3,885	1,994	1,891	287	8	1.28
Total City/Town:	**440,108**	**217,038**	**223,070**	**450,373**	**219,252**	**231,121**	**10,265**	**2.3**	**0.38**
Urban & Rural Districts									
Southern:									
Ngwaketsi South/Kanye/ Moshupa	129,247	62,262	66,985	136,099	64,099	72,000	6,852	5.3	0.86
Barolong	54,831	26,681	28,150	57,096	28,052	29,044	2,265	4.1	0.67
Ngwaketsi West	13,689	6,874	6,815	14,600	6,661	7,939	911	6.7	1.07
South East	85,014	40,699	44,315	99,361	47,285	52,076	14,347	16.9	2.6
Kweneng:									
Kweneng East	256,752	125,214	131,538	280,695	136,102	144,593	23,943	9.3	1.49
Kweneng West	47,797	24,402	23,395	54,014	26,861	27,153	6,217	13	2.04
Kgatleng	91,660	44,572	47,088	99,131	49,123	50,008	7,471	8.2	1.31
Central:									
Serowe-Palapye	180,500	88,889	91,611	187,826	88,719	99,107	7,326	4.1	0.66
Mahalapye	118,875	57,548	61,327	124,858	58,794	66,064	5,983	5	0.82
Central Bobonong	71,936	34,249	37,687	81,510	37,539	43,971	9,574	13.3	2.08
Central Boteti	57,376	28,147	29,229	61,851	30,794	31,057	4,475	7.8	1.25
Central Tutume	147,377	70,340	77,037	158,898	74,274	84,624	11,521	7.8	1.25
North East	60,264	28,595	31,669	64,333	30,687	33,646	4,069	6.8	1.09
North West:	0						0		
Ngamiland East	90,334	44,410	45,924	93,278	43,874	49,404	2,944	3.3	0.53
Ngamiland West	61,950	29,201	32,749	62,062	27,616	34,446	112	0.2	0.03
Chobe	23,347	12,023	11,324	27,388	14,069	13,319	4,041	17.3	2.66
Ghanzi:							0		
Ghanzi	43,355	22,461	20,894	43,821	21,114	22,707	466	1.1	0.18
Kgalagadi:							0		
Kgalagadi South	30,016	15,119	14,897	35,163	17,179	17,984	5,147	17.1	2.64
Kgalagadi North	20,476	10,347	10,129	22,509	12,494	10,015	2,033	9.9	1.58
Total Urban & Rural Districts:	**1,584,796**	**772,033**	**812,763**	**1,704,493**	**815,336**	**889,157**	**119,697**	**7.6**	**1.21**
Total	**2,024,904**	**989,071**	**1,035,833**	**2,154,866**	**1,034,588**	**1,120,278**	**129,962**	**6.4**	**1.04**

Note: **Annual Average Growth Rate= (1/t*LN (Pt/P0))*100**, where **(t)** is number of years between censuses, **(LN)** is the Natural Log, **(Pt)** is population at time t, **(P0)** is population at base year

Figure 2a.i: Population Inter-censal increase (%) between 1991, 2001, 2011 & 2017

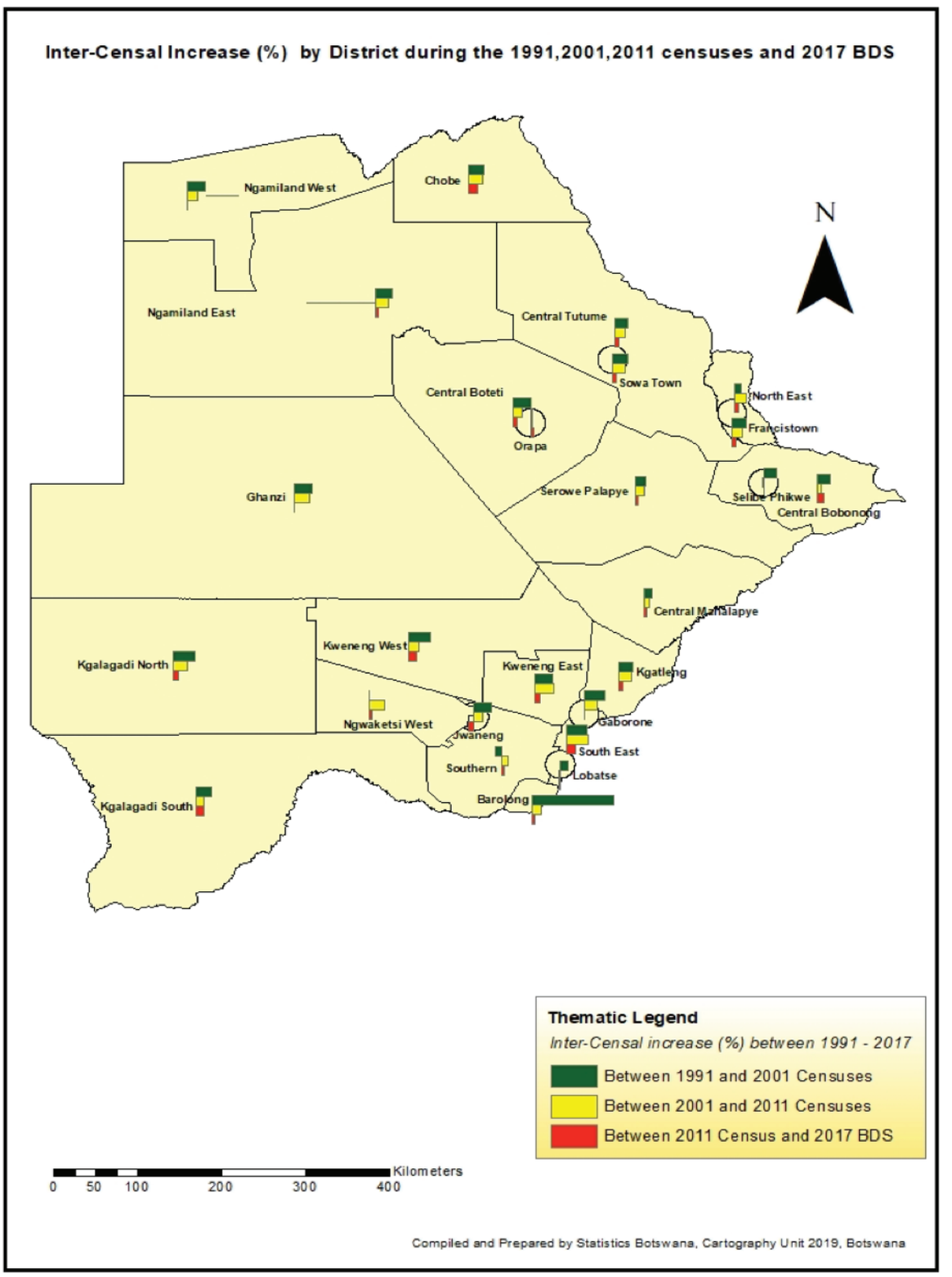
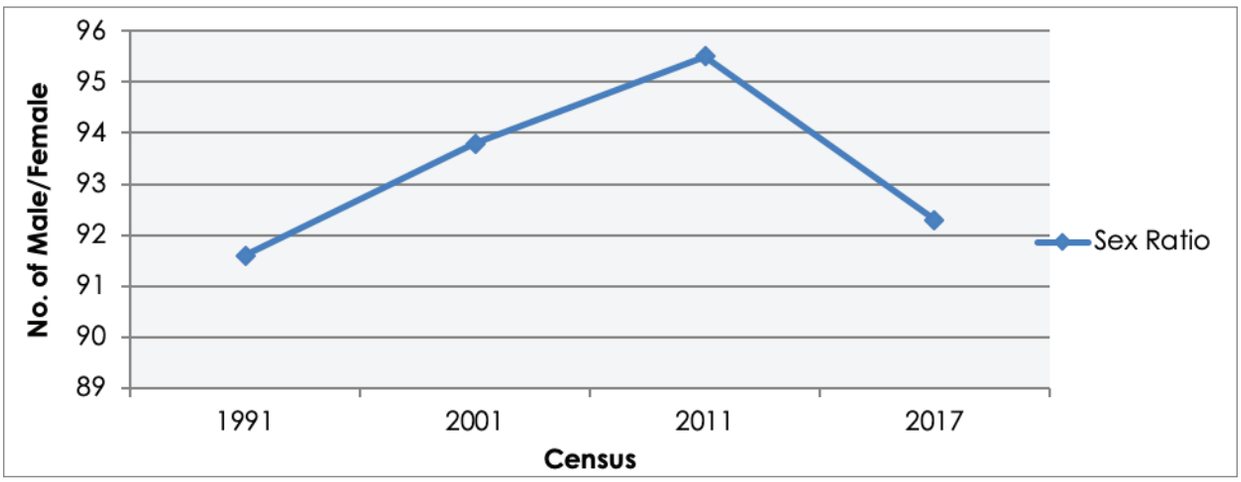


Figure 2a.ii: Sex Ratio during years 1991, 2001, 2011 & 2017



Note: 1991, 2001, 2011 Censuses & BDS 2017

2.1.3 Population Density

Population density is defined as the measure of population by area occupied, given in square kilometres. It shows how close people are living together. Generally, the population density of Botswana saw an increase during the 1991, 2001 and 2011 censuses, and 2017 BDS period. The density increased from 2.28 people per square kilometre in 1991 to 3.71 people per square kilometre in 2017. District differentials reveal that Francistown had the highest density (825.87 per square kilometre) in 1991. However, during the years 2001, 2011, and 2017 Gaborone recorded the highest densities with 1,100.63 per square kilometre, 1,345.17 per square kilometre, and 1,389.20 per square kilometre, respectively (Table 2b, Figure 2b.i and Figure 2b.ii). Table 2b further depicts that both Lobatse and Selibe Phikwe experienced a slight decrease in population density between the years 2001 and 2017. It can be concluded from the table that population densities of the majority of the districts followed an upward trend in Botswana.

Table 2b: Population Density by Census District between the 1991, 2001 and 2011 Censuses, and 2017 BDS

District:		1991 Census		2001 Census		2011 Census		2017 BDS	
Urban Cities & Towns	**Area (Km2)**	Population	Density (per Km2)	Population	Density	Population	Density (per Km2)	Population	Density (per Km2)
Gaborone	169	133,468	789.75	186,007	1,100.63	227,333	1,345.17	234,775	1,389.20
Francistown	79	65,244	825.87	83,023	1,050.92	100,079	1,266.82	107,228	1,357.32
Lobatse	42	26,052	620.29	29,689	706.88	29,032	691.24	28,493	678.4
Selibe Phikwe	50	39,772	795.44	49,849	996.98	49,724	994.48	49,460	989.2
Orapa	17	8,827	519.24	9,151	538.29	9,544	561.41	10,062	591.88
Jwaneng	100	11,188	111.88	15,179	151.79	18,063	180.63	16,469	164.69
Sowa Town	159	2,228	14.01	2,879	18.11	3,599	22.64	3,886	24.44
Urban & Rural Districts									
Southern:	28,470	147,389	5.18	171,652	6.03	198,262	6.96	207,794	7.3
Ngwaketsi South	-	128,989	-	113,704	-	129,462	-	136,098	-
Barolong	-	18,400	-	47,477	-	55,103	-	57,096	-
Ngwaketsi West	9,171		0	10,471	1.14	13,697	1.49	14,600	1.59
South East	1,800	43,584	24.21	60,623	33.68	92,843	51.58	99,361	55.2
Kweneng:									
Kweneng East	7,901	170,437	21.57	189,773	24.02	256,833	32.51	280,695	35.53
Kweneng West	24,841		0	40,562	1.63	47,841	1.93	54,014	2.17
Kgatleng	7,960	57,770	7.26	73,507	9.23	92,247	11.59	99,131	12.45
Central:									
Serowe-Palapye	31,381	128,471	4.09	153,035	4.88	188,174	6	187,826	5.99
Mahalapye	16,876	95,433	5.65	109,811	6.51	117,492	6.96	124,857	7.4
Central Bobonong	14,242	53,558	3.76	66,964	4.7	70,806	4.97	81,510	5.72
Central Boteti	33,806	35,459	1.05	48,057	1.42	56,209	1.66	61,851	1.83
Central Tutume	46,140	100,049	2.17	123,514	2.68	144,895	3.14	158,898	3.44
North East	5,120	43,354	8.47	49,399	9.65	59,829	11.69	64,333	12.57
North West:									
Ngamiland East	86,400	55,469	0.64	75,070	0.87	96,356	1.12	93,278	1.08
Ngamiland West	22,730	39,065	1.72	49,642	2.18	61,748	2.72	62,062	2.73
Chobe	20,800	14,126	0.68	18,258	0.88	23,449	1.13	27,389	1.32
Ghanzi:									
Ghanzi	117,910	24,719	0.21	33,170	0.28	43,370	0.37	43,821	0.37
Kgalagadi:									
Kgalagadi South	32,800	19,794	0.6	25,938	0.79	30,016	0.92	35,164	1.07
Kgalagadi North	72,400	11,340	0.16	16,111	0.22	20,484	0.28	22,509	0.31
Total	**581,364**	**1,326,796**	**2.28**	**1,680,863**	**2.89**	**2,038,228**	**3.51**	**2,154,866**	**3.71**

Source: *Central Statistics Office (2003); 2001 Population and Housing Census; Botswana Demographic Survey 2017*
(-) Data Not Available

Figure 2b.i: Population Density by District, 2011

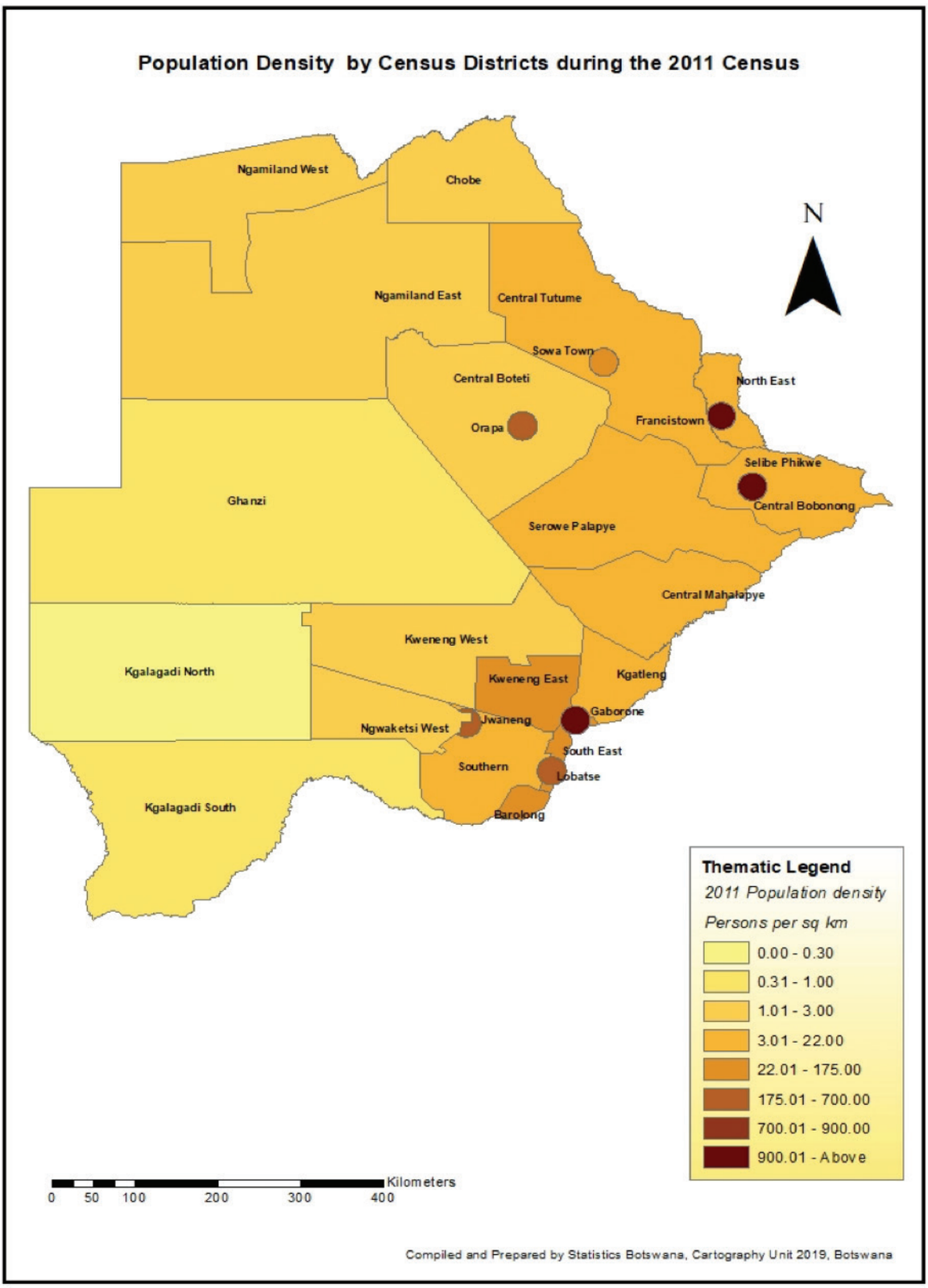
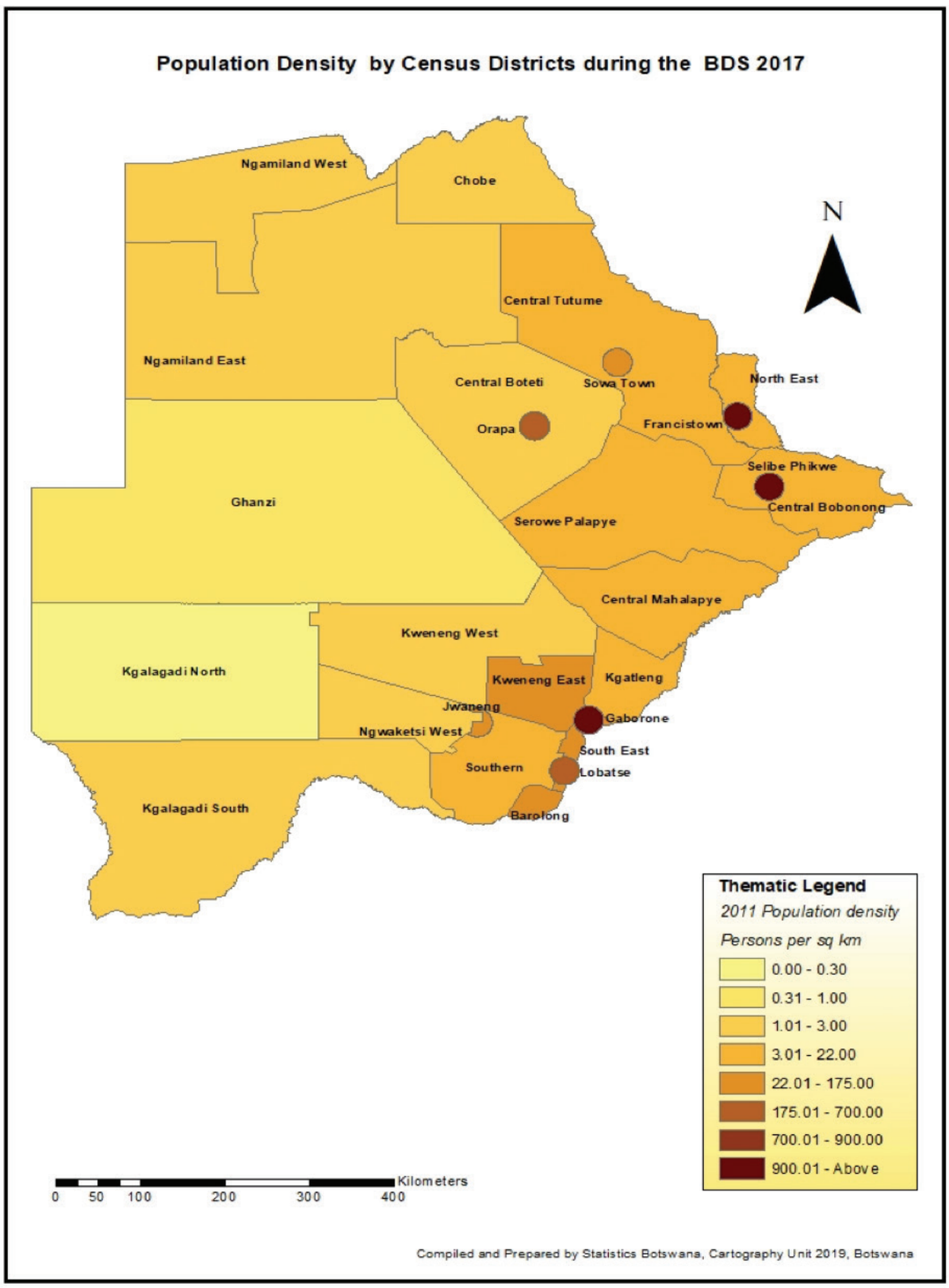


Figure 2b.ii: Population Density by District, 2017



2.2 Access to Energy, Water and Sanitation

This subcomponent captures information on population using improved drinking water sources, improved sanitation, and access to sustainable and clean energy (electricity) in both urban and rural areas of Botswana. A better health and wellbeing emanating from having access to basic services like the aforesaid could lead to a sustainable use of the environment. The primary goals of sustainability as stipulated in the Agenda 2030 for Sustainable Development, include among others: ending poverty and hunger, better standards of education and healthcare (more especially relating to water quality and sanitation), achieving gender equality, while tackling the effects of climate change, pollution and other environmental factors that can harm people's health, livelihoods and lives. It is therefore important to document and publish statistics on access to improved drinking water sources, improved sanitation, and access to sustainable clean energy in our endeavour to realising Sustainable Development Goals (For instance Goal 1 End poverty in all its forms everywhere; Goal 6 Ensure availability and sustainable management of water and sanitation for all; Goal 7 Ensure access to affordable, reliable, sustainable and modern energy for all; and Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable).

2.2.1 Energy Sources

This section provides information on access to energy sources used for cooking, space heating, and lighting during the years 2001, 2011, and 2017. The energy sources include paraffin, bio-mass, electricity, gas (LPG), among others. From Table 3a it shows that the main source of energy for household lighting in Botswana during the 2011 census and 2017 BDS was electricity, both in urban and rural areas. Its use increased from 69.13 percent in 2011 to 84.6 percent in 2017 in urban areas and from 23.9 percent in 2011 to 35.4 percent in 2017 in rural areas. During the same period the use of paraffin which was previously the main source of energy for lighting in rural areas saw a decrease, while electricity became the dominant source.

Table 3c provides information on the proportion of all households in urban and rural areas by principal energy source for cooking during the years 2001, 2011 and 2017. The table shows that wood was mostly used during these periods in rural areas, followed by gas (LPG), while in urban areas gas (LPG) was more prominent. The use of electricity on the other side experienced a significant increase for both urban and rural areas. In urban areas the use of electricity as a principal source of energy for cooking increased from 7.6 percent in 2001 to 32.1 percent in 2017.

From Table 3f it can be seen that the main source of heating during the 2001 and 2011 censuses and 2017 BDS was wood even though it experienced a slight decrease during the same period i.e. The use of wood as principal source of energy for heating in urban areas reduced from 39.86 percent in 2001 to 14.49 percent in 2017, while in rural areas the use of wood also reduced from 82.67 percent in 2001 to 51.0 percent in 2017. Generally, households in rural areas mostly use wood for space heating. A high proportion of households in the urban areas reported that they do not heat space.

Table 3a: Proportions of Households in Urban and Rural by Principal Energy Source for Lighting in 2001 & 2011 Censuses and 2017

Principal Fuel-Lighting	Residence Type						Total		
	Urban			Rural					
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Electricity									
Petrol	37.0	69.13	84.6	8.1	23.9	35.4	24.8	53.2	67.4
Diesel	0.0	0.12	0.0	0.0	0.2	0.0	0.0	0.2	0.0
Solar power	0.0	0.04	0.0	0.0	2.1	0.0	0.0	0.8	0.0
Gas (LPG)	0.1	0.17	0.7	0.4	1.1	6.2	0.2	0.5	2.6
Bio gas	0.7	0.33	0.2	0.4	0.2	0.1	0.6	0.3	0.1
Wood	0.1	0.02	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Paraffin	0.6	0.57	0.3	12.5	9.1	4.4	5.6	3.6	1.8
Candle	49.2	21.26	5.8	59.1	46.2	22.9	53.3	30.0	11.8
Paraffin/Candle	7.0	8.18	6.4	10.9	16.3	18.1	8.6	11.0	10.4
Other	5.2	0	1.4	7.1	0.0	5.9	6.0	0.0	3.0
Not Stated	0.1	0.18	0.6	1.3	0.9	7.0	0.6	0.4	2.8
No. of Households	**234,992**	**357,542**	**423,124**	**226,682**	**193,376**	**226,682**	**405,281**	**550918**	**649,806**

Table 3b: Distribution of Households in Urban and Rural by Principal Energy Source for Lighting in 2001 & 2011 Censuses and 2017

Principal Fuel-Lighting	Residence Type						Total		
	Urban			Rural					
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Electricity	86,860	247,169	358,060	13,766	46,159	80,141	100,626	293,328	438,201
Petrol	0	429	0	0	406	0	0	835	0
Diesel	0	143	0	0	4,100	0	0	4,243	0
Solar power	235	608	2,754	680	2,166	13,946	915	2,774	16,700
Gas (LPG)	1,643	1,180	683	680	367	283	2,323	1,547	966
Bio gas	235	72	0	170	39	68	405	110	68
Wood	1,409	2,038	1,347	21,244	17,578	10,041	22,652	19,616	11,388
Paraffin	115,500	76,013	24,553	100,610	89,359	51,953	216,110	165,372	76,506
Candle	16,433	29,247	26,962	18,524	31,424	40,919	34,957	60,671	67,881
Paraffin/Candle	12,207	0	5,929	12,066	0	13,307	24,274	0	19,236
Other	235	644	2,591	2,209	1,779	15,889	2,444	2,423	18,480
Not Stated	235	0	245	340	0	135	575	0	380
No. of Households	**234,992**	**357,542**	**423,124**	**170,289**	**193,376**	**226,682**	**405,281**	**550,918**	**649,806**

Figure 3a: Households in Urban and Rural by Selected Principal Energy Source for Lighting in 2001 & 2011 Censuses and 2017

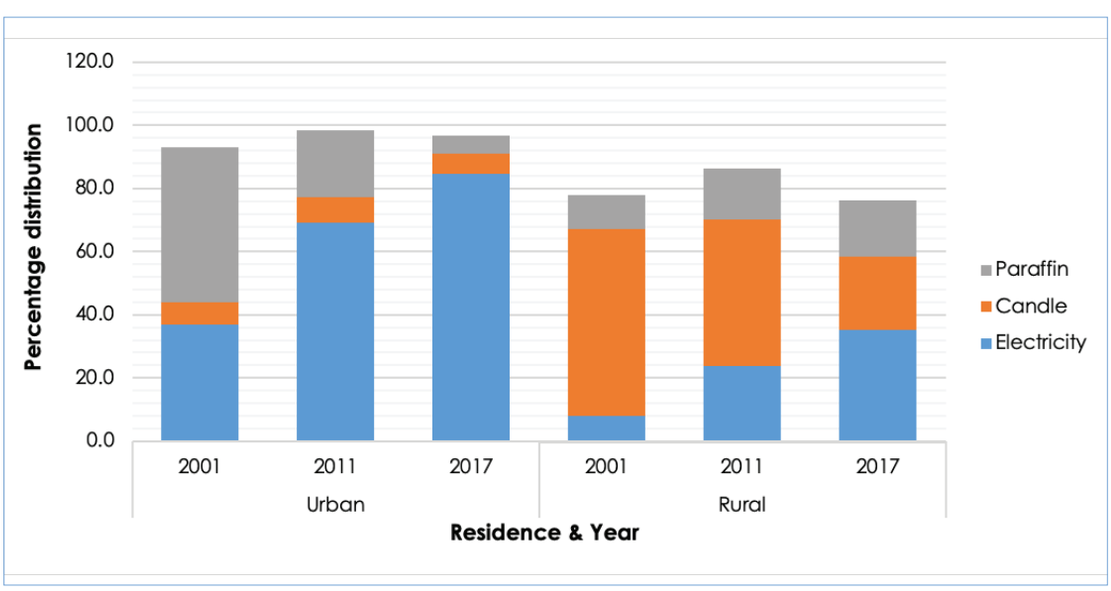


Table 3c: Proportions of Households in Urban and Rural by Principal Energy Source for Cooking in 2001 & 2011 Censuses and 2017

Principal Fuel-Cooking	Residence Type						Total		
	Urban			Rural					
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Electricity	7.6	23.6	32.1	1.1	7.1	11.2	4.9	17.8	24.8
Petrol	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0
Diesel	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0
Solar power	0.3	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.0
Gas (LPG)	57.7	50.8	54.1	17.0	14.0	15.2	40.6	37.9	40.6
Bio gas	0.7	1.2	0.1	0.4	0.5	0.1	0.6	0.9	0.1
Wood	22.8	21.8	13.2	77.3	77.0	72.6	45.7	41.2	33.9
Paraffin	10.5	2.1	0.2	3.5	0.9	0.5	7.5	1.7	0.3
Cow dung	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.1	0.1
Coal	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Crop Waste	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1
Charcoal	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0
Other	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Not Stated	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0
No. of Households	**234,757**	**357,542**	**423,123**	**169,949**	**193,376**	**226,681**	**404,700**	**550,899**	**649,804**

Table 3d: Distribution of Households in Urban and Rural by Principal Energy Source for Cooking in 2001 & 2011 Censuses and 2017

Principal Fuel-Cooking	Residence Type						Total		
	Urban			Rural					
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Electricity	17,842	84,237	135,778	1,835	13,768	25,335	19,677	98,005	161,113
Petrol	0	250	0	0	116	0	0	366	0
Diesel	0	286	0	0	193	0	0	479	0
Solar power	657	322	67	136	116	201	793	438	268
Gas (LPG)	135,337	181,667	229,038	28,908	27,073	34,542	164,246	208,740	263,580
Bio gas	1,549	4,183	573	748	870	162	2,297	5,053	735
Wood	53,595	77,980	55,879	131,439	148,958	164,492	185,034	226,937	220,371
Paraffin	24,579	7,508	875	5,897	1,644	1,029	30,476	9,152	1,904
Cow dung	47	143	0	391	271	408	438	414	408
Coal	282	143	0	187	58		469	201	0
Crop Waste	235	72	307	102	19	78	337	91	385
Charcoal	0	572	76	0	155	49	0	727	125
Other	282	179	285	153	116	313	435	295	598
Not Stated	329	0	245	170	0	72	499	0	317
No. of Households	**234,757**	**357,542**	**423,123**	**169,949**	**193,376**	**226,681**	**404,700**	**550,899**	**649,804**

Figure 3b: Households in Urban and Rural by Principal Energy Source for Cooking in 2001 & 2011 Censuses and 2017

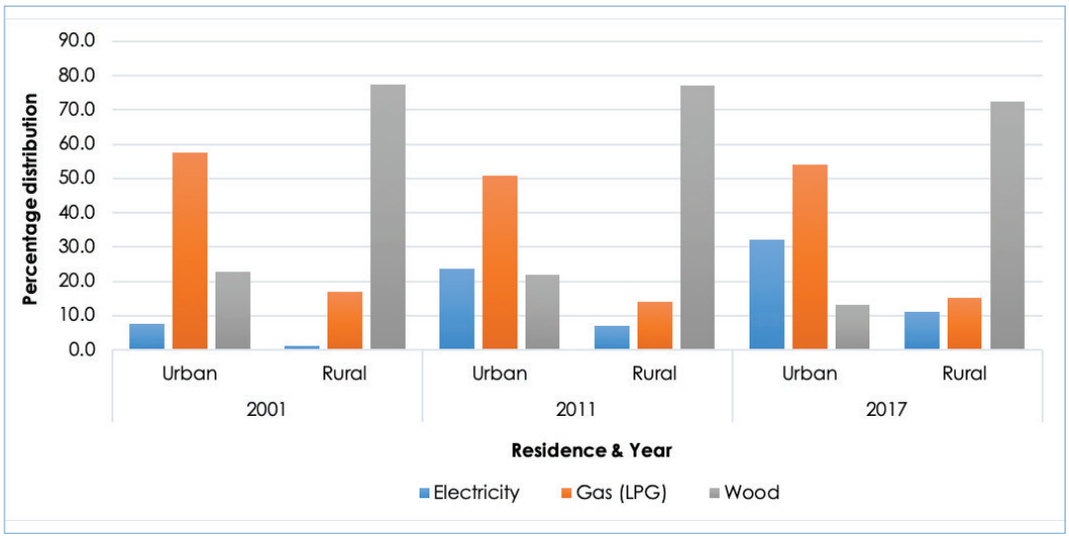


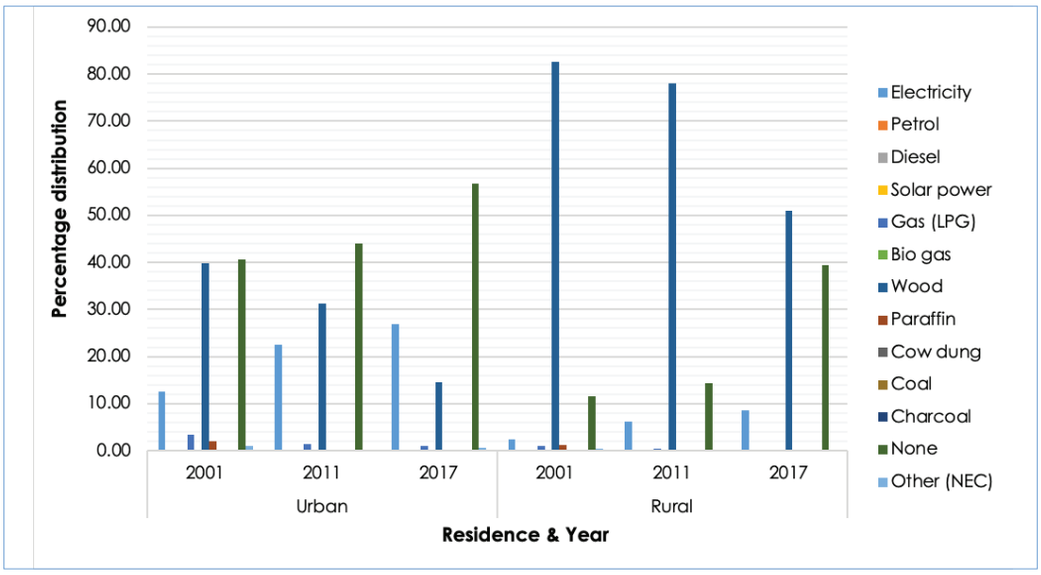
Table 3e: Proportions of Households in Urban and Rural by Principal Energy Source for Space Heating in 2001 & 2011 Censuses and 2017

Principal Fuel-Heating	Residence Type								
	Urban			Rural			Total		
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Electricity	12.54	22.47	26.97	2.4	6.18	8.61	8.30	16.75	20.56
Petrol		0.1			0.07			0.09	
Diesel		0.02			0.04			0.03	
Solar power	0.15	0.13	0.07	0.1	0.14	0.14	0.14	0.14	0.06
Gas (LPG)	3.35	1.37	1.03	1.0	0.38	0.28	2.36	1.02	0.77
Bio gas		0.06			0.05			0.06	
Wood	39.86	31.21	14.49	82.7	78.08	51.03	57.84	47.66	27.24
Paraffin	1.97	0.24		1.3	0.3		1.69	0.26	0.18
Cow dung	0.06	0.02		0.29	0.1	0.03	0.16	0.05	0.01
Coal	0.17	0.15	0.03	0.080	0.11	0.05	0.13	0.13	0.04
Charcoal	0.16	0.19	0.11	0.1	0.08		0.15	0.15	0.07
None	40.70	43.97	56.71	11.5	14.43	39.35	28.44	33.6	50.65
Other (NEC)	1.03	0.07	0.52	0.5	0.03	0.22	0.79	0.06	0.42
No. of Households	**234,757**	**357,542**	**422,880**	**169,949**	**193,375**	**226,548**	**404,706**	**550,917**	**649,428**

Table 3f: Distribution of Households in Urban and Rural by Principal Energy Source for Space Heating in 2001 & 2011 Censuses and 2017

Principal Fuel-Heating	Residence Type						Total		
	Urban			Rural					
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Electricity	29,439	80,340	114,033	4,147	11,951	19,513	33,591	92,279	133,546
Petrol	0	358	0	0	135	0	0	496	0
Diesel	0	72	0	0	77	0	0	165	0
Solar power	352	465	275	238	271	128	567	771	403
Gas (LPG)	7,864	4,898	4,350	1,666	735	641	9,551	5,619	4,991
Bio gas	0	215	0	0	97	0	0	331	0
Wood	93,574	111,589	61,287	140,497	150,987	115,614	234,082	262,567	176,901
Paraffin	4,625	858	317	2,192	580	840	6,840	1,432	1,157
Cow dung	141	72	0	493	193	71	648	275	71
Coal	399	536	137	136	213	104	526	716	241
Charcoal	376	679	467	221	155	0	607	826	467
None	95,546	157,211	239,815	19,561	27,904	89,136	115,098	185,108	328,951
Other (NEC)	2,418	250	2,199	799	58	501	3,197	331	2,700
No. of Households	**234,734**	**357,542**	**422,880**	**169,949**	**193,356**	**226,548**	**404,706**	**550,917**	**649,428**

Figure 3c: Households in Urban and Rural by Principal Energy Source for Heating in 2001 & 2011 Censuses and 2017



2.2.2 Water Sources

The purpose of this sub section of the human settlement report is to present a descriptive analysis of household access to improved water sources between the 2011 census and 2017. Table 3g shows that at district level, Gaborone had the most households using piped/tapped water source with 74,456 followed by Kweneng East with 64,022 in 2011, the pattern was repeated in 2017 when Gaborone still had the most households using piped/tapped water source with 83,074, still followed by Kweneng East with 77,389 households.

Table 3h shows that out of the 550,312 households in 2011, the proportions of households with access to improved water through piped/tapped water source was 64.5 percent in cities and towns and 26.1 percent in urban and rural villages. Out of the 649,809 households in 2017, the proportion of households with access to tapped/piped water source was decreasing in cities and towns as well as in urban and rural villages, from the 2011 figures, with 62.3 percent and 22.9 percent, respectively. The proportion of households with access to improved water source through tapped/piped water decreased from 90.6 percent in 2011 to 85.2 percent in 2017.

Lastly, Figure 3e shows that among the total number of households with access to improved water through piped/tapped water source in 2011, 65 percent resided in towns and urban villages, while 35 percent of the households were in rural villages. In 2017, about 73 percent of households in towns and urban villages had access to piped/tapped water source while 27 percent of households in rural villages had access to piped/ tapped water source. These results show that there was an increase in the number of households with access to piped/tapped water source in towns and urban villages while rural villages incurred a decrease.

Table 3g: Household Using Piped/Tapped, Bouser/Tanker & Borehole as Water Sources by Residence and District between and 2011 Census and 2017

District	2011			2017		
	Piped/Tapped	Bouser/Tanker	Borehole	Piped/Tapped	Bouser/Tanker	Borehole
Gaborone	74,456	364	37	83,074	1,143	0
Francistown	31,199	13	31	33,124	0	0
Lobatse	9,202	0	5	9,221	0	0
Selebi Phikwe	16,023	1	18	15,510	0	0
Orapa	3,288	0	0	3,235	0	0
Jwaneng	5,438	7	0	6,855	0	0
Sowa Town	1,183	2	5	1,236	0	0
Ngwaketse	27,458	388	2,043	28,788	2,014	2,095
Barolong	12,500	122	799	11,488	1,052	2,706
Ngwaketse West	29,51	319	273	2,335	429	501
South East	22,963	249	468	29,965	763	708
Kweneng East	64,022	280	1,798	77,389	875	3,476
Kweneng West	9,627	354	1,978	9,446	275	2,403
Kgatleng	21,683	387	2,026	25,216	543	1,780
Serowe Palapye	39,863	579	3,955	44,128	1,814	3,074
Central Mahalapye	25,916	235	2,660	27,562	427	1,803
Central Bobonong	15,125	237	2,101	15,426	410	740
Central Boteti	11,258	232	1,525	13,351	184	1,635
Central Tutume	32,312	794	2,709	37,206	226	2,225
North East	14,817	386	217	15,834	129	272
Ngamiland East	18,086	299	1,232	19,451	946	820
Ngamiland West	11,513	159	376	11,407	131	1,539
Chobe	6,590	66	144	9,452	0	0
Ghanzi	2,570	189	1,623	10,696	382	1,010
Kgalagadi South	6,794	324	724	5,665	444	1,264
Kgalagadi North	4,998	297	290	6,433	658	380
Total	**488,884**	**6,283**	**27,037**	**553,493**	**12,845**	**28,431**

Table 3h: Number of Households by Water Supply & Region during the 2001, 2011 Censuses and 2017

Water Source	Towns & Urban Villages			Rural Villages			Total		
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Pipped/Tapped	230,273	354,876	404512	124,652	143,853	148,987	354,925	498,729	553,499
Bouser/Tanker	194	976	2945	3,491	5,307	9,900	3,685	6,283	12,845
Well	93	44	0	7,145	5,056	6,420	7,238	5,100	6,420
Borehole	128	328	457	20,676	26,709	27,975	20,804	27,037	28,432
Other	4,069	1,352	15212	13,985	11,811	33,401	18,054	13,163	48,613
Total	**234,757**	**357,576**	**423126**	**169,949**	**192,736**	**226,683**	**404,706**	**550,312**	**649,809**

Table 3i: Proportions of Households by Water Supply & Region during the 2001, 2011 Censuses and 2017

Water Source	Towns & Urban Villages			Rural Villages			Total		
	2001	2011	2017	2001	2011	2017	2001	2011	2017
Pipped/Tapped	56.9	64.5	62.3	30.8	26.1	22.9	87.7	90.6	85.2
Bouser/Tanker	0	0.2	0.5	0.9	1	1.5	0.9	1.1	2
Well	0	0	0	1.8	0.9	1	1.8	0.9	1
Borehole	0	0.1	0.1	5.1	4.9	4.3	5.1	4.9	4.4
Other	1	0.2	2.3	3.5	2.1	5.1	4.5	2.4	7.5
Total	**58**	**65**	**65.1**	**42**	**35**	**34.9**	**100**	**100**	**100**

Figure 3d: Households by Water Supply (Piped, Bouser & Borehole) & Region during the 2001 & 2011 Censuses and 2017

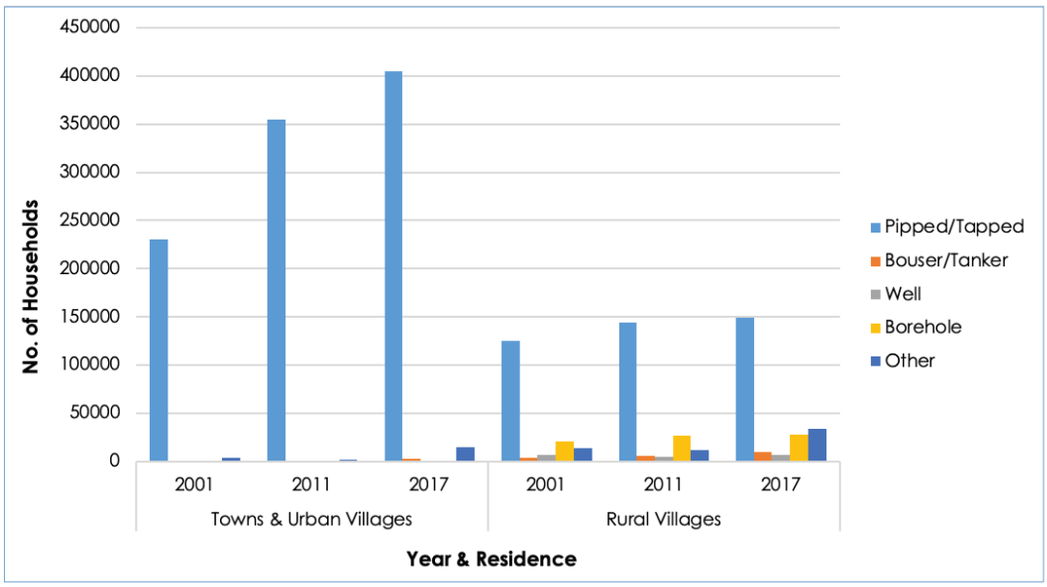
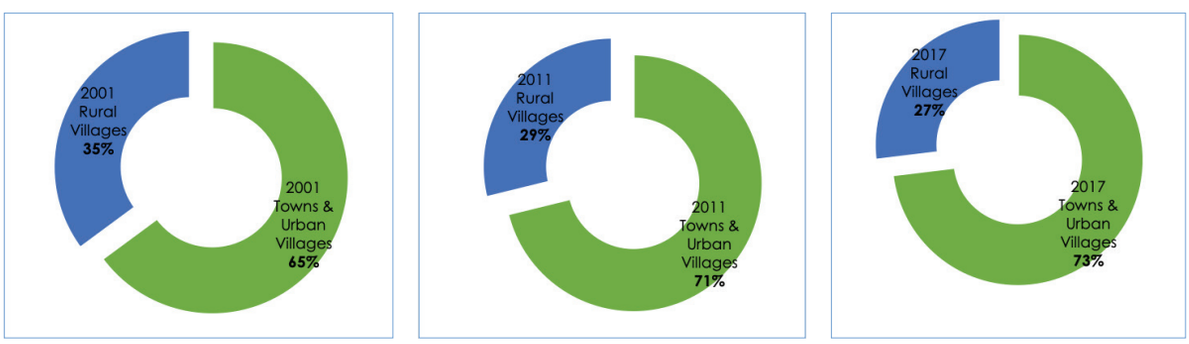


Figure 3e: Proportion of Households with Access to Improved Water through Piped/tapped Water by Residence, 2001 & 2011 Censuses and 2017



2.2.3 Access to Sanitation

This sub section provides information on households using improved sanitation facility as well as access to waste removal services. World Health Organization (WHO) defines access to improved sanitation as the proportion of population or households with at least excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta. WHO further states that improved facilities include ordinary protected pit latrines to flush toilets with sewerage connection, and all these have to be properly maintained. Both sanitation facility and waste removal services are very important for environmental quality and human health concerns, more especially in densely populated areas. Lack of proper disposal of waste water for example, can lead to ground water contamination, which can result in the spread of diarrhoea, cholera and other water-related diseases.

Toilet Facility

This subsection shows data on access to improved toilet facilities. At district level, Table 3j shows that the total number of households using flush toilets increased from 191,726 in 2011 to 289,017 in 2017. In 2011, Gaborone had the most households with access to flush toilets with 48,170, followed by Kweneng East with 19,751 with the least being Ngwaketse West with 483. While in 2017 Gaborone still had the highest number of households with access to flush toilets with 70,899, still followed by Kweneng East with 36,821and the least being Ngwaketse west with 471.(See Figures 3f.i and 3f.ii)

Table 3k reveals that the number of households with access to flush toilets in Cities and Towns increased from 64.8 percent in 2011 to 79.6 percent in 2017, whereas in urban and rural districts the proportions increased from 26.8 percent in 2011 to 38.8 percent in 2017. During the same period, pit latrine facilities were more prominent in urban and rural districts as compared to urban cities and towns, even though it was slightly decreasing in both regions. The use of pit latrines decreased from 31.8 percent in 2011 to 19.3 percent in 2017 in cities and towns while in urban and rural districts it decreased from 57 percent to 53 percent in 2017. Table 3k also shows that the percentage of households with access to improved sanitation facilities decreased from 92.7 percent in 2011 to 89.2 percent in 2017. This decrease might have been caused by some households not having any access to any form of toilet facilities.

Table 3j: Household Using Improved Sanitation Facility by District between 2011 Census and 2017

	2011				2017			
District	Flush Toilet	Ventilated Improved Pit Latrine	Pit Latrine	Dry-Com-post	Flush Toilet	Ventilated Improved Pit Latrine	Pit Latrine	Dry-Compost
Gaborone	48,170	2,852	23,678	68	70,899	0	14,141	258
Francistown	18,977	1,186	10,968	44	24,735	466	8,654	534
Lobatse	4,383	406	4,392	9	5,463	0	4,089	65
Selebi Phikwe	10,242	252	5,525	6	12,848	119	3,075	152
Orapa	3,286	3	3	0	3,235	0	0	0
Jwaneng	5,123	81	216	6	6,494	0	362	0
Sowa Town	1,158	2	3	0	1,236	0	0	0
Ngwaketse	5,400	1,172	18,341	263	8,420	633	18,595	2,815
Barolong	1,992	897	8,714	145	2,214	0	10,066	1,707
Ngwaketse West	483	91	1,806	22	471	0	2,078	465
South East	11,940	1,018	10,073	103	23,390	700	7,107	335
Kweneng East	19,751	4,251	37,632	320	36,821	630	41,833	1,953
Kweneng West	1,778	140	5,044	64	1,840	0	6,958	1,716
Kgatleng	6,592	947	14,312	267	11,747	178	14,642	99
Serowe Palapye	10,990	1,478	24,566	301	18,115	526	23,305	5,598
Central Mahalapye	5,865	1,070	17,222	191	9,844	0	18,300	2,296
Central Bobonong	3,538	225	10,379	88	3,856	0	11,154	1,888
Central Boteti	2,446	771	6,339	31	4,166	380	7,566	1,024
Central Tutume	5,991	655	22,217	294	12,334	703	22,212	3,056
North East	4,228	322	10,067	54	7,445	0	9,025	686
Ngamiland East	7,324	426	10,044	23,385	7,452	0	11,540	1,650
Ngamiland West	2,504	84	3,226	13,687	2,045	279	5,059	1,059
Chobe	3,358	118	2,404	6,854	6,239	68	3,044	259
Ghanzi	3,300	219	3,283	10	4,201	0	4,456	1,494
Kgalagadi South	1,717	289	4,163	17	1,835	258	3,107	1,212
Kgalagadi North	1,190	258	3,162	5	1,672	0	3,939	819
Total	**191,726**	**19,213**	**257,779**	**46,234**	**289,017**	**4,940**	**254,307**	**31,140**

Figure 3f.i: Households Using Improved Sanitation Facility (Flush Toilets & Pit Latrines) by District in 2011

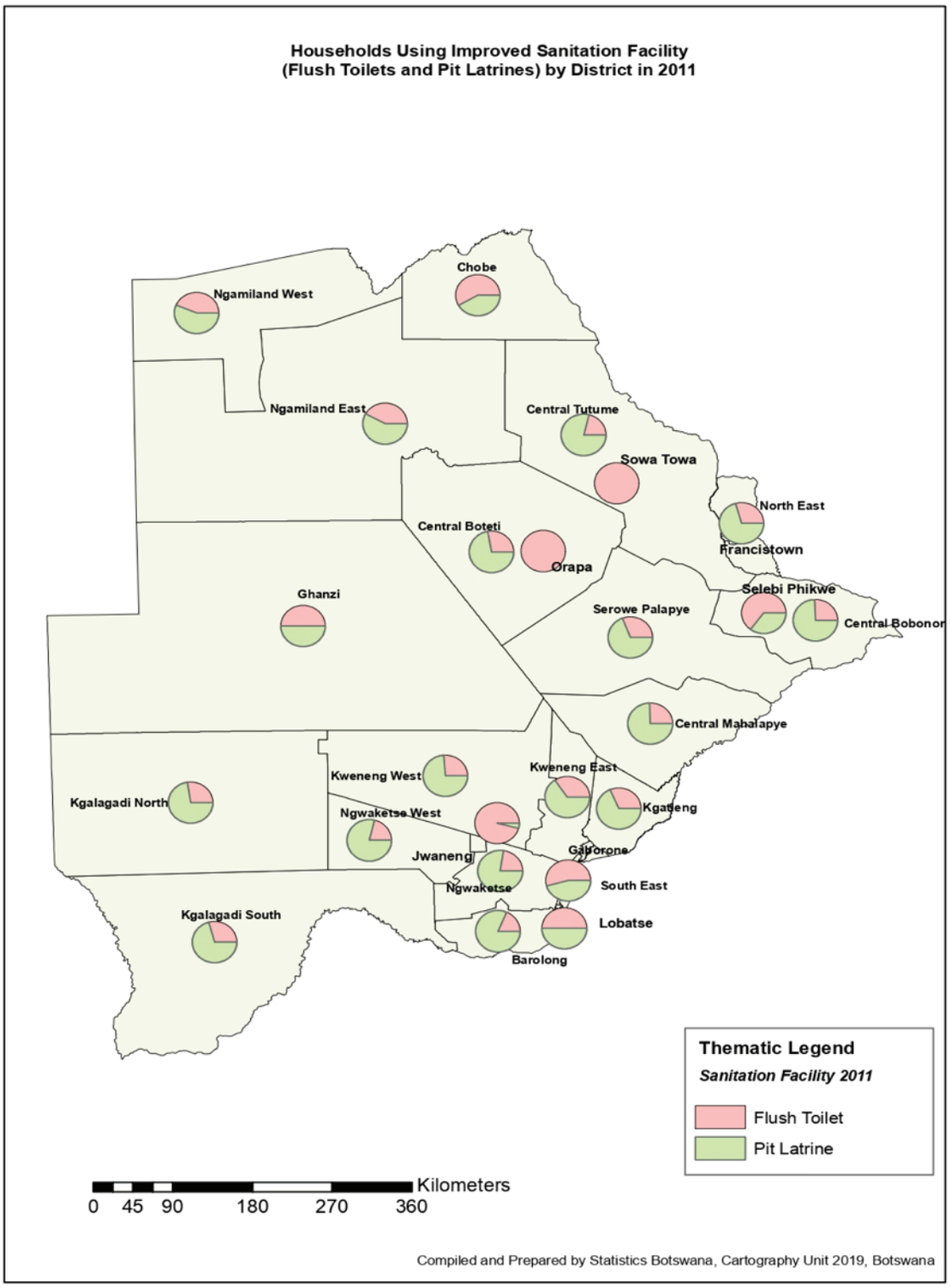


Figure 3f.ii: Households Using Improved Sanitation Facility (Flush Toilets & Pit Latrines) by District in 2017

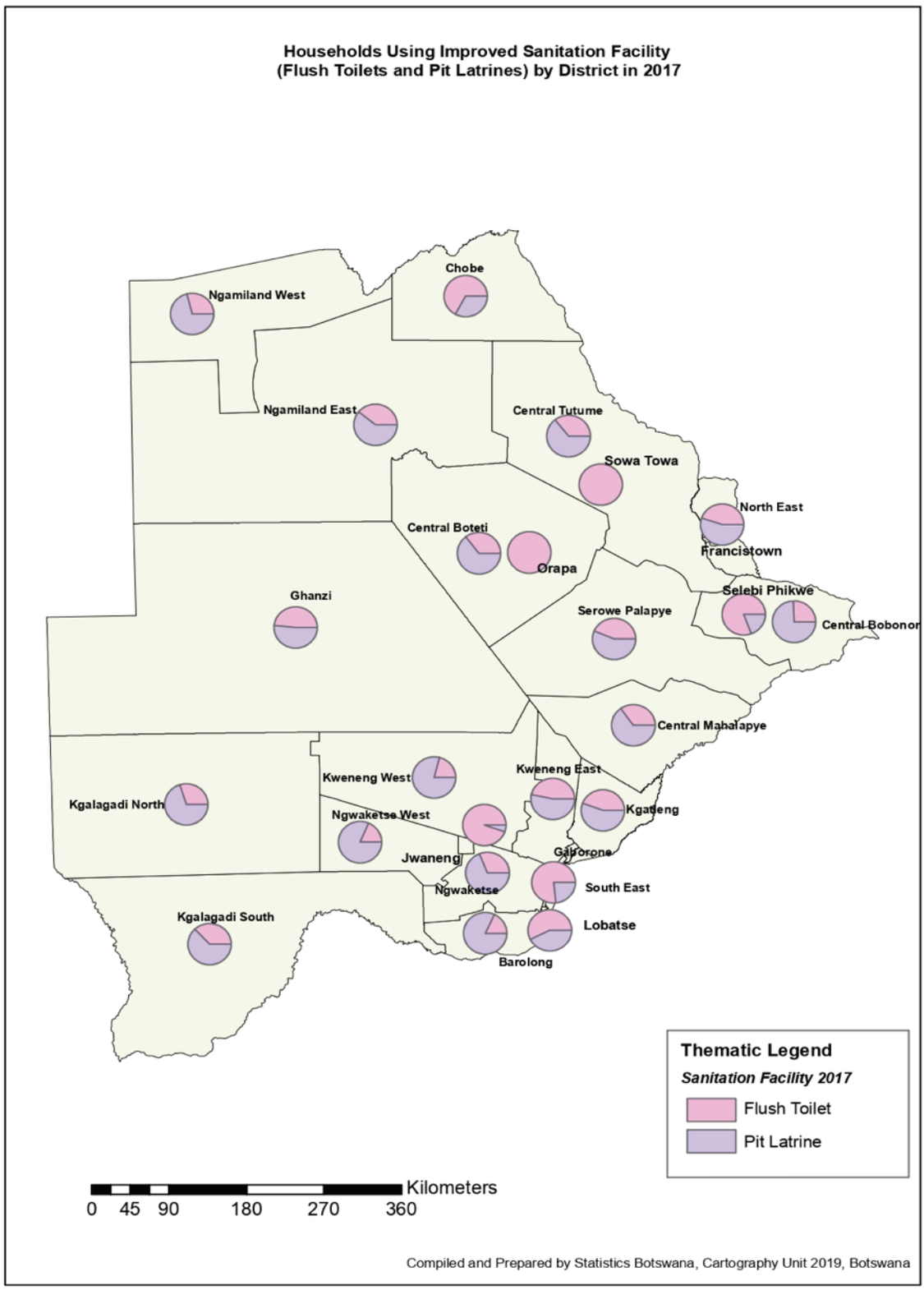
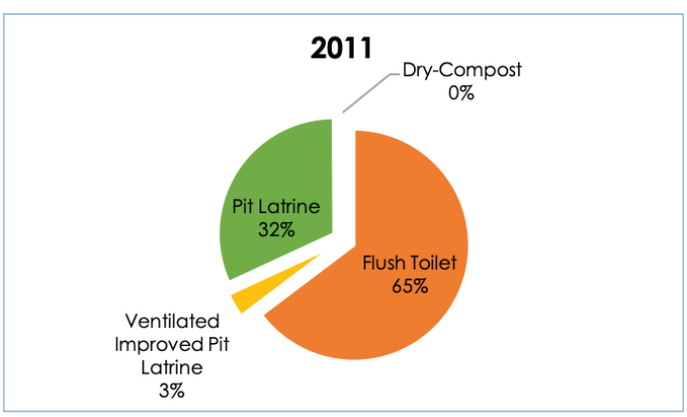


Table 3k: Distribution of Households by Improved Sanitation Facility & Region between 2011 Census And 2017

Sanitation Facility & Region	Number		Percent	
	2011	2017	2011	2017
Urban Cities/Towns:				
Flush Toilet	91,339	124,910	64.8	79.6
Ventilated Improved Pit Latrine	4,782	585	3.4	0.4
Pit Latrine	44,785	30,321	31.8	19.3
Dry-Compost	133	1009	0.1	0.6
Total:	**141,039**	**156,825**	**100**	**100**
Urban & Rural Districts:				
Flush Toilet	100,387	164,107	26.8	38.8
Ventilated Improved Pit Latrine	14,431	4,355	3.9	1
Pit Latrine	212,994	223,986	57	53
Dry-Compost	46101	30,131	12.3	7.1
Total:	**373,913**	**422,579**	**100**	**100**
Grand Total:	**514,952**	**579,404**	**92.7**	**89.2**
Total Number of Households:	**555,395**	**649,809**		

Figure 3g: Proportion of Households by Improved Sanitation Facility for Cities & Towns between the 2011 Census and 2017



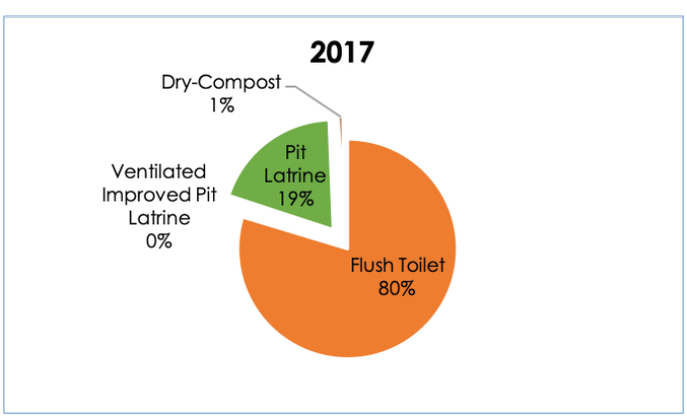
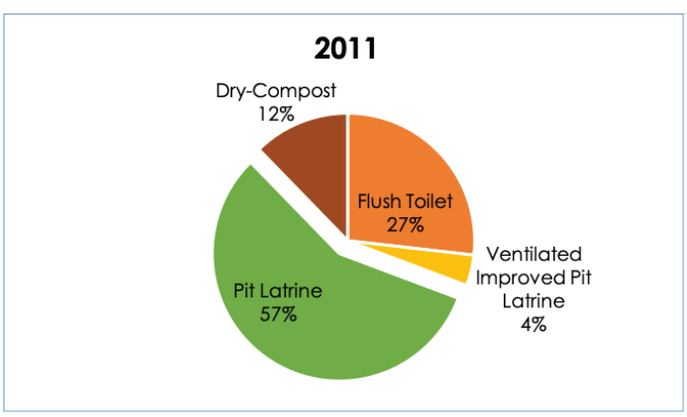
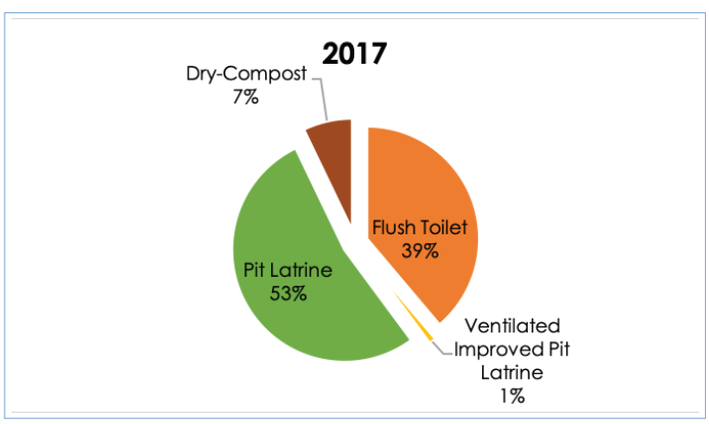


Figure 3h: Proportion of Households by Improved Sanitation Facility for Urban and Rural districts between the 2011 Census and 2017





Waste Collection and Disposal

Waste is defined as anything that has no purpose or that is no longer useful and therefore it should be disposed-off. For example, domestic waste from household activities like cooking, refrigeration (preservation) should be safely disposed-off because they attract bacteria and germs which are not good for human health. Wastes from industrial processes are considered hazardous and they can be toxic in most cases. The Government of Botswana has put measures in place to encourage safe disposal of waste, these include the development of sanitary landfills, among others.

Table 3I shows that out of a total of 649,806 households in 2017 about 50.85 percent receive regular waste collection, followed by burning with 20.50 percent. The table further shows that, all the households in the mining towns of Orapa, Jwaneng, and Sowa Town receive regular collection of waste. Burning of waste is mostly practised in the North West (Ngamiland West), with about 50.89 percent of household disposing their waste through burning. (See figure 3i)

Table 3I: Distribution of Households by Mode of Waste Disposal and District in 2017

District	Collected	Burn	Roadside dumping	Rubbish pit	Other (specify)	Not stated	Total
Gaborone	84,512	285	219	197	209	168	**85,590**
Francistown	32,052	1,484	343	628	134	0	**34,641**
Lobatse	8,819	68	275	512	0	0	**9,674**
Selibe Phikwe	15,420	251	135	322	66	0	**16,194**
Orapa	3,235	0	0	0	0	0	**3,235**
Jwaneng	6,855	0	0	0	0	0	**6,855**
Sowa Town	1,236	0	0	0	0	0	**1,236**
Ngwaketse	7,379	11,002	6,556	11,884	1,362	0	**38,183**
Barolong	3,803	5,204	2,839	4,551	250	0	**16,647**
Ngwaketse West	1,761	534	181	1,111	0	0	**3,587**
South East	26,379	2,421	1,311	1,498	311	0	**31,920**
Kweneng East	49,451	15,221	7,732	12,792	2,466	158	**87,820**
Kweneng west	2,905	3,592	1,786	6,678	243	72	**15,276**
Kgatleng	11,340	10,004	1,347	5,626	748	0	**29,065**
Serowe Palapye	13,943	17,800	4,331	16,662	1,925	0	**54,661**
Central Mahalapye	8,797	9,404	2,983	12,959	448	0	**34,591**
Central Bobonong	3,179	6,544	2,687	7,308	868	0	**20,586**
Central Boteti	5,017	5,903	1,369	3,410	675	63	**16,437**
Central Tutume	7,107	17,544	6,407	11,347	2,213	0	**44,618**
North East	10,543	3,300	2,888	1,362	114	0	**18,207**
Ngamiland East	8,222	8,704	1,884	5,939	144	0	**24,893**
Ngamiland west	1,478	7,928	1,211	4,554	407	0	**15,578**
Chobe	8,008	904	498	407	124	0	**9,941**
Ghanzi	6,114	2,426	1,609	3,166	62	0	**13,377**
Kgalagadi South	719	1,799	1,666	4,627	338	32	**9,181**
Kgalagadi North	2,153	857	1,196	3,581	26	0	**7,813**
Total	**330,427**	**133179**	**51,453**	**121,121**	**13,133**	**493**	**649,806**

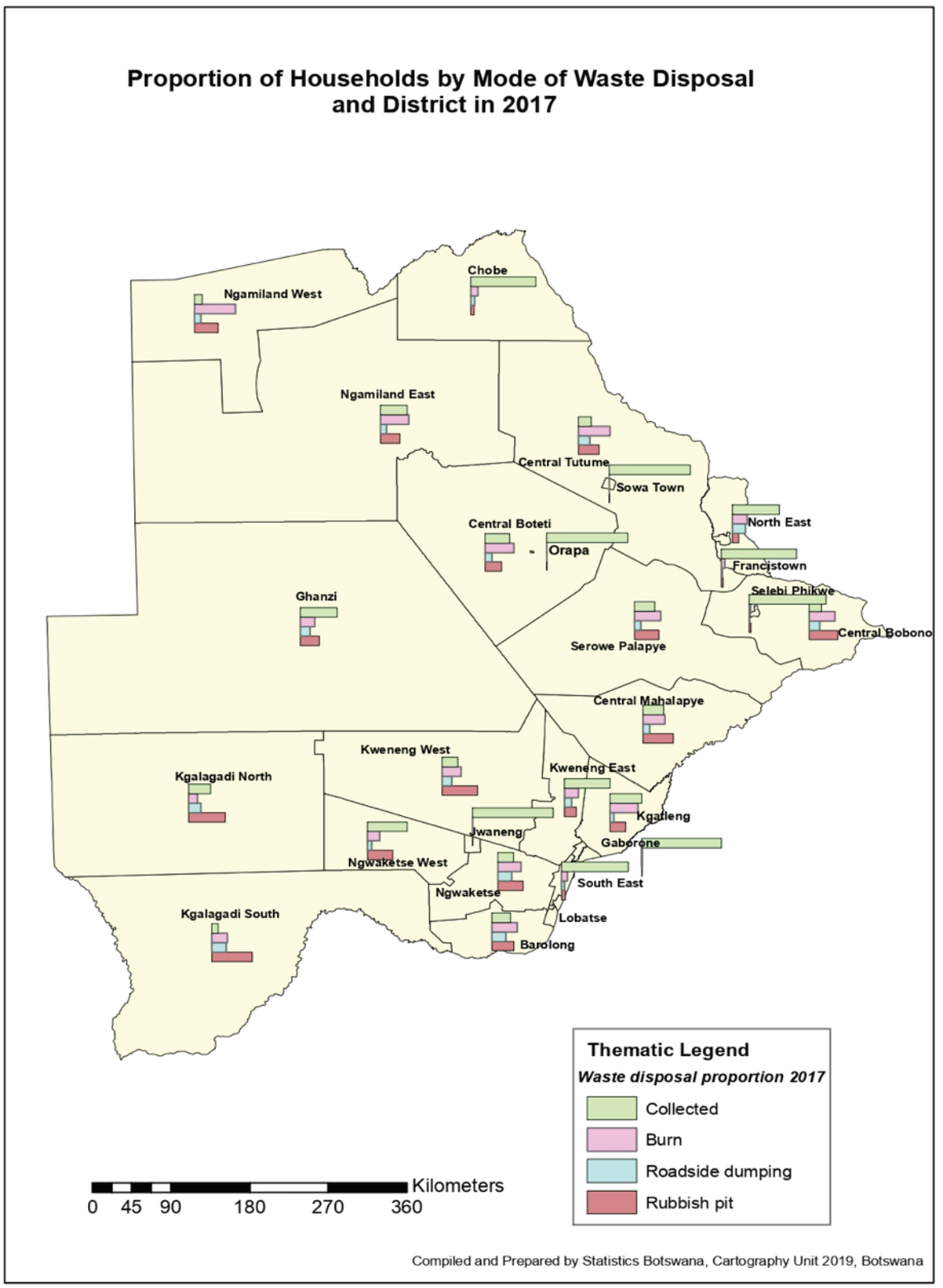
Source: Statistics Botswana (2018)

Table 3m: Proportion of Households by Mode of Waste Disposal and Districts in 2017

District	Collected	Burn	Roadside dumping	Rubbish pit	Other	Not Stated
Gaborone	98.74	0.33	0.26	0.23	0.24	0.2
Francistown	92.53	4.28	0.99	1.81	0.39	0
Lobatse	91.16	0.7	2.84	5.29	0	0
Selibe Phikwe	95.22	1.55	0.83	1.99	0.41	0
Orapa	100	0	0	0	0	0
Jwaneng	100	0	0	0	0	0
Sowa Town	100	0	0	0	0	0
Ngwaketse	19.33	28.81	17.17	31.12	3.57	0
Barolong	22.84	31.26	17.05	27.34	1.5	0
Ngwaketse West	49.09	14.89	5.05	30.97	0	0
South East	82.64	7.58	4.11	4.69	0.97	0
Kweneng East	56.31	17.33	8.8	14.57	2.81	0.18
Kweneng west	19.02	23.51	11.69	43.72	1.59	0.47
Kgatleng	39.02	34.42	4.63	19.36	2.57	0
Serowe Palapye	25.51	32.56	7.92	30.48	3.52	0
Central Mahalapye	25.43	27.19	8.62	37.46	1.3	0
Central Bobonong	15.44	31.79	13.05	35.5	4.22	0
Central Boteti	30.52	35.91	8.33	20.75	4.11	0.38
Central Tutume	15.93	39.32	14.36	25.43	4.96	0
North East	57.91	18.12	15.86	7.48	0.63	0
Ngamiland East	33.03	34.97	7.57	23.86	0.58	0
Ngamiland west	9.49	50.89	7.77	29.23	2.61	0
Chobe	80.56	9.09	5.01	4.09	1.25	0
Ghanzi	45.71	18.14	12.03	23.67	0.46	0
Kgalagadi South	7.83	19.59	18.15	50.4	3.68	0.35
Kgalagadi North	27.56	10.97	15.31	45.83	0.33	0
Total	**50.85**	**20.5**	**7.92**	**18.64**	**2.02**	**0.08**

Source: Derived from Table 3i

Figure 3i: Distribution of Households by Mode of Waste Disposal and District in 2017



2.3 Housing Conditions

This section presents data on access to an adequate housing, as well as characteristics of houses by type and place of residence (rural and urban). The Government of Botswana has committed itself in addressing the housing needs of its population by providing decent and affordable housing for all. The housing units must provide a safe and sanitary environment for the people. Housing conditions is important for the well-being and health of the population. Poor housing conditions are not desirable because they can increase the risk of being infected with air borne diseases like tuberculosis, influenza and meningitis, among others.

2.3.1 Housing Units by Type

Table 4a and Figure 4a depict proportions of housing units in Botswana during the 1991, 2001 and 2011 population censuses, and 2017 BDS as per the following categories: traditional, detached, semi-detached, town house, mixed house, flat, commercial building, shack, moveable, and room. Households living in shacks show some level of deprivation, and it is associated with poor well-being and poor health. The proportion of households living in shacks increased significantly from 1.21 percent in 1991 to 2.22 percent in 2017. This is a cause for concern. The results imply that more households are at high risk of contracting communicable diseases which in turn becomes a burden to the economy. Households occupying traditional housing units followed a downward trend during the 1991, 2001 and 2011 censuses, and 2017 BDS. The proportion dropped from 64.04 percent in 1991 to 22.17 percent in 2001, then dropped further from 13.2 percent in 2011 to 7.82 percent in 2017. During the same period the proportion of households occupying modern types of housing (e.g. detached, flats, and rooms) were on the increase.

Generally, households occupying shacks in rural areas experienced a slight increase during the review period, in spite of the transformation from traditional to modern housing types. On the other hand, households occupying shacks in urban areas decreased from 1.4 percent in 1991 to 1.3 percent in 2001, it further dropped from 0.7 percent in 2011 to 0.4 percent in 2017 (Tables 4c & 4d).

Table 4a: Distribution of Housing Units by Housing Type 1991, 2001, 2011 & 2017

Type of Housing	1991	2001	2011	2017
Traditional	176,881	89,713	72,725	50,825
Mixed	0	75,462	55,095	67,499
Detached	55,409	137,924	239,111	313,814
Semi-detached	7,464	16,312	25,344	23,519
Town House	2,805	11,475	10,468	514*
Flats	1,288	3,449	8,264	12,149
Part of Commercial building	203	811	551	115
Moveable	4,222	5,019	3,857	1,837
Shack	3,348	6,884	9,364	14,445
Rooms	20,825	55,895	126,167	164,852
Shared	0	806	0	0
other	3,764	21	0	0
Not stated	0	935	0	237
Total	**276,209**	**404,706**	**550,946**	**649,806**
Number of housing units	**276,209**	**404,706**	**550,946**	**649,806**

Source: Central Statistics Office (2003); 2011 Population & Housing Census; Botswana Demographic Survey 2017
Note: Mixed housing category was not included during 1991 census. Shared housing category was only used during the 2001 census.
**Town House: 524 figure recorded in 2017 was attributable to the small sample used during the survey.*

Table 4b: Percent distribution of housing units by housing type 1991, 2001, 2011 & 2017

Type of Housing	1991	2001	2011	2017
Traditional	64.04	22.17	13.2	7.82
Mixed	0	18.65	10	10.39
Detached	20.06	34.08	43.4	48.29
Semi-detached	2.7	4.03	4.6	3.62
Town House	1.02	2.84	1.9	0.08
Flats	0.47	0.85	1.5	1.87
Part of Commercial building	0.07	0.2	0.1	0.02
Moveable	1.53	1.24	0.7	0.28
Shack	1.21	1.7	1.7	2.22
Rooms	7.54	13.81	22.9	25.37
Shared	0	0.2	0	0
other	1.36	0.01	0	0
Not stated	0	0.23	0	0.04
Total	**100**	**100**	**100**	**100**
Number of housing units	**276,209**	**404,706**	**550,946**	**649,806**

Source: Derived from Table 4a

Figure 4a: Distribution of housing units by housing type 1991, 2001, 2011 and 2017

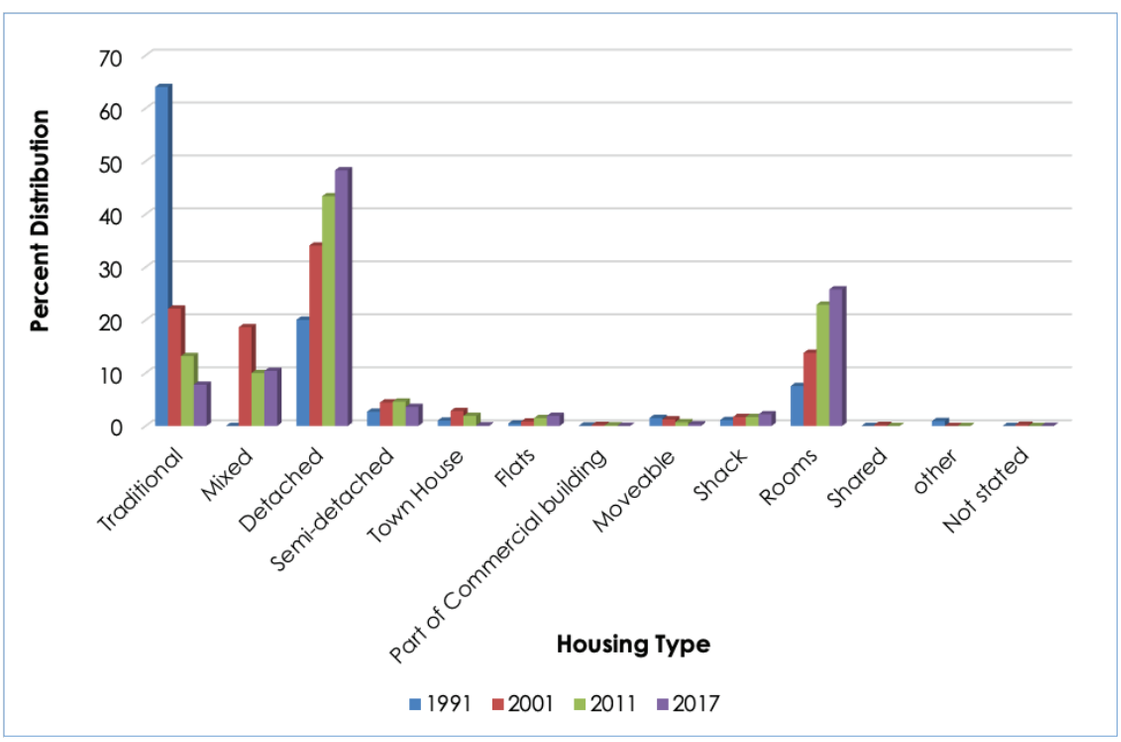


Table 4c: Distribution of housing in rural and urban areas by housing type, 1991, 2001 & 2011 Censuses, & 2017 BDS

	Rural				Urban			
Type of Housing	**1991**	**2001**	**2011**	**2017**	**1991**	**2001**	**2011**	**2017**
Traditional	118,073	84,084	35,544	48,267	58,808	28,124	37,111	2,557
Mixed	0	43,453	10,341	39,312	0	73,076	44,784	28,187
Detached	9,870	45,736	22,733	82,649	45,539	210,236	216,353	231,165
Semi-detached	1,275	6,219	2,168	5,220	6,189	25,344	23,026	18,299
Town House	249	3,485	439	0	2,556	18,122	10,188	514
Flats	78	259	275	295.93	1,210	6,632	8,170	11,853
Part of Commercial building	97	497	319	0	106	1,046	473	115
Moveable	2,535	7,213	2,479	1,809	1,687	2,406	1,390	28*
Shack	1,361	5,113	6,063	12,904	1,987	6,032	3,140	1,541
Rooms	863	12,304	12,406	36,153	19,962	96,338	113,541	128,699
Shared	0	515	0	0	0	1,024	0	0
other	925	23	0	0	2,839	8	0	0
Not stated	0	573	0	73	0	1,260	0	165
Total	**135,326**	**209,474**	**92,767**	**226,683**	**140,883**	**469,648**	**458,176**	**423,124**
No. of housing units	**135,326**	**209,474**	**92767**	**226,683**	**140,883**	**469,648**	**458,176**	**423,124**

Source: CSO (2003); 2011 Census; 2017 BDS
**Moveable Houses: 28 figure recorded in 2017 in Urban areas was attributable to the small sample used during the survey.*

Table 4d: Percent Distribution of housing in rural and urban areas by housing type, 1991, 2001 & 2011 Censuses, & 2017 BDS

Type of Housing	**Rural**				**Urban**			
	1991	**2001**	**2011**	**2017**	**1991**	**2001**	**2011**	**2017**
Traditional	87.3	40.1	38.3	21.3	41.7	6	8.1	0.6
Mixed	0	20.7	11.1	17.3	0	15.6	9.8	6.7
Detached	7.3	21.8	24.5	36.5	32.3	44.8	47.2	54.6
Semi-detached	0.9	3	2.3	2.3	4.4	5.4	5	4.3
Town House	0.2	1.7	0.5	0	1.8	3.9	2.2	0.1
Flats	0.1	0.1	0.3	0.1	0.9	1.4	1.8	2.8
Part of Commercial building	0.1	0.2	0.3	0	0.1	0.2	0.1	0
Moveable	1.9	3.4	2.7	0.8	1.2	0.5	0.3	0
Shack	1	2.4	6.5	5.7	1.4	1.3	0.7	0.4
Rooms	0.6	5.9	13.4	15.9	14.2	20.5	24.8	30.4
Shared	0	0.2	0	0	0	0.2	0	0
other	0.7	0	0	0	2	0	0	0
Not stated	0	0.3	0	0	0	0.3	0	0
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
No. of housing units	**135,326**	**209,474**	**92767**	**226,683**	**140,883**	**469,648**	**458,176**	**423,124**

Source: Derived from Table4c

2.3.2 Household Size

This section provides information on the number of households by type of housing and number of rooms in 2011 and 2017. Tables 4e and 4f show that during the years 2011 and 2017, households occupying one room were the highest with 204,152 and 218,932 respectively. The tables also depict that within each type of housing unit, most of the housing units are smaller with three rooms or less.

Table 4e: Distribution of Number of Households by Type of Housing Unit and Number of Rooms, 2011

House Type	Number of Rooms							Total
	1	2	3	4	5	6	7+	
Traditional	37,035	21,062	9,221	3,231	1,096	421	523	**72,589**
Mixed	11,118	15,167	12,694	7,768	4,110	2,083	2,121	**55,061**
Detached	50,623	64,104	64,844	36,091	12,931	5,665	4,709	**238,967**
Semi-detached	6,231	8,739	6,233	2,657	672	330	315	**25,177**
Town House/ Terraced	1,845	2,182	3,441	1,780	735	288	349	**10,620**
Flats, Apartment	1,100	2,722	3,320	917	206	100	78	**8,443**
Part of Commercial building	424	138	108	46	27	14	35	**792**
Movable	2,987	478	241	76	37	10	31	**3,860**
Shack	7,424	1,309	298	75	34	12	42	**9,194**
Rooms	85,365	24,153	8,991	4,042	1,725	793	844	**125,913**
Total	**204,152**	**140,054**	**109,391**	**56,683**	**21,573**	**9,716**	**9,047**	**550,616**

Source: 2011 Population & Housing Census

Table 4f: Distribution of Number of Households by Type of Housing Unit and Number of Rooms, 2017

Type of Housing Unit	Number of rooms										Total
	1	2	3	4	5	6	7	8+	Unknown	NA	
Traditional	28,779	13,719	5,599	1,920	526	77	108	78	0	0	50,806
Mixed	11,928	19,293	14,401	10,065	5,237	3,860	1,463	1,252	0	0	67,499
Detached	45,089	80,350	87,327	61,267	23540	8777	4744	2719	0	0	313,813
Semi-detached	3,836	7,549	9,090	2,627	236	180	0	0	0	0	23,518
Town House/Terraced	0	0	0	75	0	133	104	202	0	0	514
Flats, Apartment	470	3085	6692	1529	231	142	0	0	0	0	12,149
Part of Commercial building	115	0	0	0	0	0	0	0	0	0	115
Movable	1,593	219	0	24	0	0	0	0	0	0	1,836
Shack	13,075	1,228	141	0	0	0	0	0	0	0	14,444
Rooms	114047	3255	10199	4033	1924	1573	296	214	0	0	135,541
Total	**218,932**	**128,698**	**133,449**	**81,540**	**31,694**	**14,742**	**6,715**	**4,465**	**0**	**0**	**620,235**

Source: 2017 Botswana Demographic Survey

Figure 4b: Number of Households by Type of Housing Unit & Number of Rooms, 2011

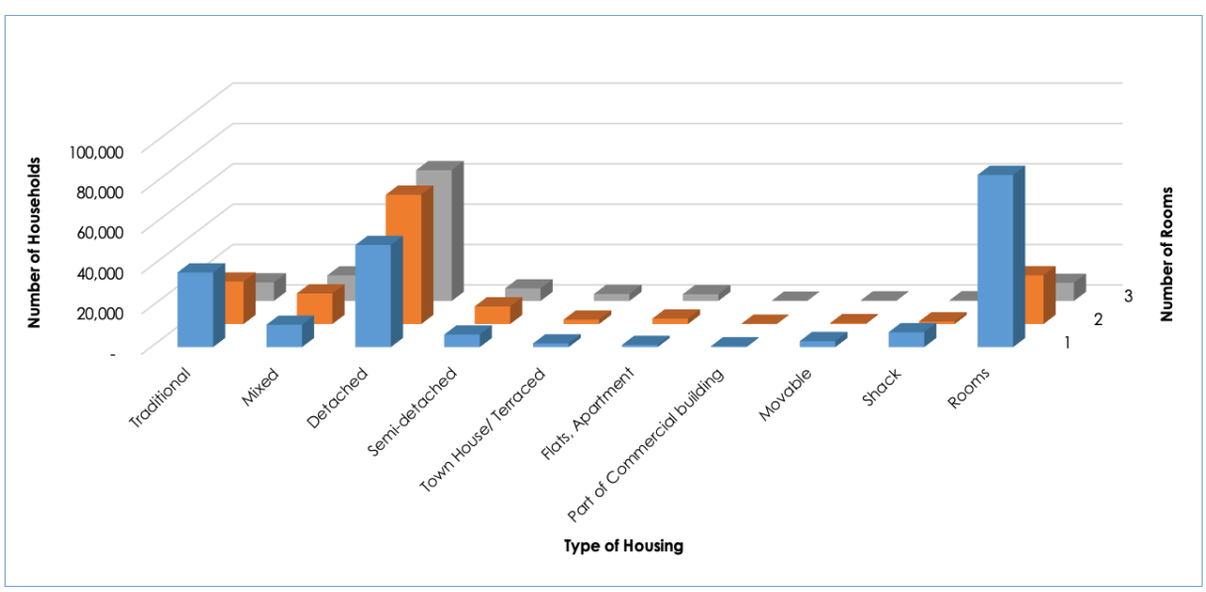
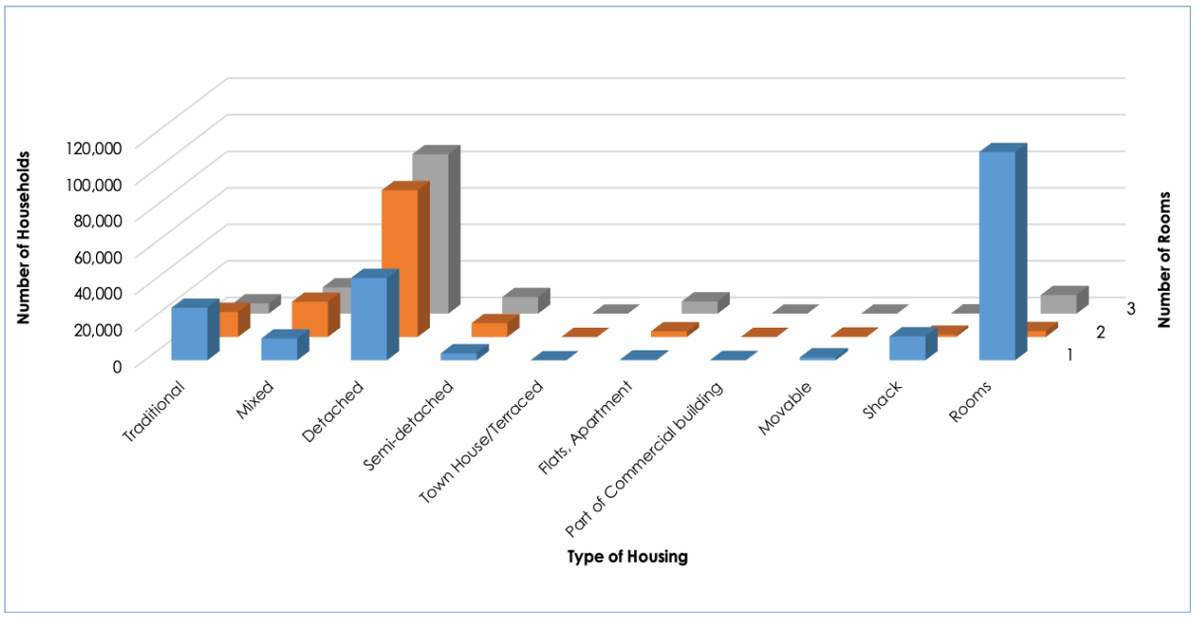


Figure 4c: Number of Households by Type of Housing Unit & Number of Rooms, 2017



2.4 Natural Extreme Events

The purpose of this section is to provide Information on flood and storm occurrence by year, location, number of households and individuals affected, as well as assistance given. A combination of both storms and floods occurrence are common in Botswana, and they are destructive by nature.

Table 4g and Figures 4d – 4e show natural disasters incidents during the years 2010 – 2017 by district, individuals affected and assistance given. It is evident from the table that both hailstorms and heavy rains affected more villages than other natural disasters in 2013 (47 villages) and 2017 (45 villages). A total of 2,660 individuals were affected by hailstorms and heavy rains in 2017. As a result, a total of 228 tents and 191 food baskets were issued to the victims. The affected villages are located in the following districts: Moshupa-Sub, Mahalapye-Sub, Central, Tonota-Sub, Southern, Kweneng, and Kgatleng. The highest flood incidences were recorded in the year 2017, with 36 villages, and 205 households affected (Table 4h). A total of 54 tents and 94 food baskets were provided as a form of relief.

Table 4h: Natural Disasters Incidents, 2010 – 2017

Incident	Year	District	Villages affected (Number)	No. of households affected	Total no. of individual affected / displaced	Assistance given	
						Tents	Food Baskets
Floods	2010	Ngamiland West	10	168	800	235	-
Storm rains		North West	1	132	568	132	69
Hail storm and heavy rains		Kgatleng	3	32	212	32	-
Hailstorm		Ngwaketsi	2	49	-	18	-
Storm winds		North West	1	37	89	4	5
Storm rains	2012	Palapye Sub-District	13	329	1,756	119	322
Floods	2013	Sowa Sub, Tonota Sub	10	477	1,573	400	218
Hailstorm and heavy rains		Kgatleng, North West, Kweneng, Moshupa-Sub, Mahalapye-Sub, Central, Tonota-Sub	47	981	1,719	483	238
Storm rains and thunderstorms		Tutume-Sub, North West, Palapye-Sub	8	67	259	15	2
Floods	2014	Tonota, Selebi Phikwe, Francistown	3	40	129	2	7
Hailstorm and heavy rains		Central, Kgatleng, Ghanzi, Tutume-Sub, Goodhope	12	254	709	134	95
Storm rains and thunderstorms	2015	Lobatse	1	51	36	7	8
Floods		Ghanzi, Kweneng	9	164	867	62	150
Hailstorm and heavy rains		Thamaga-Sub, North West	2	36	80	21	23
Storm rains and thunderstorms		-	-	-	-	-	-
Floods	2016	Central, Ghanzi, Kgatleng, Kweneng	5	63	387	37	29
Hailstorm and heavy rains		Central, Kgatleng, Southern, Kgalagadi, North East, Kweneng, North West, Ngamiland	36	482	900	164	165
Storm rains and thunderstorms		Central, Kweneng, Chobe	6	181	135	66	99
Floods	2017	Kgatleng, Kweneng, Ghanzi, North East, Southern, Ngamiland	36	205	794	54	94
Hailstorm and heavy rains		Central, Southern, Kweneng, Kgatleng	45	549	2,660	228	191
Storm rains and thunderstorms		-	-	-	-	-	-

Source: *Statistics Botswana (2013: 123); National Disaster Management Office*

Figure 4d: Distribution of Individuals & Household Affected by Incident, 2010 - 2017

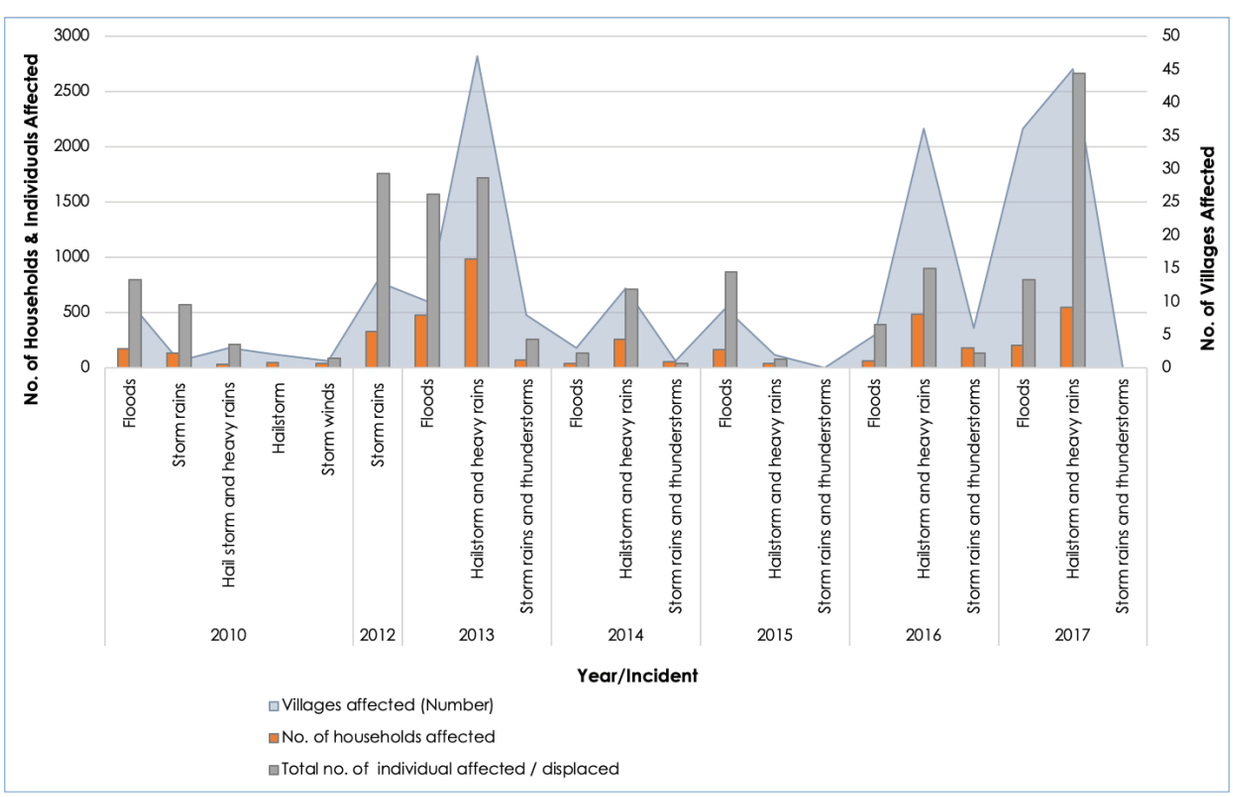
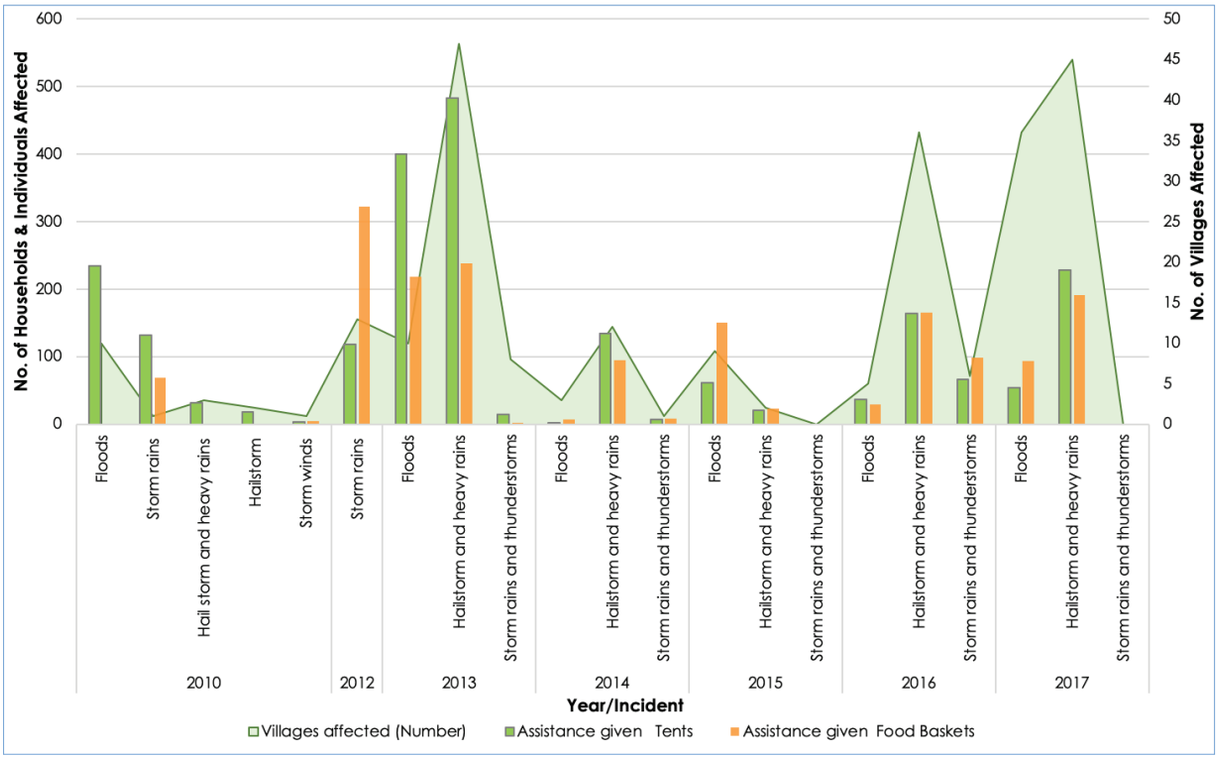


Figure 4e: Distribution of Tents and Food Baskets by Year & Incident, 2010 - 2017



3.0 Environmental Health

This section of the report focuses on Sub-component 5.2 on environmental health. "Environmental health is the science and practice of preventing human injury and illness and promoting well-being by identifying and evaluating environmental sources and hazardous agents and limiting exposures to hazardous physical, chemical, and biological agents in air, water, soil, food, and other environmental media or settings that may adversely affect human health." (NEHA 2018). Environmental health is concerned with how the environment influences human health and environmental quality, through environmental factors. The environment pertains to both the natural environment and its elements such as air, water and soil, and the man-made or built environment such as buildings and roads. (U.S. National Library of Medicine 2018).

> Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, and genetics.
>
> **World Health Organisation**

The FDES identifies specific indicators for the measurement of the health of human populations. They are mortality, morbidity and incidence of specific diseases and conditions that are influenced by environmental conditions. The diseases and conditions are grouped as indicated below.

6. Airborne diseases and conditions
7. Water-related diseases and conditions
8. Vector borne diseases
9. Health problems associated with excessive UV radiation exposure
10. Toxic substance- and nuclear radiation-related diseases and conditions

While these groupings are based on the nature of the disease or condition and its relationship with environmental factors and media of transmission, causality between the disease and the environmental factor must not be assumed since there are other factors that may influence the occurrence of the disease or condition.
This report examines the trends in disease cases, prevalence, incidence and deaths where data availability permits. They are disaggregated spatially at district level, and temporally by year. The period under study is mainly 2012 to 2017.

3.1 Airborne diseases and conditions

3.1.1 Tuberculosis

Tuberculosis (TB) has since overtaken HIV/AIDS as the leading cause of death from a single infectious agent in the world. In 2017 TB caused an estimated 1.6 million deaths from an estimated 10 million new cases globally (World Health Organisation: 2018). The disease is caused by bacteria called Mycobacterium tuberculosis and mostly affects the lungs. Transmission of the bacteria is through the air, when an infected person coughs, spits or sneezes, and the bacteria is inhaled by another person.

Figure 5.1 shows the national cases of TB for the period 2012 to 2016. There is a general falling trend in the number of TB cases for Botswana during the period at study.

Figure 5.1: National TB cases 2012 - 2016

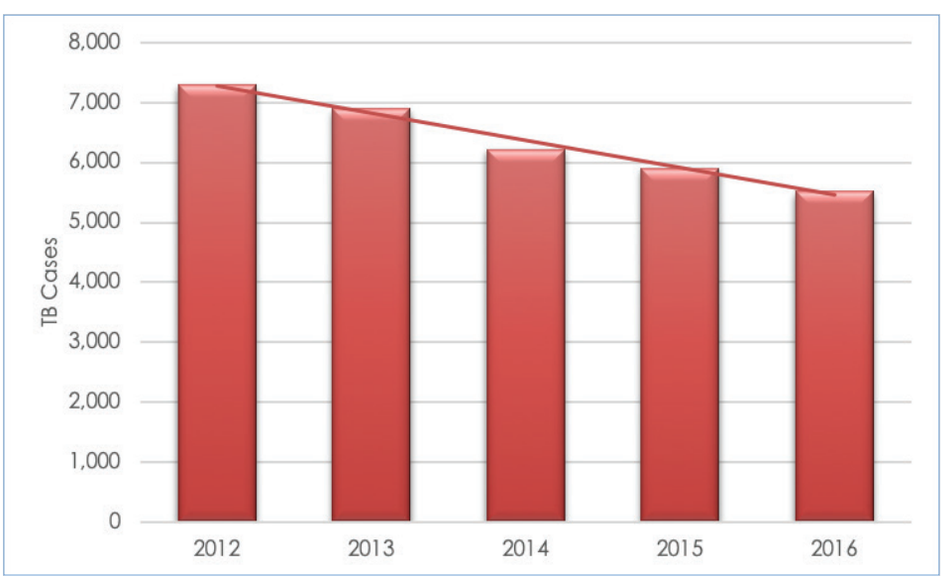


Table 5.1 shows annual TB cases by district from 2012 to 2016. The highest number of annual TB cases recorded between 2012 and 2016 is for Kweneng East at 1,207 cases in 2012. The high numbers of cases in Kweneng East and Gaborone may be the result of higher populations.

Table 5.1: Tuberculosis cases by District 20012-2016

Year	2012	2013	2014	2015	2016
Gaborone	757	728	697	1,071	964
Kweneng East	1,207	1,131	1,004	654	556
Francistown	426	362	329	463	519
Serowe/Palapye	579	571	558	480	494
Kgatleng	337	356	323	298	275
Ngamiland	284	249	255	237	240
Mahalapye	346	348	287	244	236
Ghanzi	314	272	257	288	235
Southern	187	189	189	202	206
Boteti	303	277	253	257	199
Tutume	289	259	217	198	192
South East	321	322	272	193	167
Kweneng West	207	211	137	109	159
Good Hope	180	135	175	142	133
Lobatse	150	135	106	157	131
Jwaneng	72	119	99	120	127
Kgalagadi South	147	144	139	126	126
Bobirwa	221	193	149	156	125
Selibe Phikwe	182	184	119	97	112
Okavango	133	149	146	122	85
Kgalagadi North	145	109	112	109	83
North East	164	163	142	65	74
Chobe	46	45	60	59	51
Mabutsane	63	59	62	56	26
Tonota	228	187	135	-	-
National	7,288	6,897	6,222	5,903	5,515

Source: Ministry of Health and Wellness

3.1.2 Prevalence of Tuberculosis

Table 5.2 and Figure 5.2 show the prevalence of Tuberculosis per 100,000 of the population in Botswana for the period 2007 to 2016. Indications are that TB prevalence is falling in the country.

Table 5.2: Prevalence of TB per 100,000 (2007 to 2016)

Year	Prevalence per 100 000
2007	417.5
2008	476.3
2009	448.8
2010	360.8
2011	299.9
2012	359.9
2013	340.6
2014	307.3
2015	291.5
2016	272.4

Source: Ministry of Health and Wellness

Figure 5.2: Prevalence of TB per 100,000 (2007 to 2016)

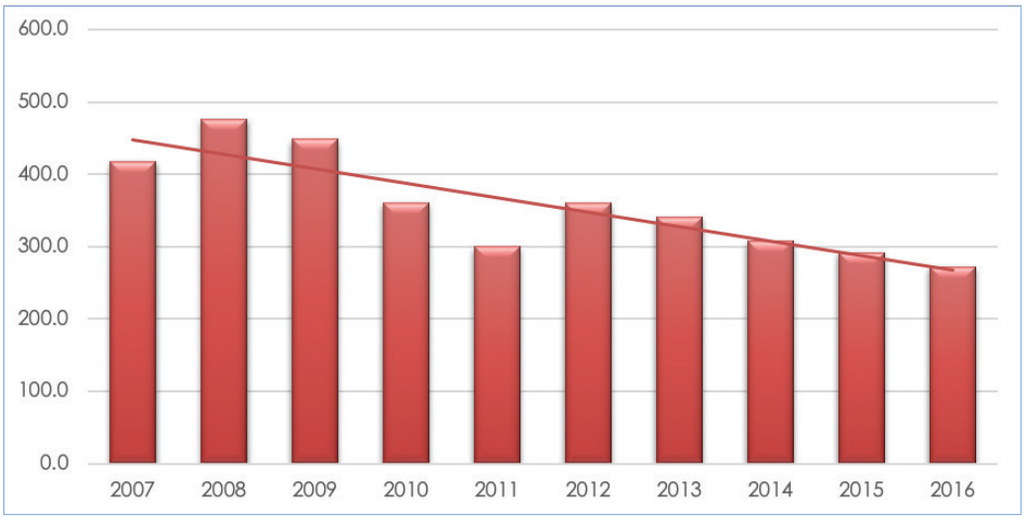


Table 5.3 shows the prevalence of TB by districts, for the period 2012 to 2016. The highest prevalence per 100 000 was recorded in Ghanzi at 706.7 in the year 2012, followed by Kgalagadi North, which recorded 689.6 cases per 100 000 of the population, also in the year 2012.

Table 5.3: Prevalence of TB by district 2012 – 2016

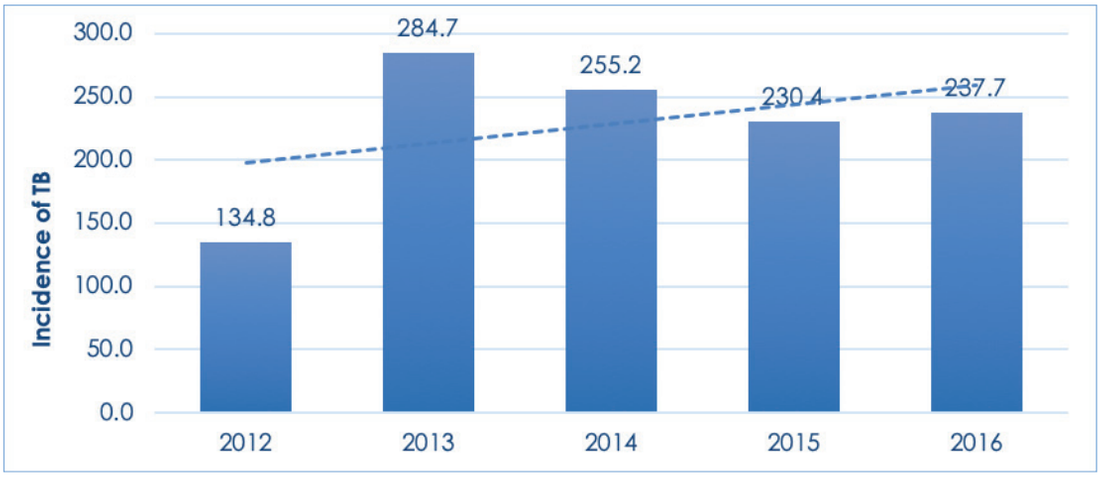
	2012	2013	2014	2015	2016
Jwaneng	392	636.1	520.4	621.1	648.4
Francistown	421.8	351.8	314.2	435.3	481
Ghanzi	706.7	594.7	546.8	597.1	475.6
Lobatse	518.3	468.5	370.2	552.9	466.3
Kgalagadi south	481.4	464.2	441.7	395.3	391
Gaborone	318.9	299.7	280.8	422.9	373.7
Kgalagadi north	689.6	505.6	507.4	483	360.4
Boteti	517.4	464.1	416.6	416.4	317.8
Kweneng west	424.9	425.5	271.9	213.2	306.9
Kgatleng	358.7	370.2	328.7	297.1	269.1
Selebi Phikwe	368.5	373.4	242.6	199	231.7
Goodhope	322.7	238.3	304.6	244.1	226.1
Chobe	191.8	182.9	238	228.8	193.7
Mahalapye	288.2	287.4	235.4	199.1	191.9
Kweneng east	455.2	413.7	356.7	226.1	187.3
South east	364.5	353.5	289.2	199.1	167.4
Kanye (southern)	142.5	142	140.3	148.3	149.9
Ngamiland	158	135.5	136	124	123.5
Serowe	165.2	175.7	176	149.1	119.5
Tutume	192.1	169	139.1	124.9	119.4
North east	266.1	258.9	221.2	99.4	111.3

Source: Ministry of Health and Wellness

3.1.3 Incidence of Tuberculosis

Figure 5.3 shows the national incidence of TB per 100,000 of the population. There is an indication of rising incidence of TB in the country.

Figure 5.3: National incidence of Tuberculosis (2012 – 2016)



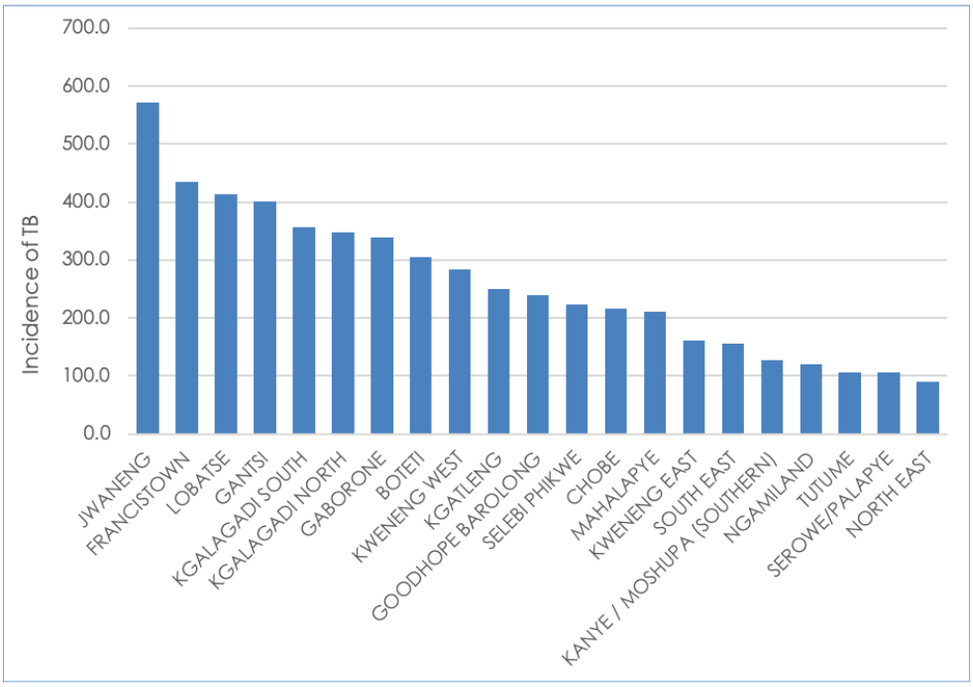
The Table 5.4 and Figure 5.4 show the annual incidence of TB by district for the period 2012 to 2016. For the period under study, the highest incidence of TB per 100,000 of the population was that of Jwaneng, followed by Ghanzi and Kgalagadi North. Jwaneng recorded the highest incidence of TB for the year 2016, followed by Francistown, Lobatse and Kgalagadi South.

Table 5.4: Incidence of TB by districts 2012 - 2016

	2012	2013	2014	2015	2016
Jwaneng	152.4	513.2	415.2	496.9	571.8
Francistown	144.6	300.3	277	370.4	434.6
Lobatse	248.8	399.1	307.3	457.8	412.9
Ghanzi	274.6	408.9	357.4	445.7	400.7
Kgalagadi South	232.5	402.9	378.2	320	356.8
Kgalagadi North	304.4	394.3	394.1	412.1	347.4
Gaborone	106.6	248.7	233.7	353.8	339.5
Boteti	186.1	398.8	347.4	345.1	305
Kweneng West	225.8	363	240.1	176	283.7
Kgatleng	93.7	310.9	279.8	242.3	250.5
Goodhope Barolong	111.2	192.4	254.2	201.1	239.8
Selebi Phikwe	153.9	330.8	224.2	166.2	223.4
Chobe	87.5	146.3	214.2	193.9	216.5
Mahalapye	149.1	246.1	202.6	164	210.6
Kweneng East	139.5	343.8	305.5	188	161
South East	111.3	292	243.5	161.9	156.4
Kanye / Moshupa (southern)	45.7	122.5	115.1	121.9	128.1
Ngamiland	56.7	117.6	117.3	106.8	120.4
Tutume	78.5	137	129.5	104.7	107
Serowe/Palapye	73.9	148.4	151.8	126.8	106.8
North East	108.7	216	190	93.3	90.3

Source: Ministry of Health and Wellness

Figure 5.4: Incidence of TB by districts 2016



3.1.4 Tuberculosis (TB) Deaths

Figure 5.5 shows the national annual TB deaths for the period 2012 to 2016. The highest number of deaths were recorded in 2012. The trend indicates falling numbers of TB deaths over the period under study.

Figure 5.5: TB deaths (2012 – 2016)

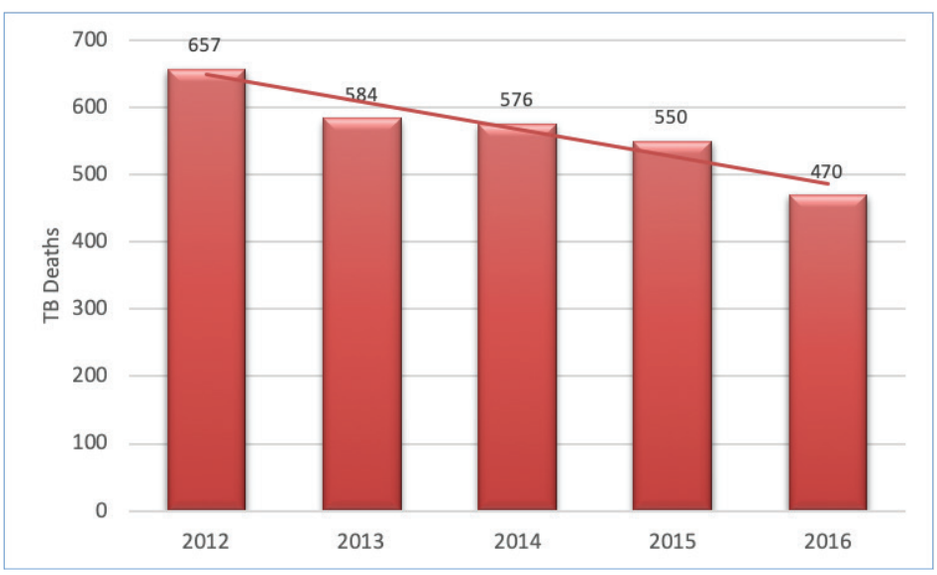


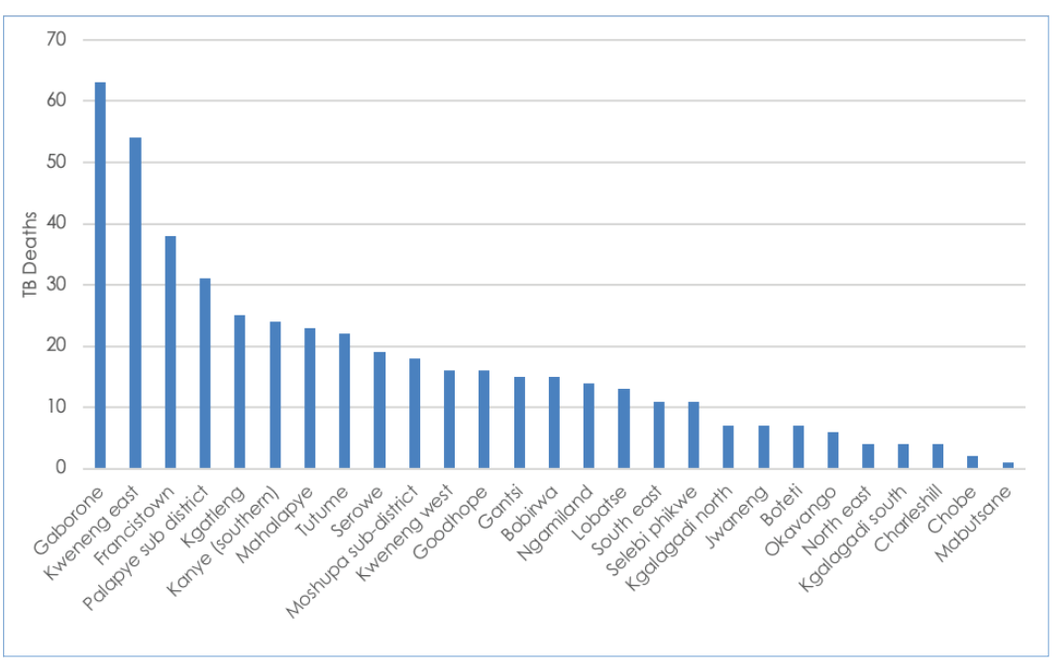
Table 5.5 and figure 5.6 show the TB deaths by district, for the years 2012 to 2016. The highest number of TB deaths for the period were recorded in Kweneng East, followed by Gaborone. Kweneng East also recorded the highest number of TB deaths in a single year, 2012; however, the numbers are seen to be going down over the years. Gaborone recorded the highest number of deaths for the latest available year, 2016.

Table 5.5: TB deaths by district (2012 – 2016)

	2012	2013	2014	2015	2016
Gaborone	42	39	46	86	63
Kweneng east	120	96	74	73	54
Francistown	32	21	20	45	38
Palapye sub district	23	25	26	19	31
Kgatleng	47	34	38	37	25
Kanye (southern)	19	17	32	19	24
Mahalapye	30	42	33	24	23
Tutume	29	19	22	10	22
Serowe	31	29	31	22	19
Moshupa sub-district	33	22	26	25	18
Goodhope	16	16	30	21	16
Kweneng west	18	14	8	5	16
Bobirwa	27	29	18	18	15
Ghanzi	17	14	20	15	15
Ngamiland	24	21	19	22	14
Lobatse	17	11	8	11	13
Selebi Phikwe	10	9	10	5	11
South east	26	32	21	15	11
Boteti	18	21	14	25	7
Jwaneng	3	12	2	11	7
Kgalagadi north	10	7	9	7	7
Okavango	9	11	14	7	6
Charleshill	1	5	5	1	4
Kgalagadi south	5	3	9	6	4
North east	15	12	14	6	4
Chobe	3	2	5	6	2
Mabutsane	10	6	6	9	1
Tonota	22	15	16	0	0
Total	**657**	**584**	**576**	**550**	**470**

Source: Ministry of Health and Wellness

Figure 5.6: TB deaths by district 2016



3.2 Water related diseases and conditions

3.2.1 Diarrhoea

Table 5. 6 shows the national diarrhoea cases over the period 2011 to 2017. The number of cases per year has gradually fallen during the period.

Table 5.6: Diarrhoea cases (2011 – 2017)

Year	Diarrhoea cases
2011	24,785
2012	22,232
2013	17,898
2014	15,867
2015	10,298
2016	10,234
2017	7,859

Source: Ministry of Health and Wellness

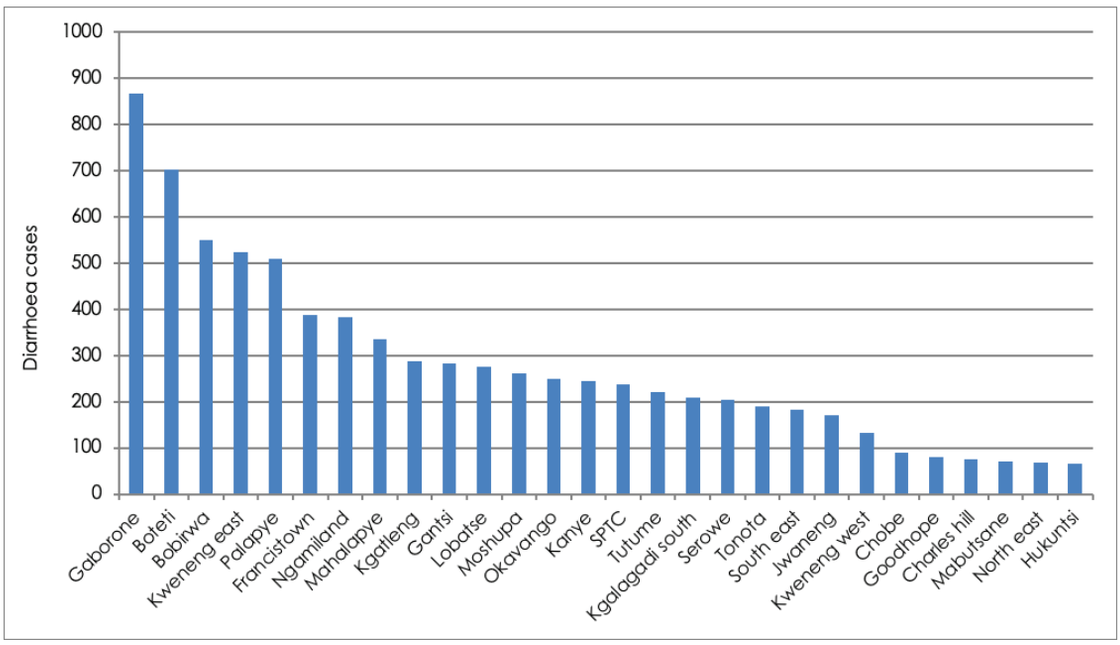
Table 5.7 and Figure 5.7 shows diarrhoea cases by district, for the period 2011 to 2017. Kweneng East recorded the highest number of cases over the period under study, followed by Gaborone and Palapye. The high numbers of cases in the districts may be the result of higher populations residing in these districts. Gaborone recorded the highest number of cases for the year 2017.

Table 5.7: Diarrhoea cases by district 2011 - 2017

	2011	2012	2013	2014	2015	2016	2017
Kweneng east	1,906	2,122	1,703	1,572	1,071	563	524
Gaborone	2,132	1,824	1,009	979	728	862	867
Palapye	1,295	1,379	1,437	1,560	896	732	508
Mahalapye	1,465	1,295	971	938	810	571	335
Ngamiland	1,238	1,412	1,082	728	335	551	384
Boteti	980	881	815	597	597	1,125	703
Serowe	1,459	1,150	1,035	741	508	482	204
Kgatleng	1,424	956	888	890	341	210	288
Tutume	869	1,131	730	1,031	338	373	220
Francistown	1,189	1,186	607	379	347	307	387
Bobirwa	821	817	743	564	402	354	550
Selibe Phikwe	941	859	569	720	444	296	237
Kanye	709	665	841	673	403	304	245
South east	963	728	512	476	430	377	184
Okavango	911	831	572	341	191	287	249
Gantsi	755	448	651	460	404	321	284
Moshupa	646	299	324	406	335	553	262
Kweneng west	788	580	492	348	249	231	133
Kgalagadi south	410	369	501	401	271	360	209
Lobatse	437	262	362	444	311	367	275
Tonota	401	623	317	374	133	232	189
Goodhope	565	510	406	226	116	80	81
Jwaneng	551	332	198	225	157	246	170
Chobe	664	389	253	221	141	108	90
Hukuntsi	455	603	295	213	97	74	67
North east	509	406	295	195	128	109	69
Charles hill	169	150	248	80	58	101	75
Mabutsane	133	25	42	85	57	58	70
National	**24,785**	**22,232**	**17,898**	**15,867**	**10,298**	**10,234**	**7,859**

Source: Ministry of Health and Wellness

Figure 5.7: Diarrhoea cases by district 2017



3.2.2 Diarrhoea Prevalence

Table 5.8 and Figure 5.8 show the prevalence of diarrhoea in Botswana for the years 2011 to 2016. Prevalence trends indicate a rapid fall in diarrhoea cases per 100,000 of the population over the years.

Table 5.8: Prevalence of Diarrhoea in Botswana (2011 – 2016)

Year	Prevalence per 100,000
2011	1,224.00
2012	1,073.50
2013	846.3
2014	735.8
2015	469.1
2016	458.7

Source: Ministry of Health and Wellness

Figure 5.8: Prevalence of Diarrhoea in Botswana (2011 – 2016)

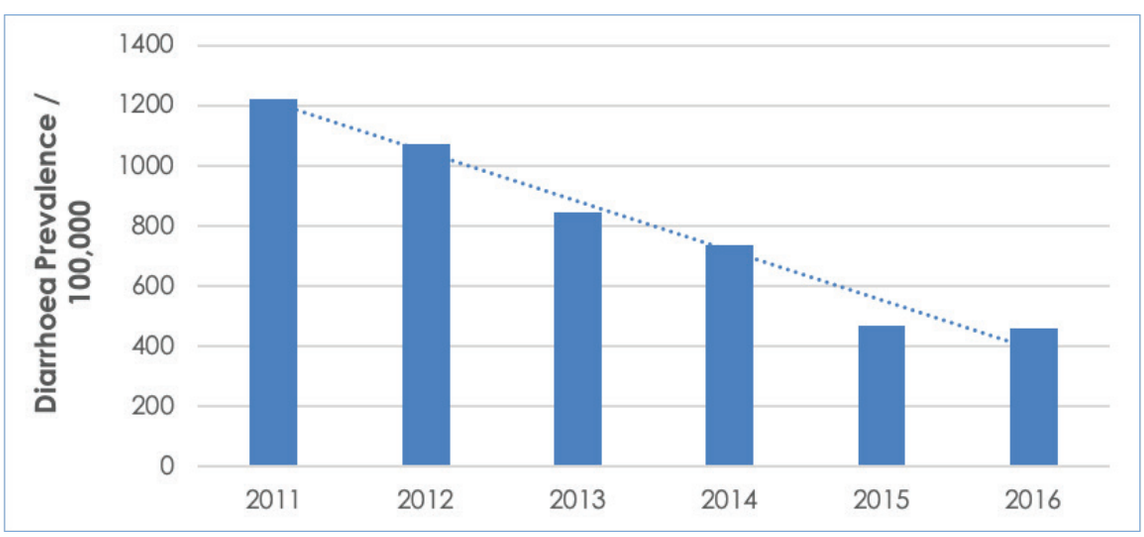


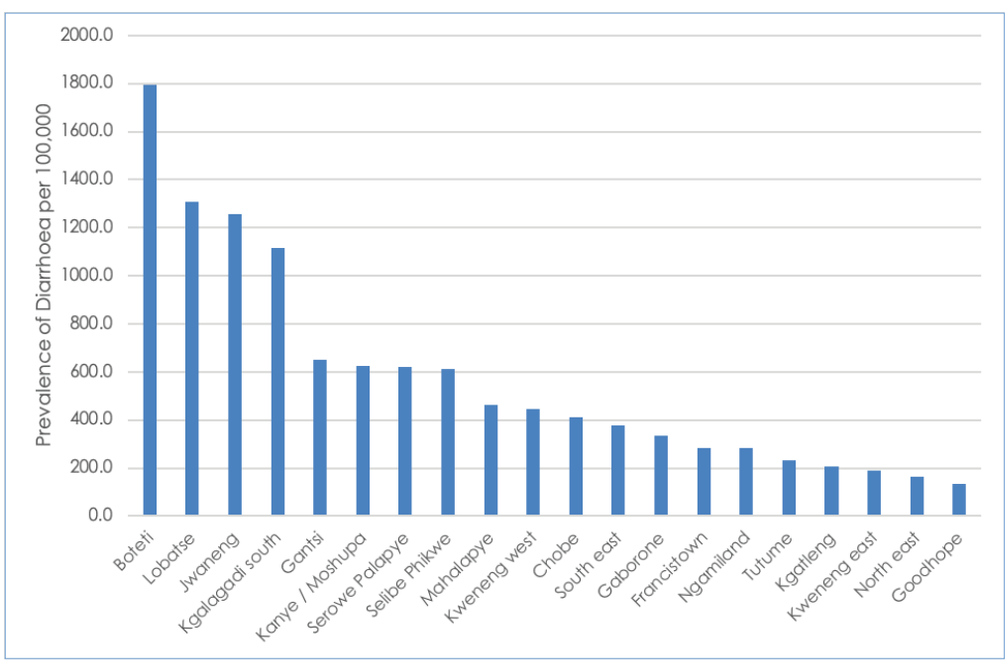
Table 5.9 and Figure 5.9 show the prevalence of Diarrhoea by districts. The highest single annual prevalence of diarrhoea is for Jwaneng town in 2011, followed by that of Chobe in the same year. Boteti recorded the highest prevalence for the year 2016. According to the trends shown, the prevalence of diarrhoea is falling in Botswana.

Table 5.9: Prevalence of Diarrhoea by districts (2011 – 2016)

	2011	2012	2013	2014	2015	2016
Boteti	1,708.00	1,504.50	1,365.60	983	967.3	1,796.80
Lobatse	1,506.50	905.3	1,256.20	1,550.50	1,095.30	1,306.40
Jwaneng	3,059.80	1,807.50	1,058.40	1,182.70	812.6	1,255.90
Kgalagadi south	1,365.90	1,208.40	1,615.00	1,274.40	850.3	1,117.00
Ghanzi	1,751.90	1,008.40	1,423.40	978.6	837.6	649.6
Kanye / Moshupa	1,048.40	734.5	875.5	800.9	541.9	623.5
Serowe Palapye	1,525.80	1,374.50	1,319.90	1,208.80	726.8	620.2
Selibe Phikwe	1,904.40	1,739.30	1,154.80	1,467.70	910.9	612.4
Mahalapye	1,232.40	1,078.60	802	769.5	661	464.4
Kweneng west	1,648.60	1,190.50	992.3	690.6	486.9	445.9
Chobe	2,844.00	1,621.60	1,028.00	876.6	546.8	410.1
South east	1,132.80	826.6	562.1	506.1	443.5	377.9
Gaborone	920.6	768.5	415.4	394.4	287.5	334.1
Francistown	1,201.50	1,174.40	589.9	362	326.2	284.5
Ngamiland	704.9	785.5	588.9	388.3	175.3	283.4
Tutume	589.6	752	476.3	661	213.3	232
Kgatleng	1,553.60	1,017.50	923.4	905.6	340	205.5
Kweneng east	742.4	800.3	622.9	558.5	370.2	189.6
North east	844.6	658.7	468.6	303.7	195.8	164
Goodhope	1,030.40	914.5	716.8	393.4	199.4	136

Source: Ministry of Health and Wellness

Figure 5.9: Prevalence of Diarrhoea by districts (2016)



3.2.3 Diarrhoea Deaths

Table 5.10 and Figure 5.11 show the deaths due to diarrhoea in Botswana for the period 2011 to 2017. Deaths from diarrhoea have decreased during the period under study.

Table 5.10: Diarrhoea deaths (2011 – 2017)

Year	Deaths
2011	194
2012	233
2013	132
2014	137
2015	45
2016	55
2017	49

Source: Ministry of Health and Wellness

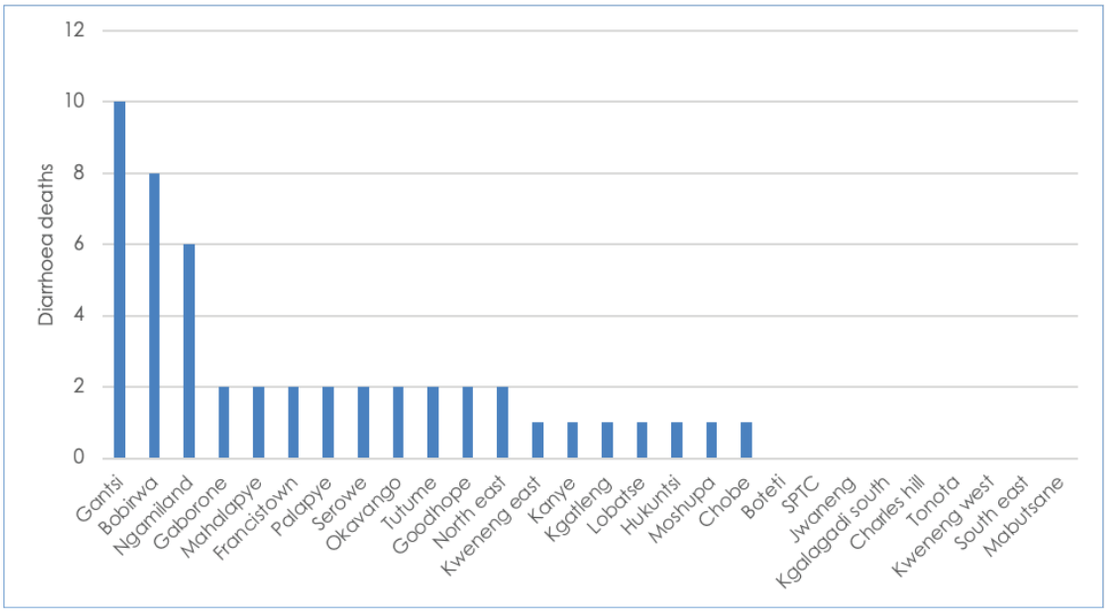
Table 5.11 shows diarrhoea deaths by district for the period 2011 to 2017. Diarrhoea deaths for the period were most recorded in Ngamiland, Gaborone and Mahalapye. The highest number of deaths recorded in one year were for Ngamiland in 2012, followed by Gaborone and Mahalapye in 2011. The latest highest recorded deaths were for Ghanzi in 2017. The year 2012 recorded the highest number of deaths in the period.

Table 5.11: Diarrhoea deaths by district (2011 – 2017)

	2011	2012	2013	2014	2015	2016	2017
Ghanzi	7	14	0	4	4	7	10
Bobirwa	12	20	14	10	5	2	8
		|					
Ngamiland	13	34	21	24	3	8	6
Mahalapye	28	21	8	8	0	5	2
Serowe	7	6	3	9	4	5	2
Gaborone	31	21	22	15	2	2	2
Okavango	4	15	5	3	2	2	2
Francistown	6	20	14	1	0	1	2
Palapye	13	12	6	3	3	1	2
Tutume	4	13	1	9	0	1	2
Goodhope	4	3	3	3	2	1	2
North east	5	4	1	0	0	0	2
Kweneng east	15	6	1	4	2	2	1
Kanye	8	1	2	6	1	2	1
Kgatleng	9	5	2	1	1	2	1
Moshupa	5	0	2	0	0	2	1
Lobatse	2	0	6	5	4	1	1
Hukuntsi	1	6	2	0	3	1	1
Chobe	1	2	0	1	3	1	1
Boteti	8	1	9	8	2	6	0
Tonota	0	1	0	0	0	2	0
Kweneng west	1	0	0	0	0	1	0
Selibe Phikwe	6	14	4	8	1	0	0
Jwaneng	1	0	3	8	2	0	0
Kgalagadi south	1	0	1	6	1	0	0
Charles hill	2	0	2	1	0	0	0
South east	0	0	0	0	0	0	0
Mabutsane	0	0	0	0	0	0	0
National	**194**	**233**	**132**	**137**	**45**	**55**	**49**

Source: Ministry of Health and Wellness

Figure 5.10: Diarrhoea deaths by district (2017)



3.3 Vector Borne Diseases

In addition, the Framework for the Development of Environment Statistics requires data on vector borne diseases. These are diseases transmitted by vectors such as insects and arachnids (spiders and scorpions) that carry viruses, bacteria, protozoa and other pathogens (FDES; 2013). These include diseases such as malaria, dengue fever, yellow fever and lyme disease. In Botswana malaria, is a notifiable disease of key concern.

3.3.1 Malaria

Malaria is spread by insect vectors; the mosquito, the proliferation of which is highly influenced by climatic and environmental conditions. Most of malaria in Botswana is caused by the malignant Plasmodium Falciparum sporozoites and the Anopheles arabiensis mosquito is the only vector. (Government of Botswana; 2009)
Table 5.12 and Figure 5.11 show the national malaria cases for the period 2011 to 2017.

Table 5.12: Malaria cases (2011 – 2017)

Year	
2011	432
2012	193
2013	456
2014	1,346
2015	326
2016	716
2017	1,900

Source: Ministry of Health and Wellness

The highest number of cases recorded in a single year were for the year 2017, followed by 2014 and then 2016. There was a rapid increase in malaria cases between 2011 and 2017.

Figure 5.11: Malaria cases (2010 – 2017)

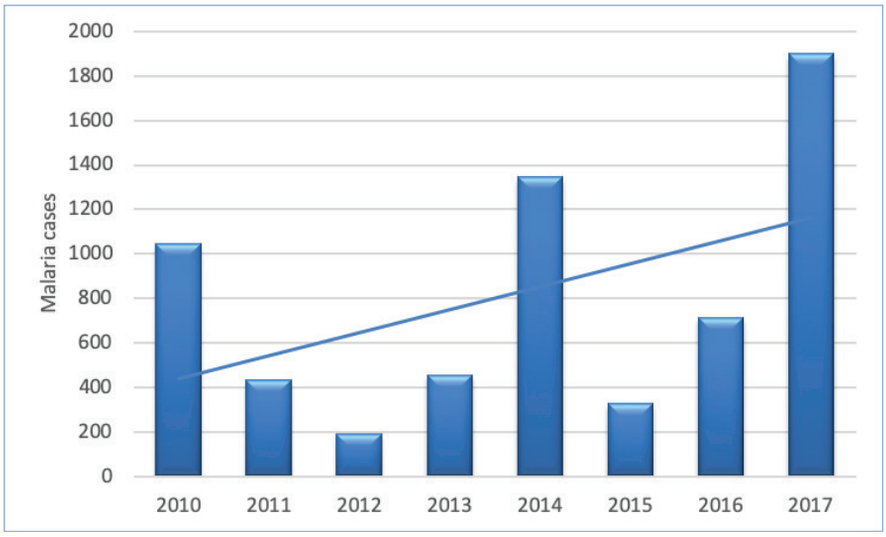


Table 5.13 shows the malaria cases by district. Okavango had the highest number of cases of malaria for one year in 2017, and for the whole period under study.

Table 5.13: Malaria cases by district (2011 – 2017)

	2011	2012	2013	2014	2015	2016	2017
Okavango	15	10	192	888	137	419	1,005
Bobirwa	78	33	39	63	19	15	260
Ngami	30	17	72	84	29	77	117
Palapye	37	24	17	55	11	6	116
Mahalapye	4	18	15	33	12	9	77
Chobe	11	15	41	94	19	107	54
Kgatleng	23	0	10	9	8	2	50
Tutume	60	19	15	19	4	23	47
Selibe Phikwe	31	11	8	11	6	6	34
Gaborone	20	10	19	18	18	8	29
Gantsi	0	0	0	6	0	12	20
Serowe	9	2	6	20	2	1	19
Kweneng East	31	2	5	15	15	0	17
Tonota	4	0	0	1	5	1	13
Kanye	0	2	0	0	2	0	10
Francistown	9	9	10	4	5	2	9
Boteti	42	16	3	10	13	19	5
North East	3	1	1	3	0	2	5
South East	8	3	2	0	10	4	3
Kgal/S-Tsabong	2	0	0	0	0	0	3
Moshupa	0	0	0	0	0	0	3
Kweneng West	15	0	0	0	2	0	2
Lobatse	0	0	0	4	5	2	1
Charles Hill	0	0	0	3	0	0	1
Kgal/N-Hukuntsi	0	0	0	4	2	0	0
Jwaneng	0	1	1	1	1	1	0
Good Hope	0	0	0	1	1	0	0
Mabutsane	0	0	0	0	0	0	0
National	**432**	**193**	**456**	**1,346**	**326**	**716**	**1,900**

Source: Ministry of Health and Wellness

3.3.2 Prevalence of malaria

Table 5.14 and Figure 5.12 show the prevalence of malaria in Botswana. Prevalence was highest for the year 2017, followed by the year 2014. The overall trend for the period shows a rapid increase in the prevalence of malaria.

Table 5.14: Prevalence of Malaria (2011 – 2017)

Year	Prevalence
2011	21.3
2012	9.3
2013	21.6
2014	62.4
2015	14.9
2016	32.1
2017	83.8

Source: Ministry of Health and Wellness

Figure 5.12: Prevalence of Malaria (2011 – 2017)

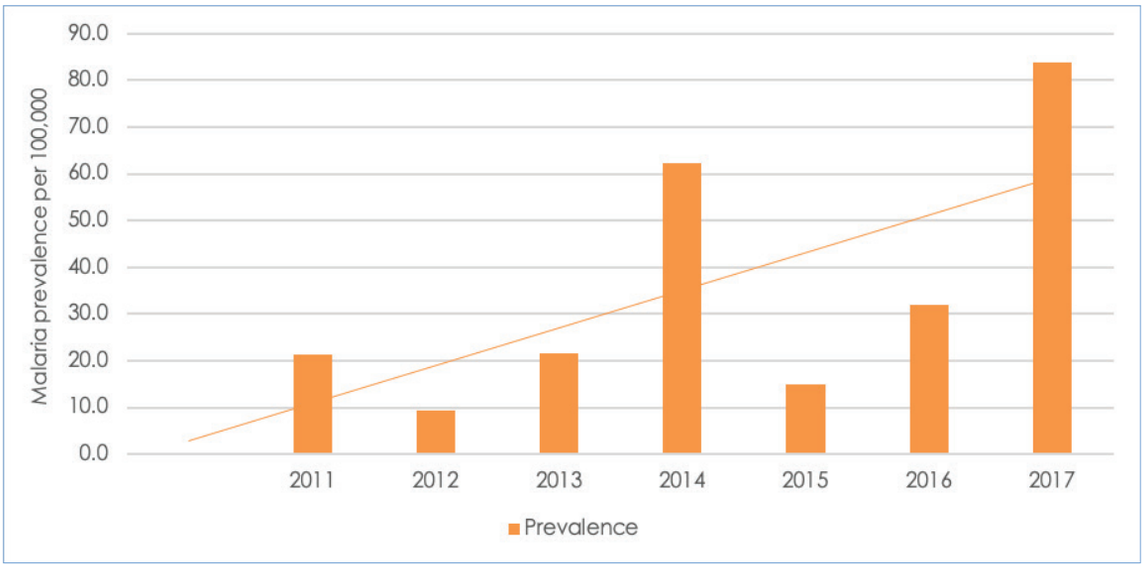


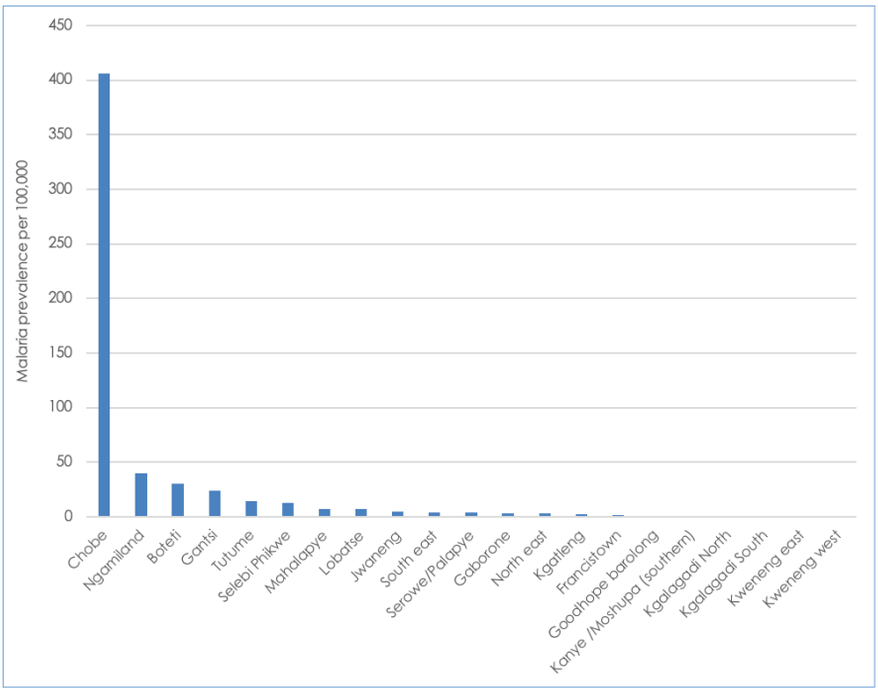
Table 5.15 and Figure 5.13 show the prevalence of malaria by district for the period 2011 to 2016. Due to lack of population data specific to Okavango, prevalence could not be reliably calculated for Okavango, where the highest number of cases was recorded. Okavango's low population suggests prevalence is highest there. Aside of Okavango's expected highest prevalence, Chobe district recorded the highest prevalence for one year in 2016, and the second highest in 2014. Boteti and Ngamiland followed respectively.

Table 5.15: Prevalence of malaria by district (2011 – 2016)

District	2011	2012	2013	2014	2015	2016
Chobe	47	63	167	373	74	406
Ngamiland	17	9	39	45	15	40
Boteti	73	27	5	16	21	30
Gantsi	0	0	0	13	0	24
Tutume	41	13	10	12	3	14
Selebi Phikwe	63	22	16	22	12	12
Lobatse	0	0	0	14	18	7
Mahalapye	3	15	12	27	10	7
Jwaneng	0	5	5	5	5	5
Serowe/Palapye	25	14	12	39	7	4
South east	9	3	2	0	10	4
Gaborone	9	4	8	7	7	3
North east	5	2	2	5	0	3
Francistown	9	9	10	4	5	2
Kgatleng	25	0	10	9	8	2
Goodhope Barolong	0	0	0	2	2	0
Kanye / Moshupa (southern)	0	2	0	0	1	0
Kgalagadi north	0	0	0	18	9	0
Kgalagadi south	7	0	0	0	0	0
Kweneng east	12	1	2	5	5	0
Kweneng west	31	0	0	0	4	0

Source: Ministry of Health and Wellness

Figure 5.13: Prevalence of malaria by district (2016)



3.4 Toxic Substance and Nuclear Radiation Diseases and Conditions

The FDES suggests data collection and management on diseases and conditions that are associated with exposure to toxic substances, residuals, and or waste that result from localized emissions. Examples from the FDES are chronic illnesses of the respiratory system such as pneumonia, upper respiratory diseases, asthma and chronic pulmonary diseases.

3.4.1 Pneumonia

Pneumonia is a notifiable disease in Botswana and is caused by infection with bacteria and virus. It is also caused by parasites and fungi but less commonly so. Pneumonia is an inflammatory condition that affects the lungs and is regarded with diarrhoea as a disease of poverty, due to its close association with such factors as poor home environments, under-nutrition and lack of access to essential services (United Nations Children's Fund; 2012).

Table 5.16 and Figure 5.14 show the national pneumonia cases for the period from 2012 to 2017. The trend shows case numbers were highest in 2013. The overall trend for the period is stable.

Table 5.16: Pneumonia cases in Botswana 2012 - 2017

Year	Cases
2012	4,394
2013	6,778
2014	5,588
2015	4,612
2016	5,536
2017	5,292

Source: Ministry of Health and Wellness

Figure 5.14: Pneumonia cases in Botswana 2012 - 2017

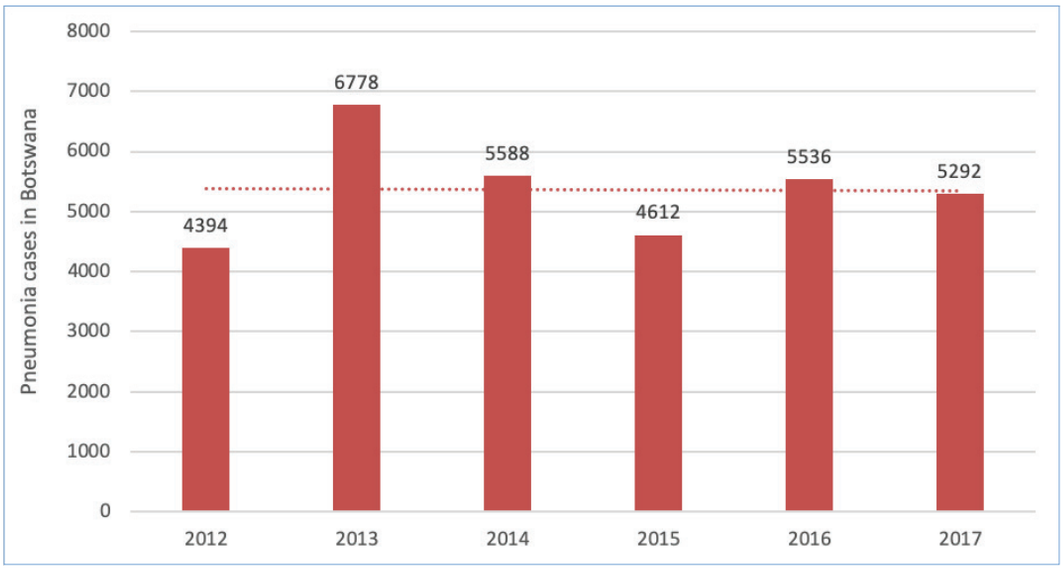


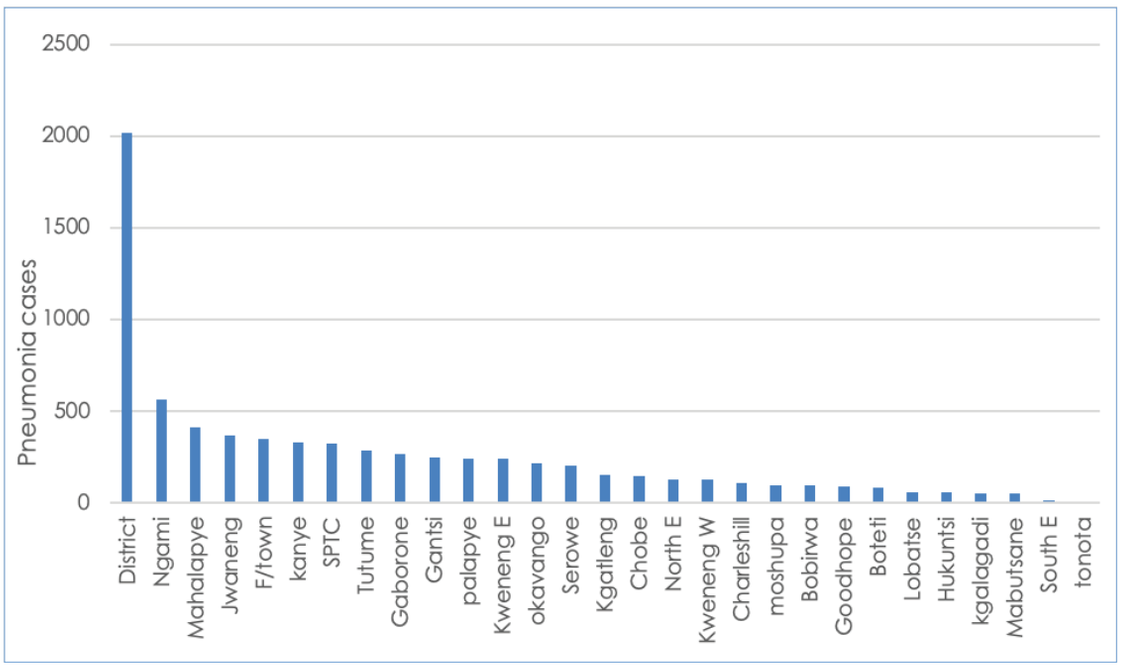
Table 5.17 and Figure 5.15 show pneumonia cases by district for the period 2012 to 2017. The highest number of cases for one year were recorded for Ngami district for the year 2013. Ngamiland and Mahalapye recorded the highest and second highest number of pneumonia cases respectively for the period under study.

Table 5.17: Pneumonia cases by district 2012 - 2017

District	2012	2013	2014	2015	2016	2017
Ngami	307	1,015	697	412	92	561
Mahalapye	200	510	462	582	543	409
Jwaneng	53	63	73	123	136	370
F/town	249	751	725	234	329	349
Kanye	145	206	327	473	593	327
SPTC	103	111	94	107	230	322
Tutume	87	88	116	280	240	285
Gaborone	409	665	140	150	267	263
Gantsi	101	135	27	136	264	244
Palapye	0	297	299	90	425	239
Kweneng E	452	472	311	335	186	238
Okavango	0	63	102	206	40	213
Serowe	56	107	134	82	166	205
Kgatleng	617	468	413	280	232	151
Chobe	53	112	133	153	108	149
North E	169	234	163	146	170	129
Kweneng W	322	185	206	98	320	129
Charleshill	24	12	29	12	5	111
Moshupa	0	55	104	43	93	97
Bobirwa	0	14	95	17	63	94
Goodhope	61	39	58	58	157	91
Boteti	160	190	140	95	153	82
Lobatse	41	27	43	32	52	57
Hukuntsi	65	101	4	12	115	56
Kgalagadi	64	64	91	54	95	53
Mabutsane	48	111	25	57	67	53
South E	82	102	131	70	55	15
Tonota	526	581	446	275	340	-

Source: Ministry of Health and Wellness

Figure 5.15: Pneumonia cases by district 2012 - 2017



3.4.2 Prevalence of Pneumonia

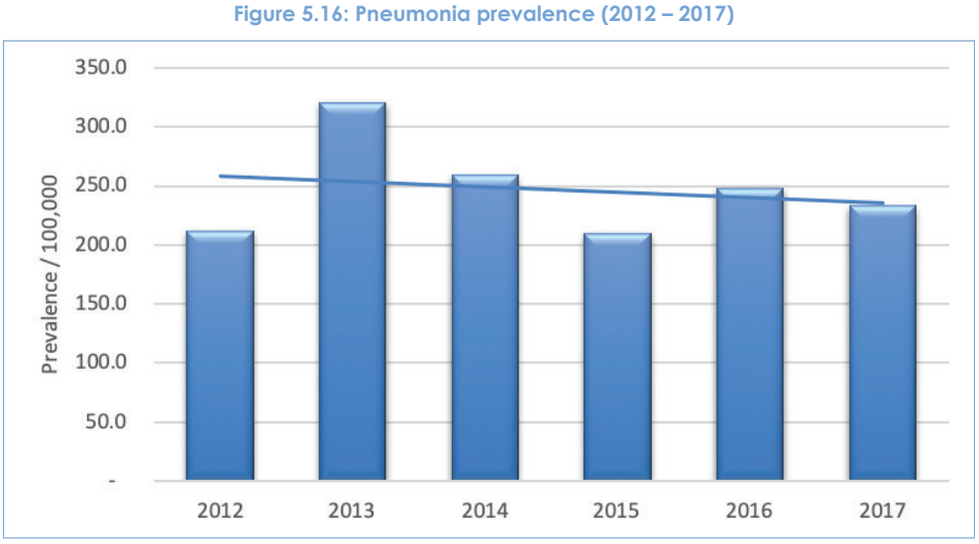
Table 5.18 and Figure 5.16 show the prevalence of pneumonia for Botswana, for the period 2012 to 2017.

Table 5.18: Pneumonia cases and prevalence (2012 – 2017)

	Cases	Prevalence
2012	4,394.00	212.2
2013	6,778.00	320.5
2014	5,588.00	259.1
2015	4,612.00	210.1
2016	5,536.00	248.2
2017	5,292.00	233.5

Source: Ministry of Health and Wellness

Figure 5.16: Pneumonia prevalence (2012 – 2017)



The general trend is of a falling prevalence of pneumonia in Botswana.

3.4.3 Pneumonia Deaths

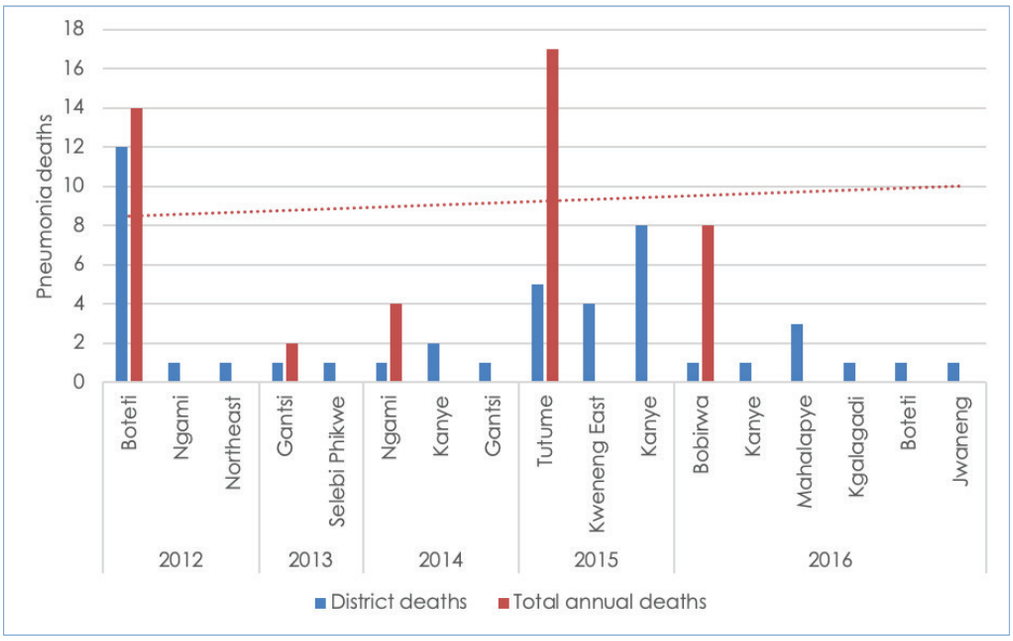
Table 5.19 and Figure 5.17 show the pneumonia deaths by the districts they were reported in for the period 2012 to 2016. The year 2015 recorded the highest number of deaths in a year, with most of the deaths recorded at Kanye. The year 2012 followed with most of the deaths recorded at Boteti. The trend in pneumonia deaths is generally increasing.

Table 5.19: Pneumonia deaths 2012 - 2016

Year	Location	Deaths	Total Deaths
2012	Boteti	12	14
	Ngami,	1	
	North East	1	
2013	Gantsi	1	2
	Selebi Phikwe	1	
2014	Ngami	1	4
	Kanye	2	
	Gantsi	1	
2015	Tutume	5	17
	Kweneng East	4	
	Kanye	8	
2016	Bobirwa	1	8
	Kanye	1	
	Mahalapye	3	
	Kgalagadi	1	
	Boteti	1	
	Jwaneng	1	

Source: Ministry of Health and Wellness

Figure 5.17: Pneumonia deaths 2012 - 2016



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