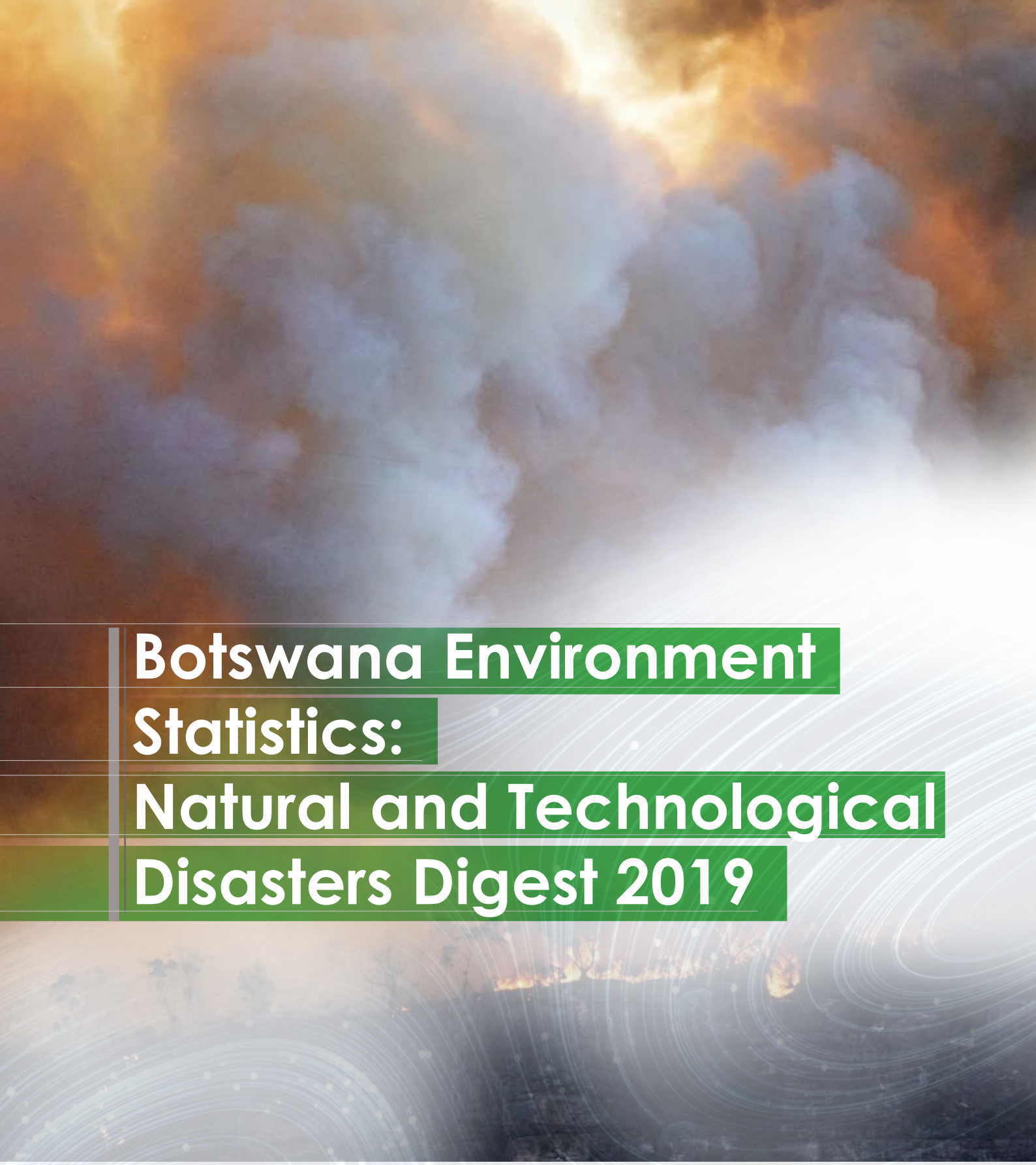

Botswana Environment Statistics: Natural and Technological Disasters Digest 2019

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Published by
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Gaborone

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Contact Unit:
Environment Statistics Unit

Phone: 3671300

ISBN: 978-99968-482-2-3

Preface

Statistics Botswana, through the Environment Statistics Unit (ESU), presents the fourth edition of the Botswana Environment Statistics: Natural and Technological Disasters Digest. The digest provides reliable and recent statistics together with trends analysis on natural and technological disasters, focusing on mines accidents, road transport accidents, veldt fires, floods, storms, and drought, particularly with reference to incidences, impacts and responses.

The Framework for Development of Environmental Statistics (FDES) of the United Nations Statistics Division and Sendai Framework for Disaster Risk Reduction were used in the preparation of this digest. The statistical information provided in this digest is important for evidence-based decision making with particular reference to disaster risk reduction and disaster management.

I wish to acknowledge the National Disaster Management Office, Department of Forestry and Range Resources, Department of Agricultural Research, and Department of Mines 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. Statistics Botswana outputs/publications are available on the website at www.statsbots.org.bw and at the Statistics Botswana Resource Center which is based at the Head-Office in Gaborone.

Thank you.

Dr. Burton S. Mguni
Statistician General
August 2020

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LIST OF ACRONYMS

BPS:	Botswana Police Service
BWP:	Botswana PULA
EMDAT:	Emergency Events Database
CSO:	Central Statistics Office
CRED:	Centre for Research on the Epidemiology of Disasters
DFRR:	Department of Forestry & Range Resources
FDES:	Framework for Development of Environment Statistics
IFRC:	International Federation of Red Cross
Kg:	Kilogram
MCM:	Million Cubic Metres
MENCT:	Ministry of Environment, Natural Resources Conservation & Tourism
NDMO:	National Disaster Management Office
NDRMP:	National Disaster Risk Management Plan
SB:	Statistics Botswana
SDGs:	Sustainable Development Goals
UN:	United Nations
UNEP:	United Nations Environment Programme
UNISDR:	United Nations International Strategy for Disaster Reduction
WHO:	World Health Organisation
WUC:	Water Utilities Corporation

EXECUTIVE SUMMARY

The digest is divided into four main sections: i) Technological Disasters; ii) Natural Disasters (veldt fires, floods, storms and heavy rains); iii) Drought Impacts and Responses; and iv) Disaster Risk Reduction efforts.

As regards technological disasters, the report reveals that the total number of mine accidents during the period 2010 to June 2019 assumed a fluctuating trend with the highest number (67 accidents) recorded in 2011. The years 2012 and 2014 saw the highest with 5 fatal accidents each, followed by those recorded in 2015 with 4 fatal accidents a share. The majority of the occurrence of mine accidents exceeded the set reduction targets.

The number of road transport accidents dropped from 7,970 in 2010 to 6,243 in 2018. Fatalities stemming from the accidents hit their peak in the years 2011 and 2010, in that order. The annual fatality stood at 20 per 100,000 people.

The highest numbers of national fire incidences were recorded in the years 2017 (295), 2014 (249), 2015 (247), and 2018 (196) in that order. During the period 2014 – 2018, Ngamiland District experienced more fire incidences in comparison with other districts. The report shows that all the districts followed a dipping trend of area affected by fire between the years 2014 and 2018. The current statistics show that districts which were affected the most by fire in terms of area burnt in 2018 were Ngamiland, Kweneng and Chobe, in the said order.

In the 2015 - 2019 period a total of 575 households and 2,433 individuals were affected by floods. Subsequently, 190 tents and 305 food baskets were handed out as relief. A substantial number of districts were affected by floods in 2017 compared to the other years under review. The death toll attributed to floods rose to 4 in 2019 from one death recorded in 2017. Of the total of 653 households affected by heavy rains during the period 2015 – 2019, about 71 percent (463) were from Central District.

The whole country was declared drought stricken during these periods: 2001-2005; 2007-2008; 2011-2013; 2014-2015; and 2016-2019. This report further reveals that cereal production does not meet the country's cereal requirements, resulting in over dependence on imports. A total of BWP9.53 Billion was used to import cereals (maize, rice, sorghum, millet and wheat) during the period 2010-2019.

The national total population of Musi cattle, which is drought tolerant saw a decrease from the year 2015 (869) to 2016 (822), then assumed an increasing trend from 2016 (822) to 2019 (1,204). On the other hand, the population of both Tswana cattle and goats, which are adapted to drought, are experiencing a slight decrease in numbers.

In terms of the human water supply situation, the report reveals that dam levels were low in 2016, and then assumed an upward trend in the subsequent years (2017 – 2019). Noticeable is the Dikgatlhong dam recording the highest annual average level of over 80 percent during the period 2016 - 2019.

1.0. INTRODUCTION

Natural hazards are geophysical events with a potential of causing natural disasters; while natural disasters are naturally occurring events or consequences of natural hazards affecting daily human activities (CSO, 2009). Natural hazards are predominantly associated with natural processes and phenomena (UN, General Assembly, 2016). Examples include volcanic eruptions, landslides, subsidence, earthquakes, floods, tsunamis, hurricanes, tornadoes, storms, drought, and veld fires, among others. Anthropogenic hazards, or human induced hazards, are induced predominantly by human activities and choices.

Technological hazards are anthropogenic, and originate from technological or industrial conditions, dangerous procedures, infrastructure failures or specific human activities (UN, General Assembly, 2016). Examples include industrial pollution, toxic wastes, dam failures, mines accidents, road transport accidents, factory explosions, fires and chemical spillages.

According to CRED Emergency Events Database (EMDAT), a hazard event should meet one of the following criteria for it to be categorized as a disaster:

- Ten (10) or more people reported killed;
- One hundred (100) or more people reported affected;
- Declaration of a state of emergency; or
- Call for international assistance.

However, Botswana has not yet set the national threshold for hazard events categorized as disasters. With that said, Botswana is generally guided by the definition of disaster as stipulated in the UN-General Assembly (2016): A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. This is exemplified by the declaration of state of emergencies as disasters occur, e.g. declaration of the drought year by the President, among others.

Botswana is no exception when it comes to issues of natural and man-made disasters. In 2017 a total of 2,660 individuals were affected by hailstorms and heavy rains in Botswana. As a result, a total of 228 tents and 191 food baskets were issued to the victims.

The 2030 Agenda for Sustainable Development accentuates the need for disaster risk reduction across sectors of the economy, informed by the appreciation that disaster risk reduction is a cross-cutting issue and requires a multi-sectoral approach. The recently developed indicators for monitoring the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction will support coherence and align implementation (http://www.unisdr.org/).

It is against this intriguing background and the identified need to support the monitoring of the SDGs indicators as well as the implementation of both the Sendai Framework for Disaster Risk Reduction and the United Nations Framework for the Development of Environment Statistics that data collection and documentation of natural and man-made disasters statistics is important. Hence, the purpose of this digest is to provide and discuss reliable statistics, and trends analysis (incidences, impacts and responses) on natural disasters, focusing on floods, storms, drought and veldt fires, as well as technological disasters (mines accidents, and road transport accidents) in Botswana.

1.1. Methodology

Both the United Nations Framework for the Development of Environment Statistics (UNFDES) and the Sendai Framework for Disaster Risk Reduction guided the production of this digest. Component 4 of the UNFDES was operationalized, with the focus on "Extreme Events and Disasters" indicators. Some indicators from the Global Targets A to E of the Sendai Framework for Disaster Risk Reduction were also operationalized. The FDES is an important framework as it is expected to contribute significantly to improved monitoring

and measurement of the environmental dimension of Sustainable Development and to the post-2015 development agenda (Statistics Botswana, 2016). According to UNISDR (2015), the Sendai Framework applies to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or man-made hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels, as well as within and across all sectors.

Administrative records were used for the production of this digest, and were drawn from various departments namely the Department of Forestry and Range Resources, National Disaster Management Office, Department of Agricultural Research, Department of Mines, and other related literature.

Formal data request letters were dispatched to the data providers during the third quarter of the year 2019/20. In the same quarter, data request follow-ups were made to ensure that at least enough data had been gathered to start the analysis and report writing. Data collection continued into the fourth quarter of 2019/20. Both data analysis and report writing were done during the fourth quarter of 2019/20. Data were captured and analysed in Microsoft Excel software. Subsequent to that was the validation of the statistics by data providers as well as the rigorous review of the draft report by Statisticians at different hierarchical levels.

2.0. TECHNOLOGICAL DISASTERS

This chapter presents statistics on technological disasters in Botswana. It focuses on the trends of incidences of both mine accidents and road transport accidents.

2.1. Mine Accidents

Presented in this sub-section is the trend analysis of mine accidents for the years 2010 to June 2019. It is evident from **Table 2.1a** that the total number of accidents during the review period followed a fluctuating trend. The highest number of accidents was recorded in the year 2011, with a total of 67 accidents of which one (1) was fatal. The second highest total number of accidents was recorded in 2010 with 60 accidents. In terms of the occurrence of fatal accidents, the years 2012 and 2014 saw the highest with five (5) fatal accidents each, followed by those recorded in 2015 with four (4) fatal accidents.

Accidents reduction targets are set with the intention of reducing the number of injuries and deaths attributed to mine explosions, fires, inundations, and rescue and response activities. Usually there are certain controls put in place to reduce the occurrence of fatal and high potential incidents. According to Debswana (2018), one of the key programmes embarked upon is identification and implementation of critical controls for priority unwanted events (PUEs) and monitoring of their effectiveness. This programme assists the business to focus on key risks and their proactive management. The use of technology to reduce risk has also been adopted, including the use of hard controls like conveyor moisture analysers, air canons, and auto by-pass valves (Debswana, 2018).

Table 2.2a and **Figure 2.2a** depict accident trends with set reduction targets during the period 2010 – 2019. Generally, the majority of the occurrence of accidents exceeded the set reduction targets. Amongst the years with the total number of accidents exceeding the set targets, the year 2011 saw the highest variance of 43 accidents. The year 2019 was an exception, recording a total of 10 accidents, six (6) accidents less than the set reduction target of 16.

Table 2.3a shows the cumulative number of accidents by month spanning the years 2016 to 2019. The analysis was limited to the aforesaid period because data on number of accidents by month was only available for these years. Cumulatively, the year 2016 experienced the highest number of accidents from beginning to end compared to the other years under review.

Table 2.1a: Total Number Of Accidents (Including Fatal) In Botswana, 2010 – 2019 (June)

Year	Total no of accidents (including fatal)	No of fatal accidents
2010	60	3
2011	67	1
2012	41	5
2013	35	3
2014	33	5
2015	39	4
2016	29	3
2017	20	2
2018	22	3
2019 (June)	10	0

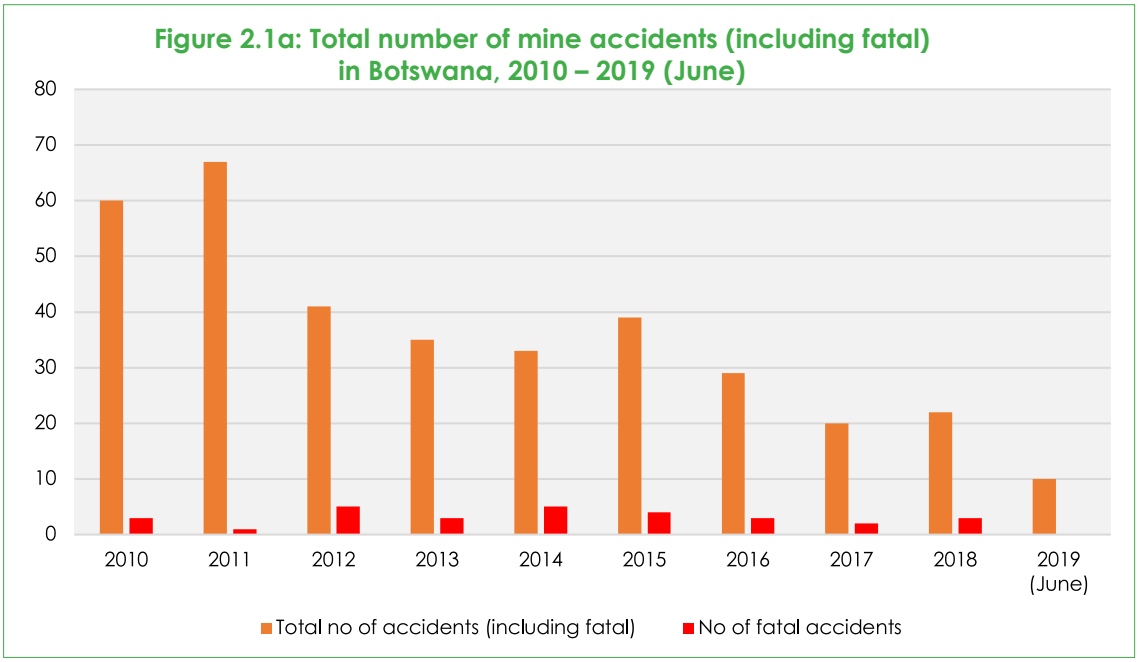


Table 2.2a: Accident trends with reduction targets, 2010 – 2019 (June)

Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019(June)
No. of Accidents	60	67	40	35	33	36	29	20	22	10
Fatal	3	1	4	3	5	4	3	3	3	0
Reduction Target	26	24	23	22	21	20	19	18	17	16

Source: Department of Mines

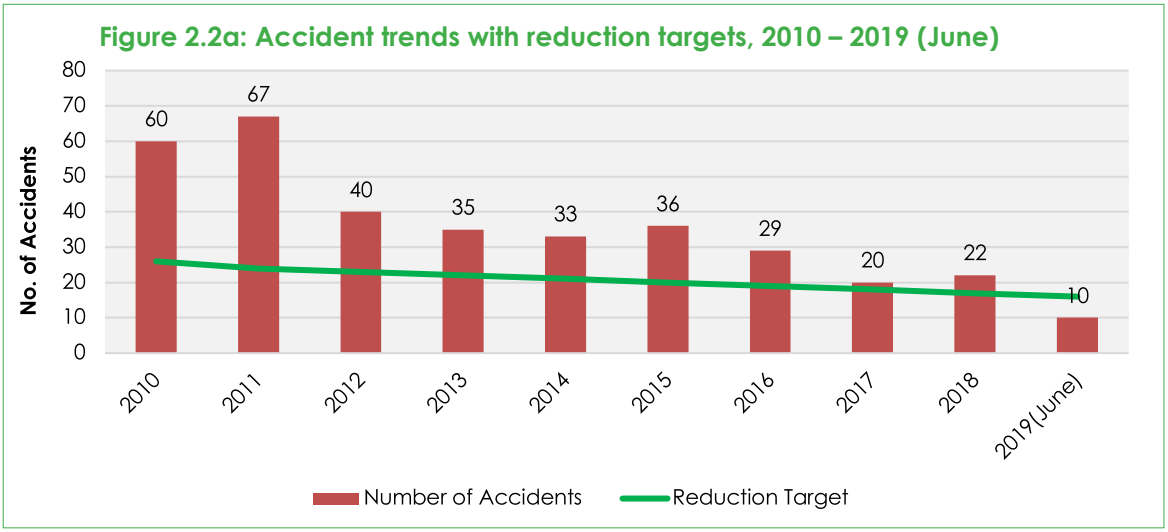
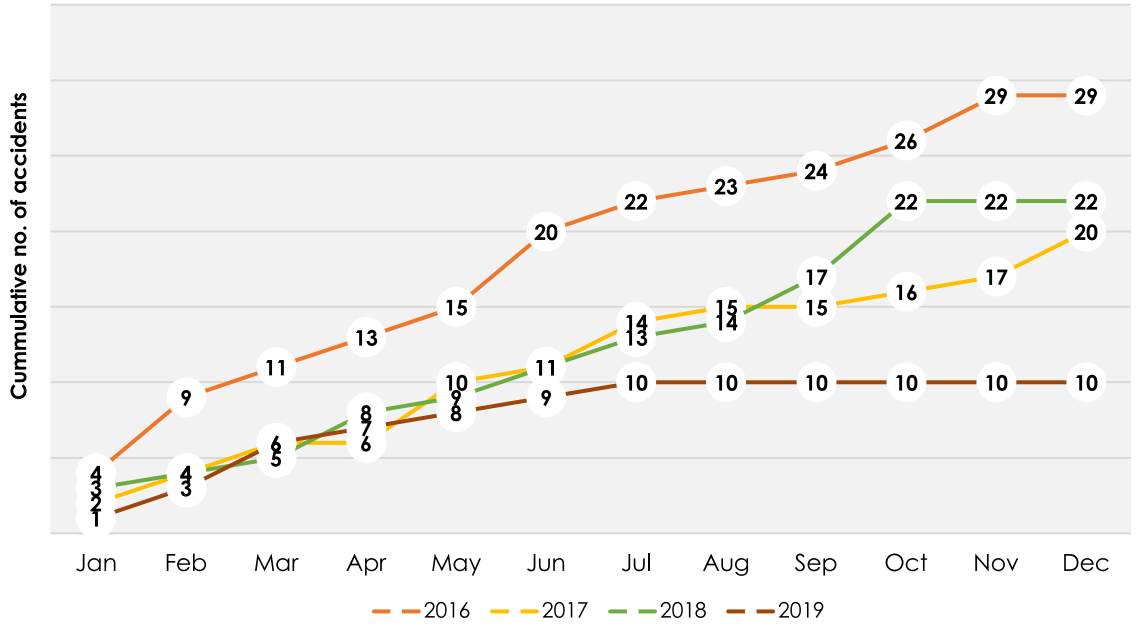


Table 2.3a: Cumulative Number Of Mine Accidents By Month, 2016 – 2019

Months	Cumulative No. of Accidents			
	2016	2017	2018	2019
Jan	4	2	3	1
Feb	9	4	4	3
Mar	11	6	5	6
Apr	13	6	8	7
May	15	10	9	8
Jun	20	11	11	9
Jul	22	14	13	10
Aug	23	15	14	10
Sep	24	15	17	10
Oct	26	16	22	10
Nov	29	17	22	10
Dec	29	20	22	10
Total	**29**	**20**	**22**	**10**

Figure 2.3a: Cumulative Number Of Accidents By Month, 2016 – 2019



2.2. Road Transport Accidents

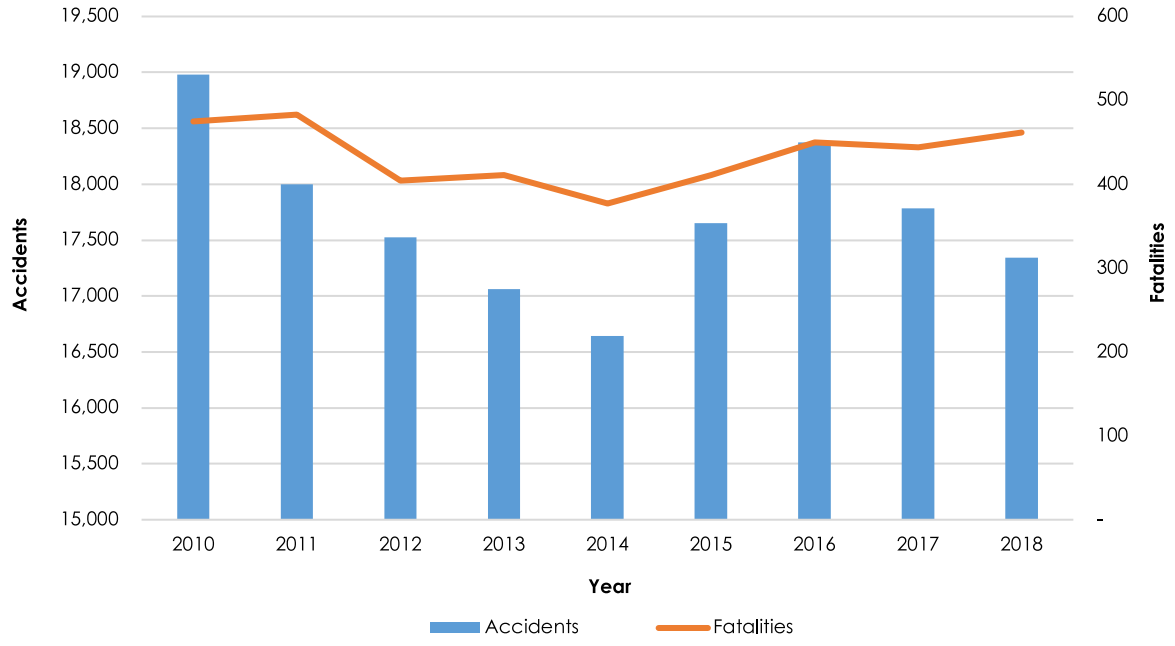
This sub-section presents a trend analysis of road transport accidents for the years 2010 to 2018 in Botswana, with a specific focus on motor vehicle accidents. Generally, the number of casualties followed a fluctuating trend with casualties dropping from 7,970 in 2010 to 6,243 in 2018 (21.67 percent). The same trend was observed for the number of fatalities during the review period **(Table 2.4a and Figure 2.4a)**. **Table 2.4** further depicts that fatalities hit the highest figures in 2011 and 2010, with 483 and 475 fatalities, respectively. The third highest fatalities figures were recorded in 2018 at 462. On average, Botswana recorded an annual fatality rate of 20 per 100,000 people.

Table 2.4a: Motor Vehicle Accidents, 2010 – 2018

Year	Accidents	Casualties	Fatalities	Estimated Population ('000s)	*Fatalities Per 100,000
2010	18,978	7,970	475	1,800	22
2011	18,001	6,436	483	2,025	24
2012	17,527	6,035	404	2,066	20
2013	17,062	6,157	411	2,107	20
2014	16,641	6,065	377	2,147	18
2015	17,654	6,303	411	2,187	19
2016	18,373	6,687	450	2,226	20
2017	17,786	6,335	444	2,264	20
2018	17,341	6,243	462	2,303	20

Source: Statistics Botswana (2018)
***Fatality Rate =** (No. of Fatalities/Estimated Population)* 100,000

Figure 2.4a: Total Motor Vehicle Accidents and Fatalities, 2010 – 2018



3.0. NATURAL DISASTERS

This chapter provides information on natural hazards causing disasters. It focuses on trends of incidences of veldt fires, floods, storms and heavy rains, and their impact on people's livelihoods and the environment they depend on.

3.1. Veldt Fires

Veldt Fire is the uncontrolled burning of open grazing areas, usually occurring during the dry season (CSO, 2009). In Botswana, the main causes of veldt fires are usually unknown but a substantial number occur naturally through ignition from lightning, while others are unnatural fires. This section gives information on fire incidences (years 2014 – 2018) and impacts (area burnt) by district for the years 2010 to 2018.

3.1.1. Fire Incidences

Table 3.1a displays the total number of veldt fire incidences by district between 2014 and 2018. It is evident from the table that the highest number of national fire incidences was recorded in 2017 with 295 incidences, while 2016 recorded the least with 159 incidences. On average, Ngamiland District experienced nearly half of the total national fire incidences each year during the period under review compared to other districts. Of late the number of fire incidences experienced a slight drop. Rural Development Council (2019) affirms this by noting that there was a decrease in both the number of fire incidences and area burnt across the country in 2018 (196) as compared to 2017 (295) signifying less effect on rangeland and veldt products. This can be attributed to effective fire management measures put in place by the Department of Forestry and Range Resources.

Table 3.1 a: Number of Fire Incidences by District (2014 - 2018)

District	2014	2015	2016	2017	2018
Ngamiland	103	124	90	109	91
Central	48	41	27	79	17
Kgalagadi	11	7	5	34	20
Ghanzi	12	18	8	23	27
Chobe	46	34	22	21	14
Kweneng	11	8	4	11	16
Southern	14	7	2	9	8
North East	3	4	1	7	3
Kgatleng	1	1	0	2	0
South East	0	7	0	0	0
Total	**249**	**247**	**159**	**295**	**196**

3.1.2. Fire Affected Area

Table 3.1b and **Figure 3.1a** depict the area (hectares) affected by veldt fires by district in the period 2012 to 2018. Generally, the table shows that the total national fire affected area followed a declining trend. The same trend is evident in almost all the districts, with a decline in area affected by fire between the years 2012 and 2016, an increase in 2017 and a drop in 2018. The 2018 figures show that districts which were affected by fire the most in terms of area burnt were Ngamiland, Kweneng and Chobe with 262,832 hectares, 168,982 hectares and 119,092 hectares respectively. Ngamiland District remained the most affected during the review period. Spatial distribution maps of burnt scars by district are displayed in **Figures 3.1c – 3.1f**.

Presented in Table 3.1c are the percentages of fire affected area by district in the years 2012 to 2018. Proportionately, Ngamiland, Chobe, Ghanzi and Kweneng show more hectarage of burnt areas compared to the rest of the districts. The lowest proportion of area burnt was observed in the South East, North East, and Kgatleng. **(Table 3.1c and Figure 3.1b)**

Table 3.1b: Fire Affected Area (Hectares) per District 2012-2018

District	2012	2013	2014	**2015	2016	2017	2018	District Size (Hectares)
Ghanzi	1,951,300	2,676,749	1,118,966	122,500	15,232	851,715	40,734	11,472,587
Ngamiland	5,120,500	3,862,011	1,180,793	473,396	225,380	712,056	262,832	11,134,421
Kgalagadi	1,290,000	482,742	358,947	11,649	6,562	342,441	71,460	10,491,604
Chobe	649,600	546,135	427,815	55,349	67,446	190,327	119,092	2,101,920
Central	1,345,400	430,677	281,256	473,060	20,126	102,154	60,106	14,637,419
Southern	506,800	37,600	16,006	643	116	4,560	11,199	2,723,320
Kweneng	437,700	532,819	18,462	27,853	4,342	3,654	168,982	3,696,345
North East	5,000	1,633	57	404	24	1,646	620	514,619
Kgatleng	5,000	47,613	535	15	-	154	0	761,943
South East	4,500	200	-	3,493	8	28	229	85,800
Grand Total	**11,315,800**	**8,618,179**	**3,402,837**	**1,168,362**	**339,236**	**2,208,735**	**735,254**	**57,619,978**

Note (-): No data
(**): Statistics up to May 2015 for all districts
Source: Department of Forestry & Range Resources

Figure 3.1a: Fire Affected Area (Hectares) per Selected Districts 2012-2018

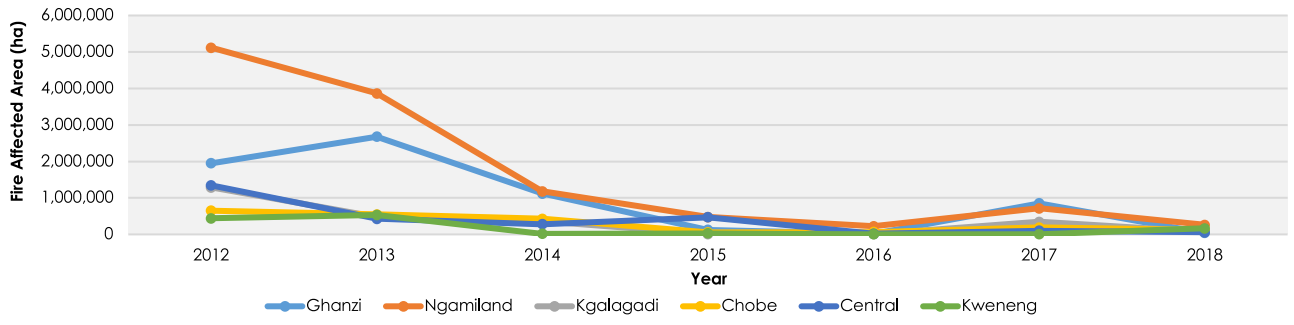


Table 3.1c: Percent of Area Affected by Fire (Hectares) per District 2012-2018

District	District size	2012	2013	2014	2015	2016	2017	2018
Ghanzi	11,472,587	17.01	23.33	9.75	1.07	0.13	7.42	0.36
Ngamiland	11,134,421	45.99	34.69	10.60	4.25	2.02	6.40	2.36
Kgalagadi	10,491,604	12.30	4.60	3.42	0.11	0.06	3.26	0.68
Chobe	2,101,920	30.91	25.98	20.35	2.63	3.21	9.05	5.67
Central	14,637,419	9.19	2.94	1.92	3.23	0.14	0.70	0.41
Southern	2,723,320	18.61	1.38	0.59	0.02	0.00	0.17	0.41
Kweneng	3,696,345	11.84	14.41	0.50	0.75	0.12	0.10	4.57
North East	514,619	0.97	0.32	0.01	0.08	0.00	0.32	0.12
Kgatleng	761,943	0.66	6.25	0.07	0.00	-	0.02	-
South East	85,800	5.24	0.23	-	4.07	0.01	0.03	3.95
Grand Total	**57,619,978**	**19.64**	**14.96**	**5.91**	**2.03**	**0.59**	**3.83**	**1.28**

Derived from Table 3.1b
Note (-): No data

Figure 3.1b: Percent of Fire Affected Area (Hectares) per Selected Districts 2012-2018

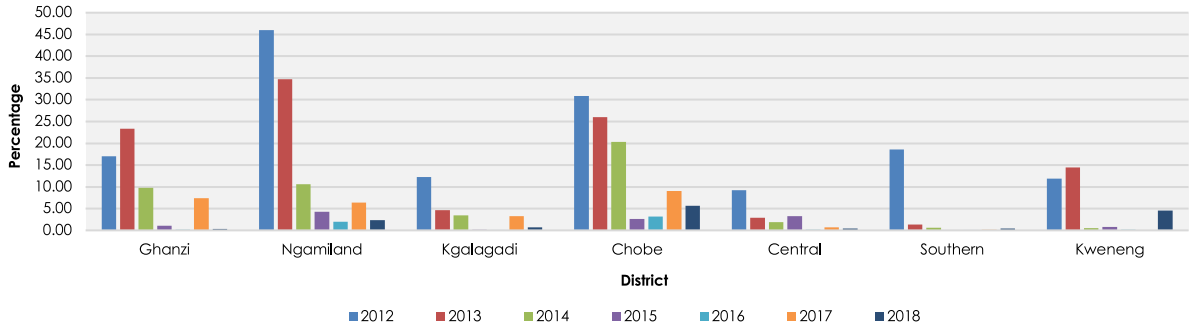
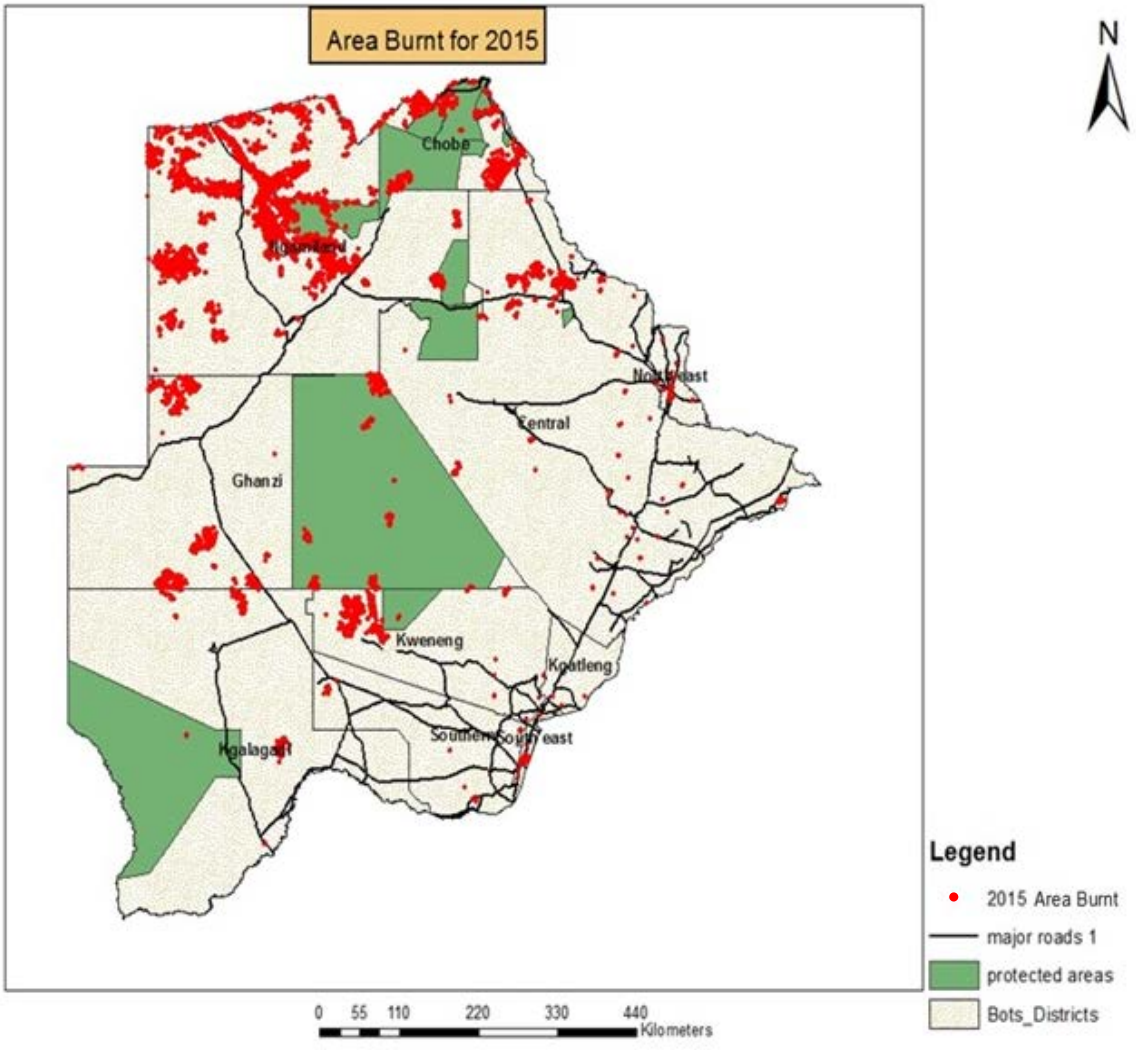
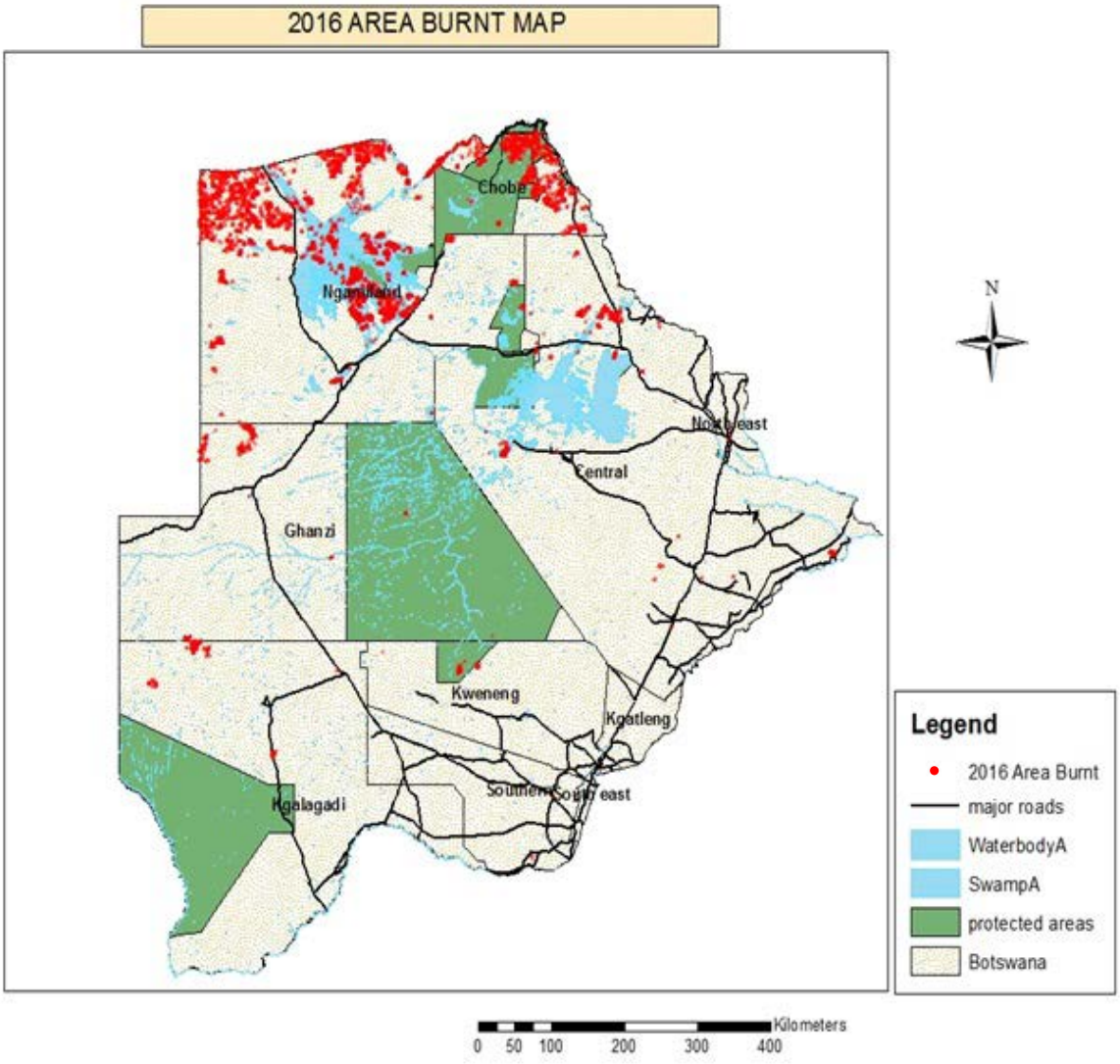


Figure 3.1c: Fire Affected Area (Hectares) by Districts in 2015



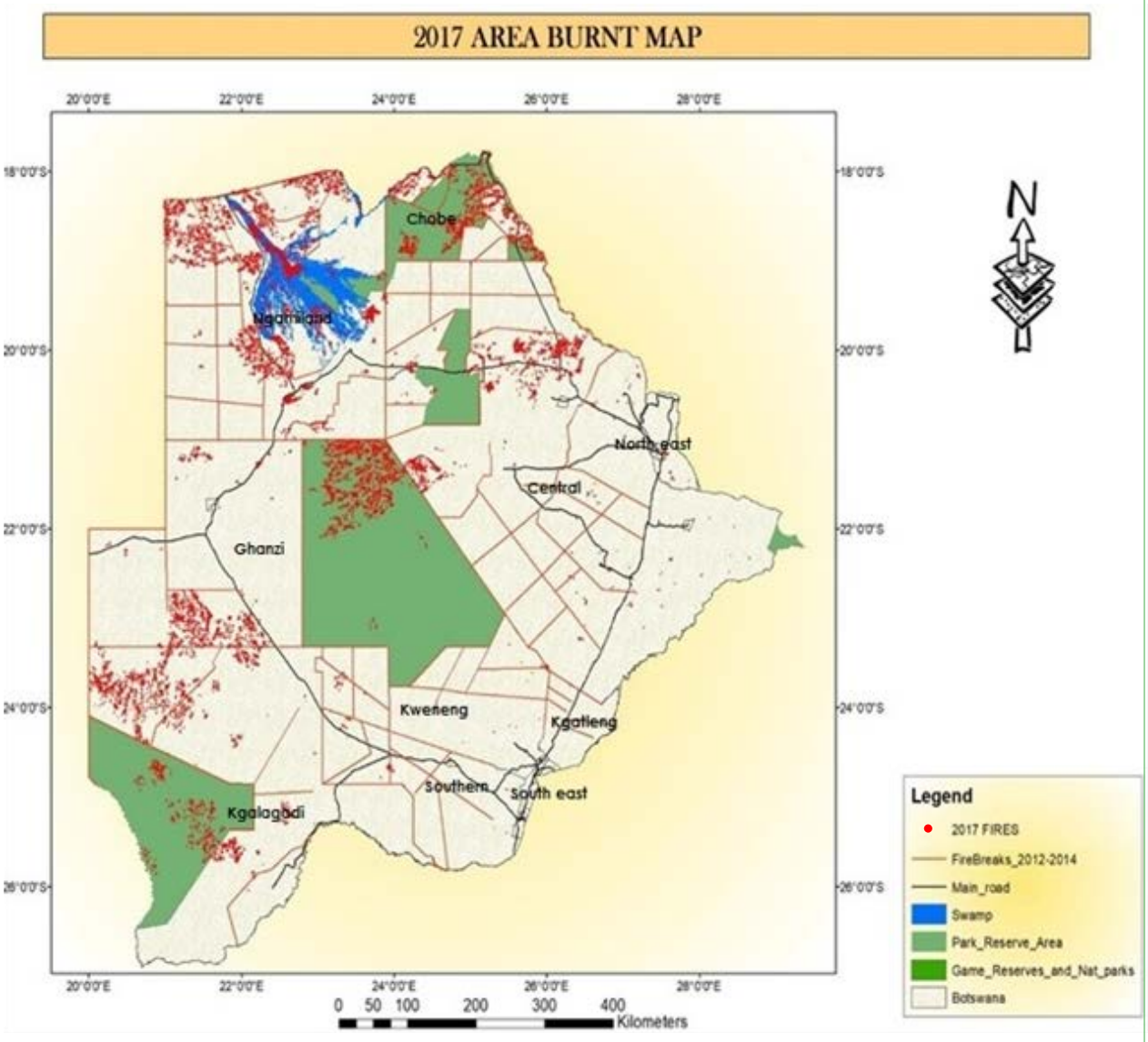
Source: Department of Forestry & Range Resources

Figure 3.1d: Fire Affected Area (Hectares) by Districts in 2016



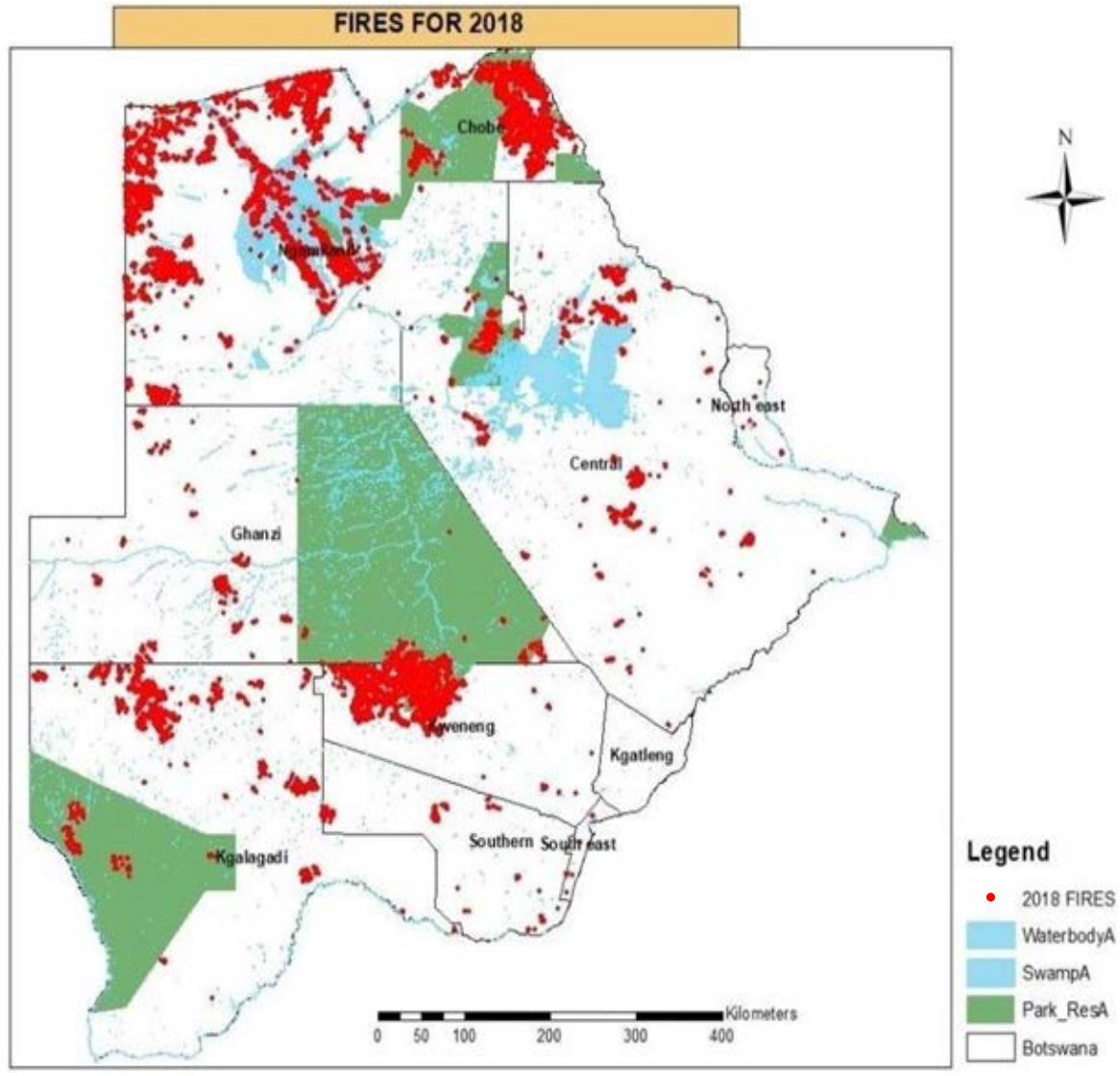
Source: Department of Forestry & Range Resources

Figure 3.1e: Fire Affected Area (Hectares) by Districts in 2017



Source: Department of Forestry & Range Resources

Figure 3.1f: Fire Affected Area (Hectares) by Districts in 2018



Source: Department of Forestry & Range Resources

3.2 Floods and Storms

Floods pose a serious danger to human beings; they cause loss of lives, damage to personal property, destruction of infrastructure, and damage to crop fields and natural vegetation (Statistics Botswana, 2016). Floods are classified as natural hazards. They only become disasters when they destroy human settlements, or when they displace, cause injuries or death. Both river floods from seasonal precipitation and flash floods caused by seasonal storms are common in Botswana.

This sub-section presents flood, heavy rains, and storm occurrences by location and year, as well as the number of households and individuals affected, and assistance given.

3.2.1. Floods

Table 3.2a shows that the impacts of floods were more prominent in Ghanzi District for most part of the period 2015 - 2019. In 2015, the floods affected 139 households and displaced a total of 859 individuals in Ghanzi District. Ghanzi District also recorded the highest number of both households affected and individuals affected/displaced by floods in the year 2016, with 35 and 265, respectively. The impact resulted in a total of 14 tents and 14 food baskets issued to the victims as a form of relief. A significant number of districts were affected by floods in 2017 compared to the other years under consideration. This was the year when Botswana was hit by a tropical depression called 'Dineo', some of the flood incidences were attributed to this tropical depression.

In 2019, floods affected 87 households, with 177 individuals affected/displaced. In the same year, Serowe Administration District recorded the highest number of households affected (44) and individuals affected (89). With regards to the assistance given, 6 tents and 8 food baskets were dispensed to the victims. The floods incidences also occurred in Tonota and North East districts. In an effort to relief the victims of the floods, the Office of President through the National Disaster Management Office issued a total of 190 tents and 305 food baskets during the 2015 – 2019 period.

The death toll attributed to floods increased to four (4) in 2019 from one (1) death recorded in 2017. The 2019 deaths were recorded in Mahalapye Sub, Central, and Tonota Sub districts. **(See Table 3.2b)**

Table 3.2a: Floods Incidences & Impacts by District, 2015 – 2019

Incident	Year	District	Villages	Impact/Damages		Assistance given	
				No. of households affected	Total no. of individuals affected / displaced	Tents	Food Baskets
Floods	2015	Ghanzi	D'kar, Kuke, New Xade, Chobokwane, Ghanzi Township, Grootlaagte, Qabo	139	859	52	136
		Kweneng	Thamaga	25	125	10	14
	2016	Central	Pilikwe	9	9	6	3
		Ghanzi	D'Kar	35	265	14	14
		Kgatleng	Leshibitse	14	68	12	9
		Kweneng	Molepolole, Mmmanoko	5	45	5	3
	2017	Kgatleng	Leshibitse, Mochudi, Bokaa, Pilane	39	98	0	31
		Kweneng	Gabane, Kubung	22	166	1	0
		Ghanzi	West Hanahai, D'kar, East Hanahai,New Xade, Kacqae, Ghanzi Township,Charlehill, Kole, Ncojane	63	282	36	34
		North East	Tatisiding, Siviya, Masingwaneng, Mapoka, Matshelagabedi, Matopi, Matsiloje, Ditladi, Zwenshambe, Nlapkhwane, Senyawe, Letsholathebe, Gulubane, Mambo, Botalaote	44	174	17	12
		Southern	Moshopa, Polokwe	22	34	0	4
		Ngami-land	Khwai, Chanoga, Morutsha	15	40	0	13
	2018	Tsabong Sub	Struizendam	11	15	11	11
		Maun Admin.	Makalamabedi	10	13	7	2
		North East	Kalakamati,Mambo, Letsholathebe,Masingwaneng, Mulambakwena,Gulubane, Sechele,Matshelagabedi	35	63	7	2
	2019	Serowe Admin.	Setshe,Kgosing,Mausu,Moeletsi	44	89	6	8
		Tonota	Shashemooke, Jamataka	2	10	1	1
		North East	Zwenshambe,Gungwe,Kalakamati	41	78	5	8
TOTAL				**575**	**2,433**	**190**	**305**

Source: National Disaster Management Office

Table 3.2b: Number of deaths attributed to Floods, 2017 & 2019

Year	District	Village	Hazard Type	No. of Deaths
2017	Mogoditshane Sub	Metsimotlhabe	Floods	1
2019	Mahalapye Sub	Pallaroad	Floods	2
	Serowe/Palapye Sub	Serowe	Floods	1
	Tonota Sub	Borolong	Floods	1

Source: National Disaster Management Office

3.2.2. Storms Incidences (Hailstorm, Thunderstorm & Storm)

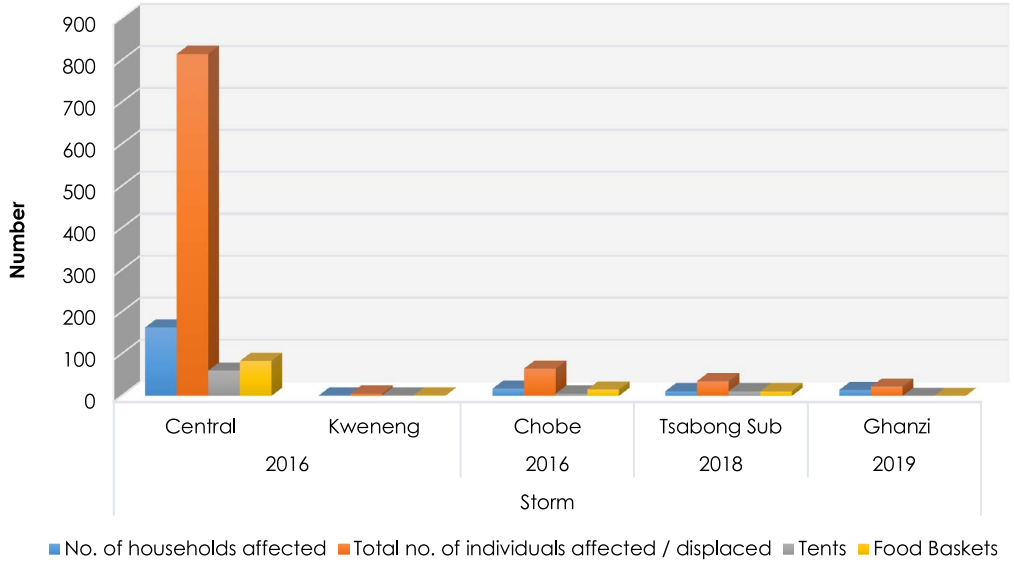
The most recent storm incidences were recorded in the years 2018 and 2019 as depicted in **Table 3.2c** and **Figure 3.2a.** The storm incidences reported in 2018 took place at Struizendam village in Tsabong Sub District affecting 11 households with 35 individuals. Resultantly, a total of 11 tents and food baskets each were issued to the affected households. On the other hand, New Xade village in Ghanzi district recorded a total of 14 households with 22 individuals affected by storm in 2019.

Table 3.2c: Storm Incidences, Impacts & Responses by District, 2016 - 2019

Incident	Year	District	Villages	Impact/Damages		Assistance given	
				No. of households affected	Total no. of individuals affected / displaced	Tents	Food Baskets
Hailstorm	**2016**	**Central**	**Damochujenaa**	5	16	0	3
		Kgatleng	**Artesia, Segwagwa, Dikgonnye, Mathubudukwane, Ramonaka, Leshibitse**	24	105	12	10
		Southern	**Jwaneng**	2	5	2	0
		Kgalagadi	**Otjiseu, Sunset, Botshabelo, Mogobe**	27	55	4	2
		North East	**Pole**	4	22	2	1
		Kweneng	**Mmatseta**	8	39	4	4
		North West	**Maun**	32	192	3	23
	2017	**Southern**	**Kgomokasitwa**	17	69	33	23
		Central	**Molalatau, Serule, Foley, Gojwane, Jamataka**	181	1,012	42	106
		Kweneng	**Boatlaname, Letlhakeng, Sorilatholo, Kumakwane**	79	375	17	36
		Kgatleng	**Ramokana, Mmathubudukwane**	39	80	7	12
Storm	**2016**	**Central**	**Serowe, Mabeleapudi, Matlhako, Kala-mare**	163	815	60	83
		Kweneng	**Molepolole**	1	5	1	1
	2016	**Chobe**	**Kazungula**	17	65	5	15
	2018	**Tsabong Sub**	**Struizendam**	11	35	11	11
	2019	**Ghanzi**	**New Xade**	14	22	0	0
TOTAL				**624**	**2,912**	**203**	**330**

Source: National Disaster Management Office

Figure 3.2a: Storm Impacts & Responses by District, 2016 – 2019



3.2.3. Heavy Rains

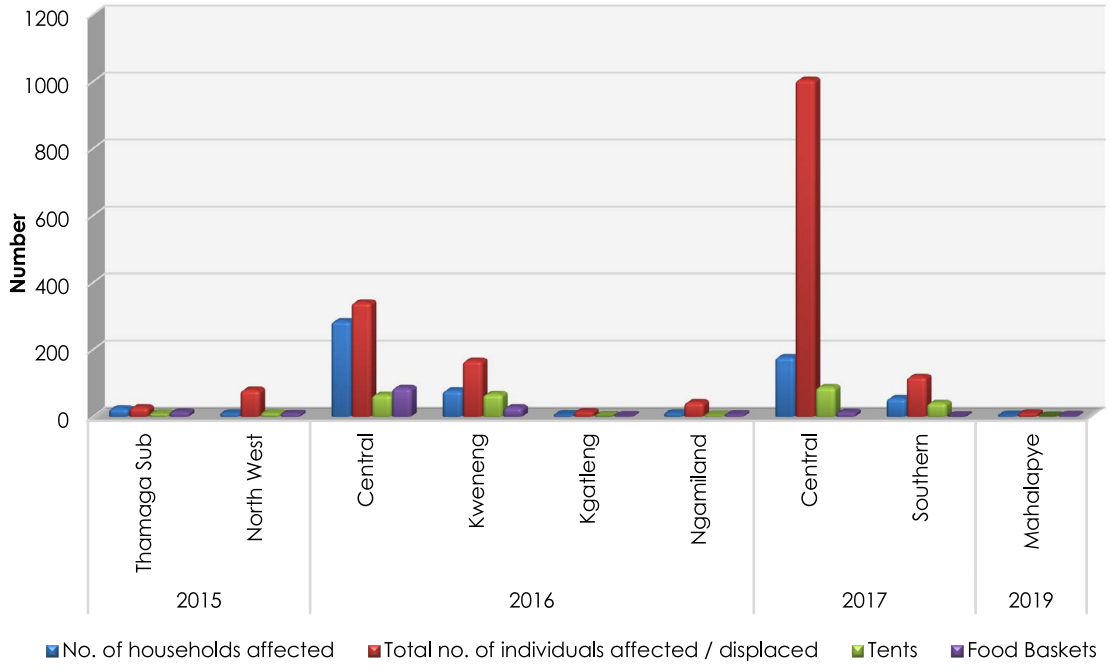
Out of a total of 653 households affected by heavy rains during the period 2015 to 2019, the highest number of households affected (285) were recorded in the Central District in 2016. The Central District continued to experience the highest number of households affected by heavy rains in the year 2017 compared to other districts, with 178 households affected. About 71 percent (463) of the total number of households affected by heavy rains (653) during the review period was from the Central district. The latest figures show that there were only 4 households affected by heavy rains in the year 2019 in Mahalapye district, resulting in three food baskets given as a form of relief **(Table 3.2d and Figure 3.2b)**.

Table 3.2d: Heavy Rain Incidences & Impacts by District, 2015 - 2019

				Impact/Damages		Assistance given	
Incident	Year	District	Villages	No. of households affected	Total no. of individuals affected / displaced	Tents	Food Baskets
Heavy rains	2015	Thamaga Sub	Thamaga	25	28	10	14
		North West	Bodibeng	11	80	11	9
	2016	Central	Radisele, Lerala, Mabuo, Sehunonu, Motshegaletau, Majwanaadipitse, Tshimoyapula, Malatswai	285	341	65	86
		Kweneng	Sojwe, Shadishadi, Loologane, Lephephe,	78	167	67	28
		Kgatleng	Sanyedi, Boseja	6	15	1	2
		Ngamiland	Disaneng, Botshabelo, Matomo, Kgosing, Moeti, Boseja, Samedupe	11	43	4	6
	2017	Central	Kodibeleng, Mokgenene, Makwati, Moshana, Lorolwana,ruele,Diabo, Tshweneyagae, Maisane, Lotlhakane East, Gasita, Dipotsana, Mokgenene, Otse, Bonwapitse, Mahalapye, Kalamare, Dovedale, Pilikwe, Mosolotshane, Ramokgonami, Mookane, Tumasera, Tewane	178	1,005	88	13
		Southern	Moshana, Lorolwana, Ruele, Diabo, Tshweneyagae, Maisane, lotlhakane East, Gasita, Dipotsana	55	119	41	1
	2019	Mahalapye	Borotsi,Chadibe,Sefhare	4	11	0	3
TOTAL				**653**	**1,809**	**287**	**162**

Source: National Disaster Management Office

Figure 3.2b: Heavy Rains Incidences & Impacts by District, 2015 – 2019



4.0. DROUGHT

This section presents drought occurrences and related impacts, as well as some of the responses with the focus on adaptation and mitigation against the impacts. Drought is defined as a deficiency in rainfall in terms of its timing and spatial-temporal distribution (Manthe-Tsuaneng, 2014). Long dry spells negatively affect plant growth, water supplies, wildlife condition and eventually human livelihoods and food security, and this is evident in Botswana.

4.1. Drought Occurrences and Impacts/Severity

Table 4.1a displays occurrences of drought or drought declarations in Botswana since the year 2001. The year with below average rainfall is usually declared a period of drought by His Excellency the President. Generally, the whole country was declared drought stricken during the review period as revealed in **Table 4.1a.**

Table 4.1a: Occurrences of Drought in Botswana (Drought declarations)

Year	Impact Area
2001-2005	Drought years (Whole Country)
2007-2008	Drought year (Whole Country)
2008-2009	Non-drought year
2009-2010	Drought year (Whole Country)
2010-2011	Drought year (Whole Country)
2011-2012	Drought year (Whole Country)
2012-2013	Drought year (Whole Country)
2013-2014	Non-drought year
2014-2015	Drought year (Whole Country)
2015-2016	Drought year (Whole Country)
2016-2017	Drought year (Partial)
2017-2018	Drought year (Whole Country)
2018-2019	Drought year (Whole Country)

Source: Rural Development Council

4.1.1. National Crop Yield Estimates (Cereal)

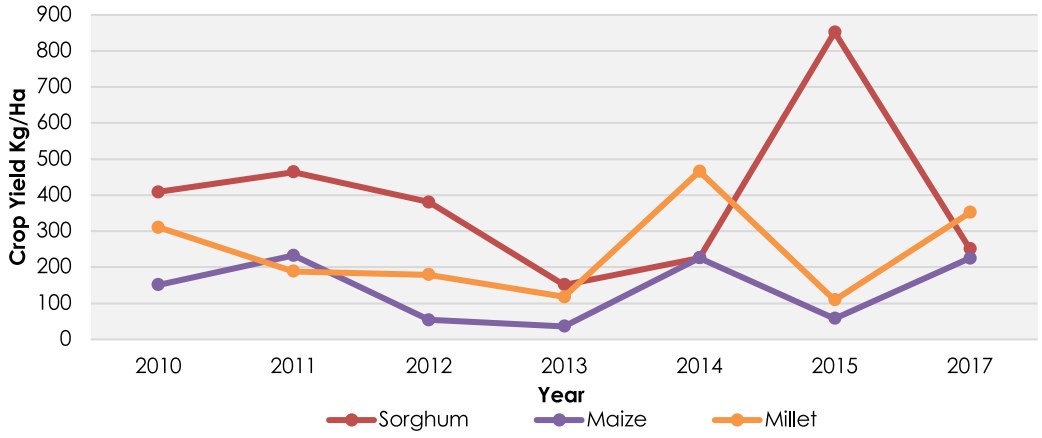
Drought-related moisture deficiency is largely triggered by high temperatures and low rainfall leading to low crop yields. **Table 4.1b** shows the yield per hectare planted by cereal crop in 2010 – 2017. Of all the crops under discussion, sorghum had the highest yield per hectare planted during the period 2010 to 2017. In 2015 alone, sorghum recorded the highest annual yield of 852 Kg/Ha. However, it experienced a decline from 464 Kg/Ha in 2011 to 226 Kg/Ha in 2014. On the other hand, maize recorded the lowest yield per hectare during the review period. Generally, all the annual yields per crop saw a fluctuating trend during the review period **(Table 4.1b and Figure 4.1a)**. A comparative analysis between the national crop yields and the cereal requirements evidently reveal that the yields do not meet the country's cereal demand. This has led to the country's overdependence on imports (refer to subsection 4.1.2 for more details). Low average yields have far reaching implications on the livelihoods of many households in Botswana, particularly small holders. Rural Development Council (2015) asserts that low average yields will inevitably result in serious food deficit at household level.

Table 4.1b: Yield Per Hectare Planted (kg/ha) by Cereal Crop, 2010 - 2017

Crop	2010	2011	2012	2013	2014	2015	2017
Sorghum	409	464	381	151	226	852	251
Maize	151	233	54	36	226	58	225
Millet	311	189	179	118	466	109	352

Source: Agricultural Statistics Unit, Statistics Botswana

Figure 4.1a: Yield Per Hectare Planted (kg/ha) by Cereal Crop, 2006 - 2017



4.1.2. Cereal Requirements, Production and Imports

Botswana has been experiencing recurring drought incidences which resulted in low agricultural production (cereals in particular). This has invariably led to more cereal imports and increased food prices. It is evident from **Table 4.1c** that the total cereal requirements fluctuated between the years 2010 and 2014, and then assumed an upward trend in the subsequent years.

The cereal production fell short of requirements in the years 2010 to 2017 **(see Table 4.1c and Table 4.1d).** Domestic production is drastically lower than the demand for cereals. Hence the country resorted to cereal imports to augment the short fall in order to meet its food security obligation. A total of BWP 9,528,676,671 (P9.53 Billion) was used to import cereals (maize, rice, sorghum, millet and wheat) from 2010 to 2019 **(see Table 4.1e)**. Rural Development Council (2019) also affirms this finding by reporting that during the year 2018/19 estimated cereal production was 5,356 metric tons compared to 66, 093 metric tons harvested in 2017/18 which was far less than the national cereal requirement of 300, 000 metric tons.

Table 4.1e further depicts that more money was expended on importing Maize (P4.29 Billion) during the period under review compared to the amount expended on imports of other cereal crops. The second highest amount of money was expended on importing Rice (P2.34 Billion), followed by Wheat (P1.99 Billion) and Sorghum (P872 Million). Generally, the amount of money expended fluctuated during the 2010 to 2019 period, with the highest amount recorded in 2015 (P1.24 Billion), followed by the year 2016 (P1.21 Billion). According to the Rural Development Council the aforesaid years were among those declared as drought years.

Table 4.1c: Cereal Requirements in ('000) Tons by Crop (2010-2017)

Year	Maize	Wheat	Sorghum	Rice
2010	156	95	47	36
2011	161	95	46	36
2012	202	104	67	36
2013	221	125	96	36
2014	220	124	95	36
2015	308	147	110	36
2016	308	155	144	39
2017	308	155	145	39

Figure 4.1b: Cereal Requirements in ('000) Tons by Crop (2010-2017)

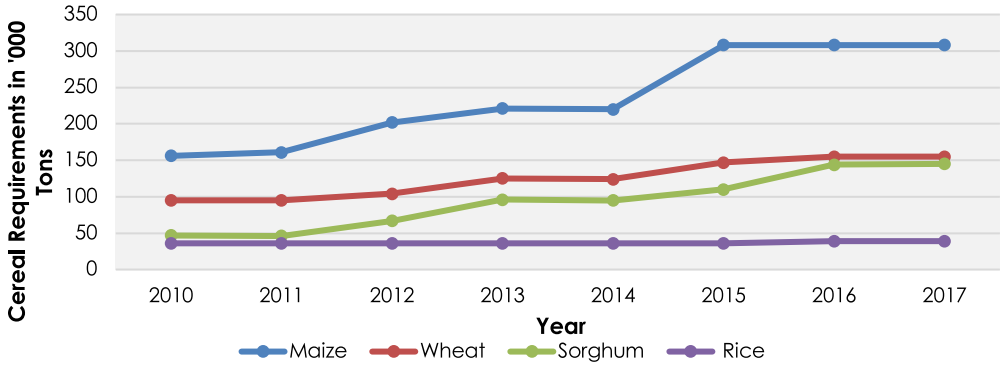


Table 4.1d: Cereal Production in Tons by Crop from 2010-2017

Year	Sorghum	Maize	Millet
2010	31,326	16,575	3,368
2011	32,591	35,322	2,511
2012	24,021	7,677	1,959
2013	10,231	3,844	1,391
2014	14,310	28,550	3,398
2015	35,508	3,792	555
2017	5,975	13,911	1,099

**2017 Figures are for traditional sector ONLY
Source: Agricultural Statistics Unit, Statistics Botswana

Figure 4.1c: Cereal Production in ('000) Tons by Crop from 2005-2017

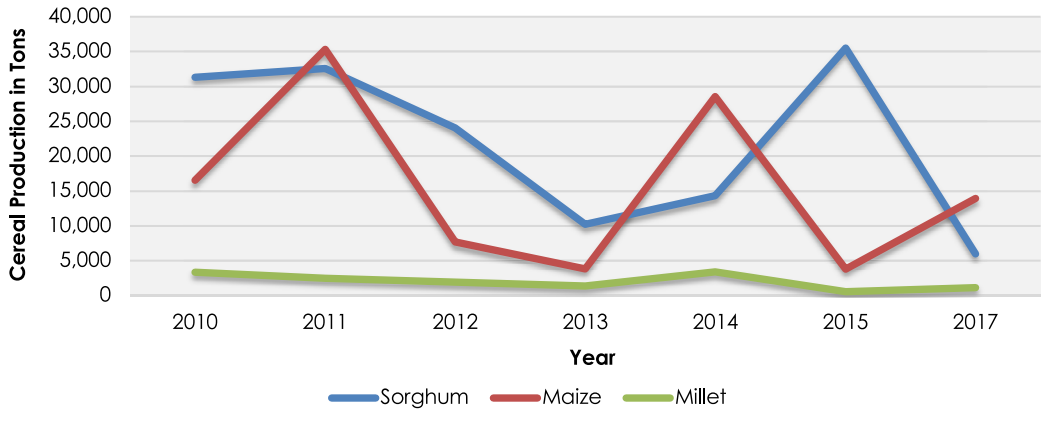
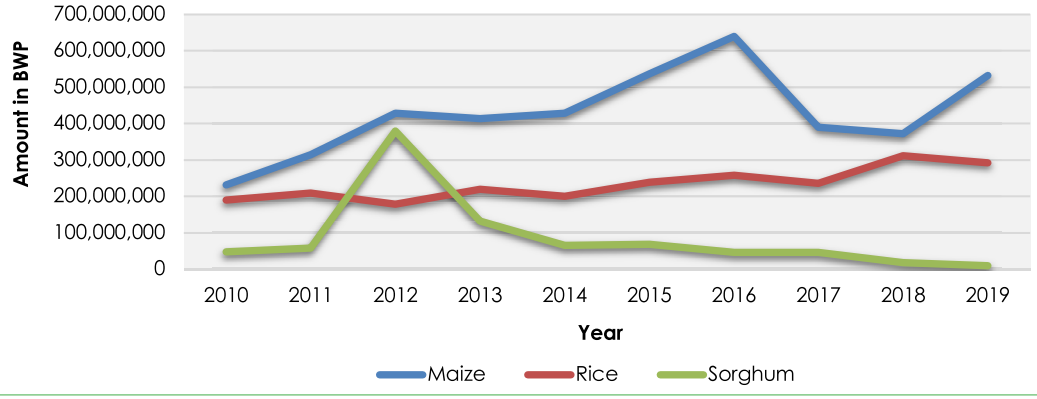


Table 4.1e: Expenditure on Imports of Cereals by Crop from 2010-2019 (BWP)

Year	Maize	Rice	Sorghum	Millet	Wheat
2010	231,682,898	190,096,355	47,175,331	2,226	181,567,409
2011	315,037,143	209,816,125	57,527,117	2,032	146,502,416
2012	429,286,583	178,732,627	379,852,285	176,035	42,198,059
2013	413,877,517	219,435,931	132,465,692	520,118	49,832,975
2014	428,625,206	200,829,895	66,209,659	147,955	22,705,813
2015	536,641,900	238,970,598	68,403,927	2,682,944	399,311,266
2016	639,747,667	257,890,783	46,872,876	2,535,250	267,900,278
2017	389,795,574	235,368,979	46,713,767	1,884,306	246,647,550
2018	372,198,980	311,880,701	17,589,186	30,084,106	294,523,388
2019	531,988,905	292,767,970	9,676,858	2,190,079	340,103,431
TOTAL	**4,288,882,373**	**2,335,789,964**	**872,486,698**	**40,225,051**	**1,991,292,585**

Source: International Merchandise & Trade Statistics Unit, Statistics Botswana

Figure 4.1d: Money Expended on Imports of Cereals by Selected Crop from 2010-2019



4.1.4. Human Water Supply Situation

Botswana is a water scarce country with an erratic rainfall pattern, high evaporation rate and recurring drought incidences. The country is also prone to below normal rainfall which results in declining dam and borehole water levels. The said sources are the principal water sources in-country, with 56 percent from boreholes and 44 percent from dams (Rural Development Council, 2015). Therefore, it is important to collect and document statistics on water sources for monitoring purposes (e.g. SDG 6- Ensure availability and sustainable management of water and sanitation for all). On the basis of the distribution of rainfall across the country, which was poor in space and time the season 2018/19 was declared a severe meteorological drought year (Rural Development Council, 2019: 6).

Table 4.1f presents statistics on dam levels in Botswana during the years 2016 – 2019. It is evident from the table that dam levels were low in 2016, and then assumed an increasing trend in the succeeding years (2017 – 2019). However, there was a slight dip in dam levels from the years 2018 -2019. According to Rural Development (2019), the 2018/19 storage level was relatively fair and all the dams, except Bokaa dam, had more than twelve months of supply without rainfall. Most notable is the Gaborone dam which saw an increase from an annual average level of 12.88 percent in 2016 to 62.63 percent in 2019. On the other hand, Dikgatlhong dam recorded the highest annual average level of over 80 percent during the review period. This is pleasing looking at the fact that the dam supplies water to areas with large population sizes in Botswana.

Groundwater continues to be the main source of water supply in Botswana though it is hindered by challenges such as high salinity, low rates of replenishment due to low rainfall and deep seated nature

of aquifers (Rural Development Council, 2019: 11). The report further reveals that the 2018/19 water level of 3.28 metres at Mowana hydrometric station in the Chobe River was far too lower than the bankfull level of 5.35 metres and therefore drought conditions were anticipated in the area.

Table 4.1f: Percentage Dam Levels in 2016 - 2019

Year	Month	Dam									
		Gaborone (141.4 MCM)	Nnywane (2.3 MCM)	Bokaa (18.5 MCM)	Letsibogo (100.0 MCM)	Shashe (85.0 MCM)	Ntimbale (26.5 MCM)	Thune (90.0 MCM)	Lotsane (42.5 MCM)	Dikgatlhong (400.0 MCM)	Molatedi (201.0 MCM)
2016	**Jan 18th**	1.7	100	51.7	35.6	83.8	82.7	36.5	46.5	70.4	7.3
	Feb 15th	1.7	93.3	49.4	36.5	80.7	91	37	44.4	70	7
	Mar 17th	9	102.6	73.5	68.7	100.8	101.6	37.3	98	88	8.9
	Apr 20th	18.8	94.6	99	75.9	98.1	97.8	39.9	96.9	97.9	39.3
	May 19th	18.6	88.2	91.5	72.9	95.4	95.4	37	93.2	95.9	36
	Jun 6th	17.2	80.1	88.5	71.1	93.7	93.8	37	91	94.5	35
	Jul 21st	16.1	77.3	82.5	67.9	89.4	90.6	36.2	87.8	92.1	33.7
	Aug 8th	15.5	74.1	80	66	87.2	88	-	-	91	-
	Sep 12th	14.4	68	75.7	63.3	83.6	88.5	-	-	-	29.7
	Oct 10th	13.2	61.5	71.4	60.6	80.5	87	-	-	-	-
	Nov 18th	13.7	54	71.8	57.3	77.8	79.8	29.9	91.5	84.2	24.7
	Dec 8th	14.6	74.5	99.8	56.3	76.3	78.7	29.9	92.6	83.2	24.9
2017	**Jan 16th**	22.2	100	100	67.9	100.8	100.9	47.2	100.9	101.8	30.4
	Feb 13th	35.8	100	100.8	100	100	103.6	72.4	100.9	104	37.6
	Mar 15th	99.6	99.7	100	100	100.4	100.2	87.4	100.8	101.8	65.9
	Apr 12th	97	91.9	95.8	97.2	97.7	99	85.4	96.4	99.3	64.4
	May 15th	94.7	91.9	90.8	95	94.3	92.7	80.9	94.2	96.9	61.9
	Jun 15th	91.6	91.9	85.1	92.4	91.1	95.5	80.5	89.1	95.1	59
	Jul 19th	89.6	91.2	80.5	89.6	87.2	91.8	78.4	88.8	93.2	57.2
	Aug 15th	87.7	89.4	75.4	88	84.5	90.6	76	86.1	91.8	54.9
	Sep 15th	85.7	86.5	70	85.4	81.5	85.1	74.8	82.9	89.7	52.5
	Oct 16th	83.7	79	64.9	83.8	79.3	82.9	72.9	81.3	88.2	49.7
	Nov 15th	80.7	73.9	58.4	80.8	76.8	80.2	72.1	77.5	86.1	46.4
	Dec 11th	79.4	72.3	55.8	85.1	74.8	80	67.8	74.8	84.9	44.1
2018	**Jan 16th**	76	67.3	51.6	81.7	72.4	77.4	66.2	67.4	82.3	39.5
	Feb 13th	75.8	81	67.5	81.2	70.2	82.6	63.7	63.9	80.4	39.4
	Mar 15th	74	80.4	64.3	96.9	99.8	99.9	70.4	72.1	100.8	38.2
	Apr 12th	81.5	100.6	87.7	96.3	100	100	69.9	71.7	100.5	39.8
	May 15th	79.5	97.5	84.8	93.5	97.5	97.1	67.7	62.4	98.8	39.8
	Jun 15th	91.6	91.9	85.1	92.4	91.1	95.5	80.5	89.1	95.1	59
	Jul 19th	75.3	90.5	74.1	86.3	91.5	91.2	65.1	62	94	37.1
	Aug 15th	73.5	87.7	70.5	86.2	88.7	89.1	63.5	61.3	92.6	34.3
	Sep 15th	70.8	83.1	65.9	84.8	85.5	85.8	61.9	57.8	90.6	31.5
	Oct 16th	68.5	78.7	59.9	81.7	82.5	83.5	59.7	55.2	88.5	28.7
	Nov 15th	65.8	73.7	55.1	78.4	79.5	79.9	57.5	49.3	85.6	26
	Dec 11th	62.8	68.4	49.7	74.4	77.2	78.2	56.5	49.1	84.6	22.5

Table 4.1f Cont'd: Percentage Dam Levels in 2016 - 2019

Year	Month	Dam									
		Gaborone (141.4 MCM)	Nnywane (2.3 MCM)	Bokaa (18.5 MCM)	Letsibogo (100.0 MCM)	Shashe (85.0 MCM)	Ntimbale (26.5 MCM)	Thune (90.0 MCM)	Lotsane (42.5 MCM)	Dikgatlhong (400.0 MCM)	Molatedi (201.0 MCM)
2019	**Jan 16th**	60.6	87.9	44.0	78.5	83.2	100.0	58.3	68.7	85.8	25.0
	Feb 13th	58.0	84.0	36.8	80.2	97.3	100.0	57.4	66.1	86.3	23.0
	Mar 15th	57.9	83.8	35.1	88.0	99.1	99.1	57.5	65.2	90.0	23.0
	Apr 12th	69.6	100.9	66.8	85.4	96.2	95.6	57.6	62.4	87.3	23.5
	May 15th	68.7	99.0	64.8	82.0	92.8	92.2	55.5	58.1	85.1	22.8
	Jun 14th	66.9	95.1	61.3	79.9	90.4	89.6	54.0	56.1	83.2	21.4
	Jul 17th	64.9	91.9	58.4	77.2	87.2	87.3	52.9	53.9	81.4	20.6
	Aug 15th	63.4	87.2	55.1	75.6	82.3	84.6	51.8	51.7	79.4	19.1
	Sep 16th	61.0	82.2	51.2	73.0	79.2	80.3	49.7	43.7	77.3	18.0
	Oct 15th	58.8	76.8	45.6	71.2	77.1	75.7	48.1	42.8	75.0	15.6
	Nov 15th	59.0	75.0	62.7	69.7	74.5	72.9	46.1	41.4	73.0	14.6
	Dec 16th	62.8	100.6	100.0	82.0	76.2	83.9	46.8	55.2	72.7	17.4

Dash (-) = no data
Source: Water Utilities Corporation publication

4.2. Response to Drought Impacts

4.2.1. Drought-Tolerant Livestock (Tswana Breed & MUSI Composite Cattle Breed)

Musi composite cattle breed was developed in Botswana in order to improve animal productivity and adaptability to harsh climatic conditions in the country. An increase in the population of drought-tolerant livestock like Musi cattle and Tswana cattle and goat breeds can imply some reduced communities' vulnerability to impacts of climate change.

Table 4.2a presents the updated and recalculated time series data on Musi composite cattle per agricultural region and holder. The updated time series statistics were sourced from the Department of Agricultural Research of the Ministry of Agriculture and Food Security. The table depicts that Matlolakgang Ranch in Kweneng Agricultural District had the highest annual average (258) population of Musi cattle during the period 2015 to 2019, followed by Mahalapye (Morale ranch) and Ghanzi (Xanagas ranch) with 227 and 181, respectively **(Table 4.2a and Figure 4.2a)**. The yearly variances are such that Matlolakgang Ranch in Kweneng (271 cattle) recorded the highest number of Musi cattle in the year 2019.

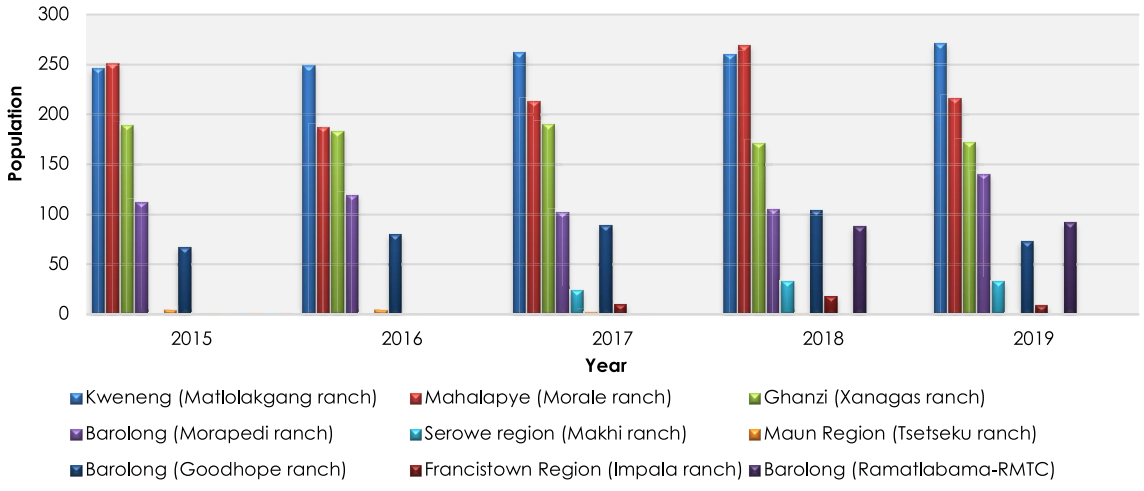
The national total population of Musi cattle dropped from the year 2015 to 2016, then assumed an increasing trend from the year 2016 to 2019. In general, the national total population increased from 869 in 2015 to 1,204 in 2019, a 39 percent increase **(Table 4.2a and Figure 4.2b)**. According to the Department of Agricultural Research, the inconsistencies observed across regions in the trends are attributed to the relocation of the cattle between the agricultural regions and between holders within the same regions.

Table 4.2a: MUSI Cattle population by District and Ranch (2015 - 2019)

Agricultural District	2015	2016	2017	2018	2019
Kweneng (Matlolakgang ranch)	246	249	262	260	271
Mahalapye (Morale ranch)	251	187	213	269	216
Ghanzi (Xanagas ranch)	189	183	190	171	172
Barolong (Morapedi ranch)	112	119	102	105	140
Serowe region (Makhi ranch)	-	-	24	33	33
Maun Region (Tsetseku ranch)	4	4	2	1	-
Barolong (Goodhope ranch)	67	80	89	104	73
Francistown Region (Impala ranch)	-	-	10	18	9
Gaborone Region (Sebele ranch)	-	-	-	-	-
Barolong (Ramatlabama - RMTC)	-	-	-	88	92
Barolong (farmer - Lobatse)	-	-	-	-	33
Mahalapye (Farmer)	-	-	-	-	33
Sherwood (farmer)	-	-	-	-	29
Gobogoo (Farmer) Central region	-	-	-	-	103
TOTAL	**869**	**822**	**892**	**1,049**	**1,204**

Dash (-) means no data
Source: Ministry of Agricultural Development and Food Security

Figure 4.2a: MUSI Cattle population by Selected District and Ranch (2015 - 2019)



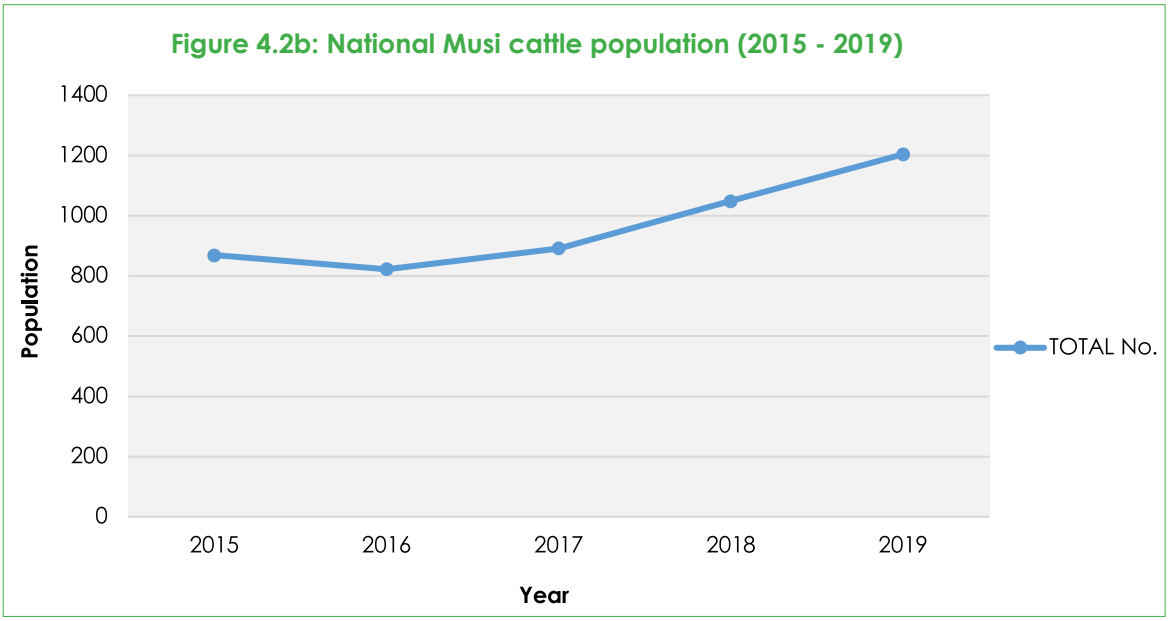


Table 4.2b presents drought-adapted/tolerant livestock population ('000) by district for the period 2010 to 2017. The 2017 figures reveal that the highest number of Tswana cattle (205,278) was recorded in the Central Region. During the same year, Maun Region recorded the least number of Tswana cattle at 27,221.

As regards the population of Tswana goats, **Table 4.2b** reveals that the population of Tswana goats fluctuated during the review period with the highest count recorded in 2010 (1,380,352) and the lowest in 2017 (719,623). Generally, the Central Region recorded the highest population of Tswana goats throughout the review period **(Table 4.2b and Figure 4.2c)**.

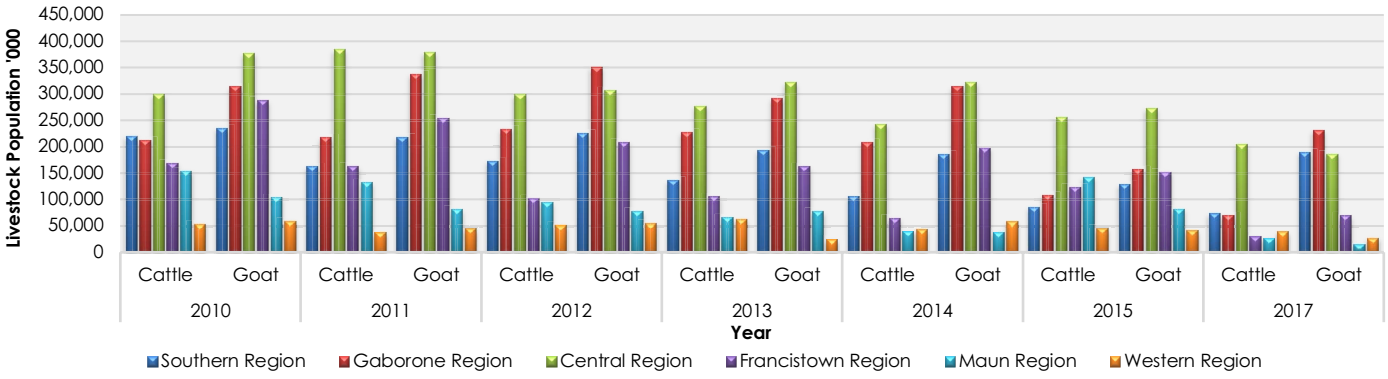
It can be concluded that the population of both Tswana cattle and goats, which are adapted to drought, are significantly decreasing in numbers.

Table 4.2b: Drought-Adapted/Tolerant Livestock Population ('000) by Region (2010 - 2017)

Agricultural District	2010		2011		2012		2013		2014		2015		2017	
	TSWANA Cattle	TSWANA Goat	TSWANA Cattle	TSWANA Goat	TSWANA Cattle	TSWANA Goat	TSWANA Cattle	TSWANA Goat	TSWANA Cattle	TSWANA Goat	TSWANA Cattle	TSWANA Goat	TSWANA Cattle	TSWANA Goat
Southern Region	220,639	236,046	162,636	218,542	173,610	225,867	136,848	193,460	105,751	186,084	86,207	128,603	74,254	189,960
Gaborone Region	212,086	313,794	217,500	338,008	234,183	351,460	228,092	292,616	208,656	313,728	108,658	157,094	69,674	231,322
Central Region	299,768	378,531	384,644	379,821	299,340	307,170	277,624	322,727	242,560	322,807	255,996	273,097	205,278	186,505
Francistown Region	169,225	288,227	163,375	254,668	101,451	209,403	105,132	162,695	65,205	198,677	124,242	152,571	29,918	69,428
Maun Region	154,553	103,975	131,864	81,494	94,162	77,646	65,590	77,915	39,640	38,140	142,163	82,503	27,221	14,891
Western Region	54,363	59,779	37,351	45,470	52,299	54,914	62,992	24,866	43,795	58,317	45,975	41,158	38,933	27,517
TOTAL	**1,110,634**	**1,380,352**	**1,097,370**	**1,318,003**	**955,045**	**1,226,460**	**876,278**	**1,074,279**	**705,607**	**1,117,753**	**763,241**	**835,026**	**445,278**	**719,623**

Source: Agriculture Statistics Unit, Statistics Botswana
Note: All figures are for traditional sector ONLY

Figure 4.2c: Drought-Adapted/Tolerant Livestock Population ('000) by Region (2010 – 2017)



5.0. DISASTER RISK REDUCTION EFFORTS

The Government of Botswana through the National Disaster Management Office is making efforts to ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation. One of the noticeable initiatives include among others, the 2009 National Disaster Risk Management Plan (NDRMP) which provides a national framework to implement disaster risk reduction and emergency management in Botswana involving all the sectors and institutions at all levels. In 2013 the National Disaster Risk Reduction Strategy of 2013-2018 was developed and implemented after the realisation of the increasing frequency and magnitude of disasters.

The Global target E of Sendai Framework for Disaster Risk Reduction spells out that there should be a substantial increase in the number of countries with national and local disaster risk reduction strategies by 2020. Hence the reason why the Government of Botswana is making strives to meet this target by encouraging local authorities to adopt and implement local disaster risk reduction strategies in line with national strategies.

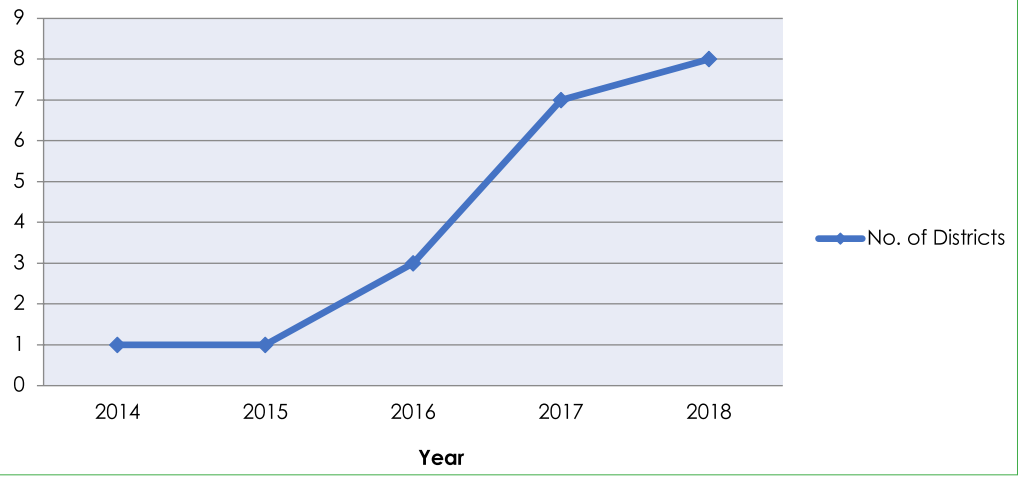
Table 5.1a indicates to what extent the local authorities adopted and implemented local disaster risk reduction strategies aligned with national strategies in the period 2014 - 2018. The table shows that the number of districts which adopted and implemented disaster risk reduction strategies were on the rise, with figures showing eight (8) districts in 2018 compared to one (1) district in 2014 and 2015 **(Table 5.1a & Figure 5.1a)**.

Table 5.1a: Number of local authorities that adopt and implement local disaster risk reduction strategies, 2014 - 2018

Year	District	Number of Districts
2014	Chobe	1
2015	Chobe	1
2016	Chobe Charleshill Sub District Hukuntsi Sub District	3
2017	Chobe, Charleshill Hukuntsi, Ghanzi, Masunga, Jwaneng Tutume	7
2018	Chobe, Charleshill, Hukuntsi, Ghanzi, Masunga, Jwaneng Tutume, S. Phikwe	8

Source: National Disaster Management Office

Figure 5.1a: Number of local governments that adopt and implement local disaster risk reduction strategies, 2014 - 2018



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ISBN: 978-99968-482-2-3