BOTSWANA ENVIRONMENT STATISTICS

CLIMATE DIGEST SEPTEMBER 2019

STATISTICS BOTSWANA

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April 2020

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PREFACE

This report is the second edition of the climate statistics digest, which is published biannually. The report presents Statistics Botswana's progress towards the focused monitoring of climate statistics, and the availing of data for climate trends analysis. The indicators covered in this report are guided in part by the United Nations Framework for the Development of Environment Statistics (UNFDES).

Climate statistics are useful for trends analysis and review of climate related performances in human livelihoods, health, social and economic activities. All aspects of life are affected directly by climate, which is the core determining factor of how people and other organisms live and interact on planet earth. Climate determines food availability and the habitability of regions and environments. Extreme climate events are recorded and monitored for better understanding and planning to ensure minimum casualties and disturbances to lives, as well as for adaptation strategies to climate change phenomena. Statistics Botswana strives to facilitate informed planning and decision making through trends analysis and climate statistics reporting in these submissions.

I would like to extend my gratitude and appreciation to stakeholders and data providers, particularly the Department of Meteorological Services and Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) whose contributions were invaluable in the production of this Digest.

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 Resource Centre (Head-Office, Gaborone).

Dr. Burton S. Mguni
Statistician General
April 2020

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EXECUTIVE SUMMARY

Goodhope received the highest monthly rainfall which fell during the month of April 2019, recording 126.6 mm, followed by Ranaka at 111.8 mm and Mahalapye at 111.0 mm. The highest rainfall recorded in 24 hours is that for Mahalapye, at 58.6 mm, followed by that recorded in Ranaka at 46.8 mm, and that recorded in Pandamatenga at 39.2 mm all recorded during the month of April 2019. The wettest area was Goodhope, recording a six months total of 134.4 mm followed by Ranaka recording 117.0 mm and Mahalapye recording 111.0 mm.

The lowest mean monthly minimum air temperature recorded was in Ngwatle at 1.2 °C, followed by that of Werda and Tsabong both at 1.5 °C all recorded in July 2019. The lowest minimum temperature recorded for a day was in Tsabong at -4.6 °C in June 2019, followed by -4.1°C and -3.9 °C both recorded in Ngwatle during the month of July 2019.

The highest mean monthly maximum temperatures for the period April to September 2019 was for Shakawe at 32.9 °C in September 2019, followed by 32.6 °C in April 2019 also at Shakawe, and for Mababe at 32.5 °C in September 2019. The highest maximum temperature was recorded at Baines Drift at 38 °C in September 2019, followed by that recorded for Tsabong at 37.3 °C, and 37.2 °C in September 2019.

Winds were strongest in Goodhope, with the highest mean monthly maximum wind speed of 6.8 m/s during April 2019 and 6.6 m/s in August and September 2019. Mahalapye had the lowest mean monthly maximum wind speeds at 0.3 m/s in April and May 2019 followed by 2.0 m/s for Ranaka in May 2019. The highest wind speeds recorded were all recorded in Goodhope. The highest was 12.5 m/s followed by 12.3 m/s both recorded in April 2019, and that of 11.1m/s recorded in September 2019.

The highest predominance of wind direction is that of Ranaka, where 44.0 percent of the winds were from the south, Baines Drift and Pandamatenga followed at 42.6 percent with predominantly east, and east north east winds respectively. Nationally, Botswana's winds were predominantly from the east 19.6 percent of the period and from the north east at 19.0 percent of the period, both recorded during the month of May 2019. This was followed by predominance of 18.4 percent from the east north east direction, recorded in April 2019.

The highest predominance by maximum wind speed is that for Pandamatenga with 33.3 percent of the days recording strongest winds blowing from the east north east, followed by Shakawe, where 30.1 percent of the strongest winds blew from a south east direction, and Werda, where 29.0 percent of the strongest winds blew from the north north east. Nationally, the strongest winds blew mainly from the north east at 22.0 percent of the days in April 2019, followed by east north east at 18.1 percent of the days in May 2019, and east north east at 17.4 percent of the days in August 2019.

1. INTRODUCTION

This report covers the period April to September 2019, which is Botswana's cold and dry season. Climate is important to human livelihoods. It influences human life directly through wellbeing and health and indirectly through human activities such as economic or agricultural practices.

Botswana is climatically classified as arid to semi-arid, and is drought prone, with highly erratic rainfall that ranges from 250mm in the southwest to around 650mm in the north. Most of the rainfall is received between October and March, which is also the period of warmer temperatures. Climate is influenced by the El Nino and La Nina phases, which are a result of variations in oceanic temperature.

2. RAINFALL

Rainfall in Botswana is normally higher during the La Niña than during the El Niño years. The period under study is the dry season characterised by low rainfall and low temperatures.

2.1. Monthly rainfall

Table 1 shows the total monthly rainfall in millimetres (mm) for the stations with data available. The period under study is the dry cold season, often with some late rains falling during April and May and some early rains of the subsequent wet season (Oct – March) falling in September.

Table 1: Total monthly Precipitation (mm) April to September 2019

	April	May	June	July	August	September
Goodhope	126.6	7.6	0.0	0.0	0.2	0.0
Ranaka	111.8	3.2	0.8	0.0	0.0	1.2
Mahalapye	111.0	0.0	0.0	0.0	0.0	0.0
Werda	76.6	6.0	0.0	0.4	0.0	0.2
Pandamatenga	66.6	0.0	0.0	0.0	0.0	0.0
Lephephe	63.6	0.0	0.0	0.0	0.0	0.4
Tsabong	49.6	1.0	0.0	0.0	0.0	0.0
Tshane	37.8	4.6	0.0	0.0	0.0	0.0
Baines Drift	35.6	0.0	0.0	0.0	0.0	0.0
Tubu	31.4	0.0	0.0	0.0	0.0	0.0
Ghanzi	30.4	0.0	0.0	0.0	0.0	0.0
Shakawe	14.0	0.0	0.0	0.0	0.0	0.0
Ngwatle	9.6	2.2	0.0	0.0	0.0	0.0
Lotlhakane East	6.6	0.6	0.0	0.0	0.0	0.2
Mababe	0.0	0.0	0.0	0.0	0.0	0.0
Sowa	0.0	0.0	0.6	0.0	0.0	0.0

Source: Department of Meteorological Services and SASSCAL

Goodhope received the highest of the late rains that fell during the month of April 2019, recording 126.6 mm, followed by Ranaka at 111.8 mm and Mahalapye at 111.0 mm.

2.2. Rainfall extremes

Table 2 shows the highest ten (10) daily rainfall recorded in a 24 hour period by station. For the study period, the highest rainfall recorded in a 24 hours period is that for Mahalapye, at 58.6 mm, followed by that recorded in Ranaka at 46.8 mm, and that recorded in Pandamatenga at 39.2 mm, all recorded during the month of April 2019.

Table 2: Highest ten stations rainfall (mm) recorded in 24 hours April to September 2019

Station	Rainfall (mm)
Mahalapye	58.6
Ranaka	46.8
Pandamatenga	39.2
Goodhope	32.4
Baines Drift	29.2
Tshane	28.4
Pandamatenga	27.2
Lephephe	24.8
Mahalapye	24.0
Goodhope	22.8

Table 3 shows the total rainfall by station during the cold dry season from April to September 2019. Indications are that the wettest area was Goodhope, recording a total of 134.4 mm followed by Ranaka recording 117 mm and Mahalapye recording 111.0 mm over a period of six months.

Table 3: Total rainfall (mm) by station April to September 2019

Station	Total Rainfall (mm)
Goodhope	134.4
Ranaka	117.0
Mahalapye	111.0
Werda	83.2
Pandamatenga	66.6
Lephephe	64.0
Tsabong	50.6
Tshane	42.4
Baines Drift	35.6
Tubu	31.4
Ghanzi	30.4
Shakawe	14.0
Ngwatle	11.8
Lotlhakane East	7.4
Sowa	0.6
Mababe	0.0

Source: Department of Meteorological Services and SASSCAL

3. TEMPERATURES

Botswana's diurnal temperature range is high, but it is normal for semi-arid and arid climates. The temperatures also vary spatially, with extremes common in the north-eastern and the south-western regions of the country.

3.1. Minimum air temperatures

Table 4 shows the mean monthly minimum air temperatures in degrees Celsius (°C). The period April to September is characterised by Botswana's lowest temperatures, mostly recorded during the months of June and July. The lowest temperatures are often recorded during the night period.

The coolest mean monthly minimum air temperatures during the period April to September 2019 were recorded in the south-western parts of the country.

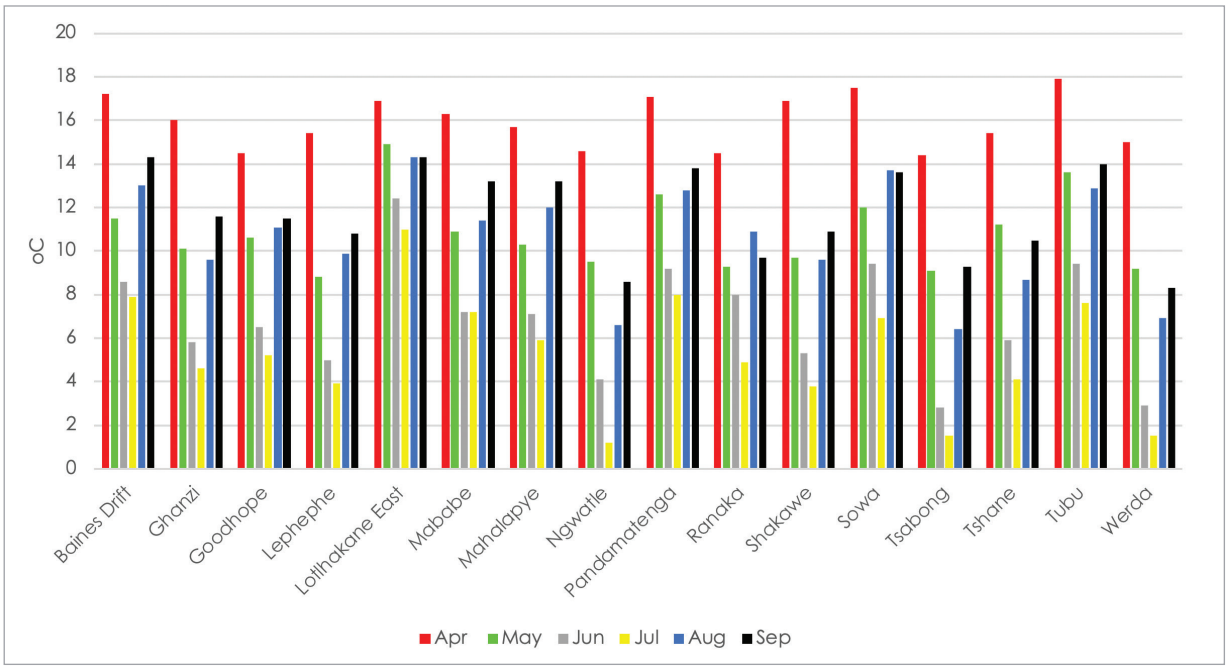
Table 4: Mean monthly minimum air temperatures (degrees Celsius) April to September 2019

	Apr	May	Jun	Jul	Aug	Sep
Baines Drift	17.2	11.5	8.6	7.9	13.0	14.3
Ghanzi	16.0	10.1	5.8	4.6	9.6	11.6
Goodhope	14.5	10.6	6.5	5.2	11.1	11.5
Lephephe	15.4	8.8	5.0	3.9	9.9	10.8
Lotlhakane East	16.9	14.9	12.4	11.0	14.3	14.3
Mababe	16.3	10.9	7.2	7.2	11.4	13.2
Mahalapye	15.7	10.3	7.1	5.9	12.0	13.2
Ngwatle	14.6	9.5	4.1	1.2	6.6	8.6
Pandamatenga	17.1	12.6	9.2	8.0	12.8	13.8
Ranaka	14.5	9.3	8.0	4.9	10.9	9.7
Shakawe	16.9	9.7	5.3	3.8	9.6	10.9
Sowa	17.5	12.0	9.4	6.9	13.7	13.6
Tsabong	14.4	9.1	2.8	1.5	6.4	9.3
Tshane	15.4	11.2	5.9	4.1	8.7	10.5
Tubu	17.9	13.6	9.4	7.6	12.9	14.0
Werda	15.0	9.2	2.9	1.5	6.9	8.3

Source: Department of Meteorological Services and SASSCAL

The lowest mean monthly minimum air temperature is that for Ngwatle at 1.2 °C, followed by that of Werda and Tsabong both at 1.5 °C all recorded in July 2019. Figure 1 shows the mean monthly minimum temperatures graphically.

Figure 1: Mean monthly minimum temperatures (degrees Celsius) April to September 2019



3.2.Minimum temperature extremes

Table 5 shows the lowest minimum air temperatures recorded at a station for a period of 24 hours, during the period April to September 2019. The lowest minimum temperature for a day was recorded in Tsabong at -4.6 °C in June 2019, followed by -4.1 °C and -3.9 °C both recorded in Ngwatle during the month of July 2019.

Table 5: Lowest minimum temperatures recorded (degrees Celsius) April to September 2019

Temperature (°C)	Month	Station
-4.6	June	Tsabong
-4.1	July	Ngwatle
-3.9	July	Ngwatle

Source: Department of Meteorological Services and SASSCAL

3.3. Maximum air temperatures

Table 6 shows the mean monthly maximum temperatures for the period April to September 2019. This period is mostly dry and cold. The maximum air temperatures will show the parts of Botswana that are warmest during the winter months and days.

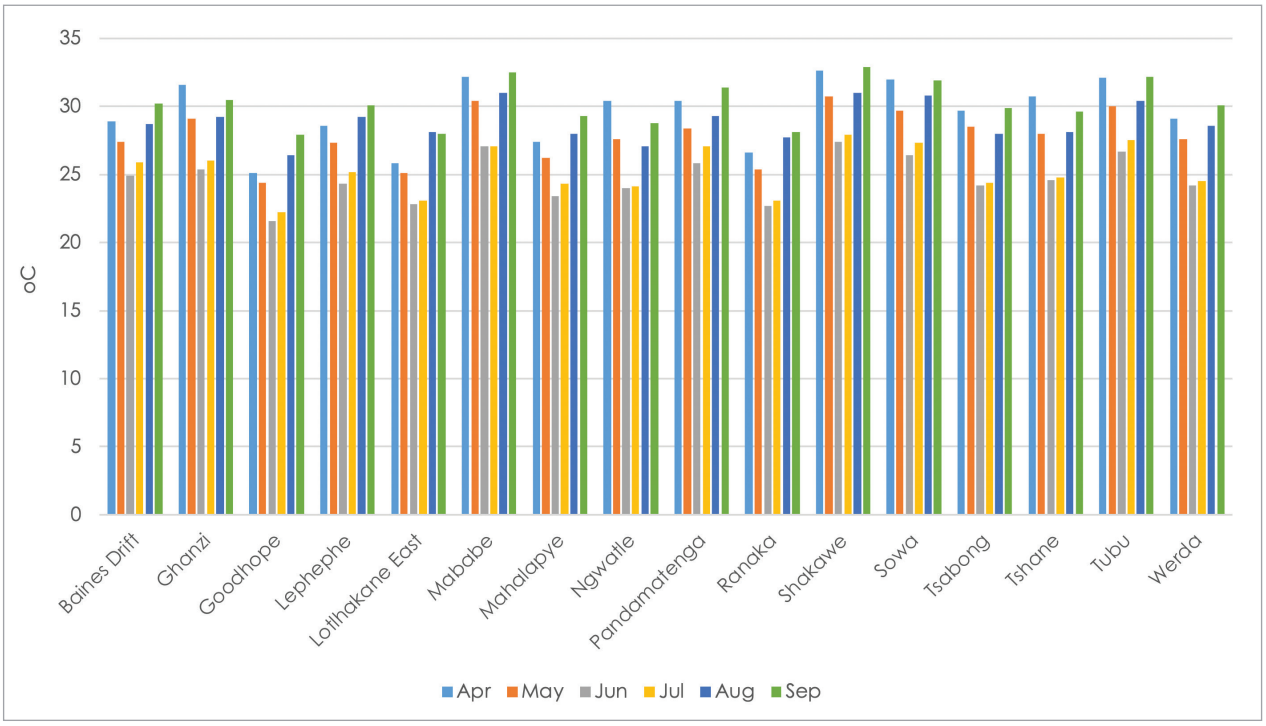
Table 6: Mean monthly maximum air temperatures (degrees Celsius) April to September 2019

Station	Apr	May	Jun	Jul	Aug	Sep
Baines Drift	28.9	27.4	24.9	25.9	28.7	30.2
Ghanzi	31.6	29.1	25.4	26.0	29.2	30.5
Goodhope	25.1	24.4	21.6	22.2	26.4	27.9
Lephephe	28.6	27.3	24.3	25.2	29.2	30.1
Lotlhakane East	25.8	25.1	22.8	23.1	28.1	28.0
Mababe	32.2	30.4	27.1	27.1	31.0	32.5
Mahalapye	27.4	26.2	23.4	24.3	28.0	29.3
Ngwatle	30.4	27.6	24.0	24.1	27.1	28.8
Pandamatenga	30.4	28.4	25.8	27.1	29.3	31.4
Ranaka	26.6	25.4	22.7	23.1	27.7	28.1
Shakawe	32.6	30.7	27.4	27.9	31.0	32.9
Sowa	32.0	29.7	26.4	27.3	30.8	31.9
Tsabong	29.7	28.5	24.2	24.4	28.0	29.9
Tshane	30.7	28.0	24.6	24.8	28.1	29.6
Tubu	32.1	30.0	26.7	27.5	30.4	32.2
Werda	29.1	27.6	24.2	24.5	28.6	30.1

Source: Department of Meteorological Services and SASSCAL

The highest mean monthly maximum temperatures for the period April to September 2019 was for Shakawe at 32.9 °C in September 2019, followed by 32.6 °C in April 2019 also at Shakawe, and Mababe at 32.5 °C in September 2019. Figure 2 shows the mean monthly maximum temperatures graphically.

Figure 2: Mean monthly maximum temperatures (degrees Celsius) April to September 2019



3.4. Maximum temperature extremes

Table 7 shows the highest maximum air temperatures recorded for the stations, during the period April to September 2019. The highest maximum temperature for the period was recorded for Baines Drift at 38 °C in September 2019, followed by that recorded for Tsabong at 37.3 °C, and 37.2 °C in September 2019.

Table 7: Highest maximum temperatures recorded (degrees Celsius) April to September 2019

Temperature (°C)	Month	Station
38.0	September	Baines Drift
37.3	September	Tsabong
37.2	September	Tsabong

Source: Department of Meteorological Services and SASSCAL

4. WIND SPEED AND DIRECTION

Wind speed is measured in metres per second (m/s) while wind direction is expressed in degrees. Wind direction is expressed in terms of the direction that the wind is blowing from. For example, northerly winds blow from the north to the south.

4.1. Monthly maximum wind speed

Table 8 shows the mean monthly maximum wind speed for the period April to September 2019.

Table 8: Mean monthly maximum wind speed (m/s) April to September 2019

Stations	Apr	May	Jun	Jul	Aug	Sep
Baines Drift	4.6	3.9	3.9	4.4	4.7	5.2
Ghanzi	6.2	5.5	5.2	4.5	6.2	6.5
Goodhope	6.8	5.3	5.0	5.3	6.6	6.6
Lephephe	5.8	5.1	4.6	4.9	5.8	6.4
Lotlhakane East	2.3	2.2	2.3	3.0	4.3	2.9
Mababe	5.1	4.8	4.8	4.8	5.6	6.4
Mahalapye	0.3	0.3	3.7	4.4	5.4	5.7
Ngwatle	5.3	5.0	4.4	4.2	5.2	5.8
Pandamatenga	4.5	4.7	4.7	4.3	5.0	5.6
Ranaka	2.7	2.0	2.2	2.5	2.6	2.4
Shakawe	4.0	3.9	3.5	3.8	4.2	4.7
Sowa	5.0	4.4	4.7	4.5	5.2	5.8
Tsabong	6.2	5.3	4.8	5.1	5.2	6.1
Tshane	5.5	4.6	4.3	4.2	5.1	5.7
Tubu	5.1	5.2	4.9	4.5	5.7	6.1
Werda	5.1	4.5	4.4	4.3	4.9	5.5

Source: Department of Meteorological Services and SASSCAL

During the period under study, winds were strongest in Goodhope, with the highest mean monthly maximum wind speed of 6.8 m/s during April 2019 and 6.6 m/s in August and September 2019. Mahalapye had the lowest mean monthly maximum wind speeds at 0.3 m/s in April and May 2019 followed by 2.0 m/s for Ranaka in May 2019.

4.2. Highest wind speed recorded

Table 9 shows the highest wind speed recorded during the period April to September 2019. The wind speeds are the highest recorded in a 24 hour period.

The highest wind speed recorded during the period under study were all recorded in Goodhope. The highest was 12.5 m/s followed by 12.3 m/s both recorded in April 2019, and that of 11.1 m/s recorded in September 2019. These are categorised as a strong breeze on the Beaufort scale. (See appendix)

Table 9: Maximum wind speed (m/s) April to September 2019

Speed m/s	*Beaufort classification	Month	Station
12.5	Strong breeze	April	Goodhope
12.3	Strong breeze	April	Goodhope
11.1	Strong breeze	September	Goodhope

*See table 14 in appendix
Source: Department of Meteorological Services and SASSCAL

4.3. Wind direction

Botswana's winds are predominantly easterly to north easterly except for the south west of the country where northerly winds are dominant. (Department of Meteorological Services: 2003).

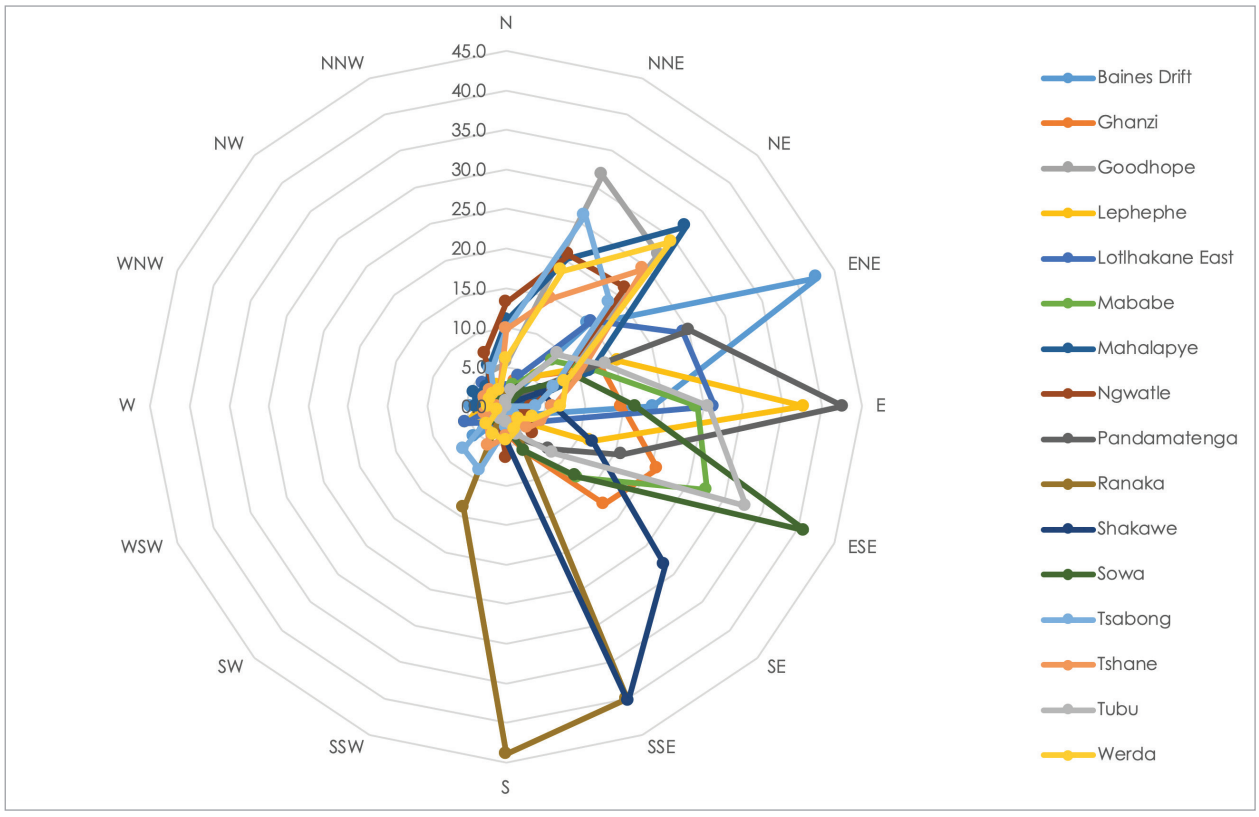
Table10 shows the stations' predominant winds as a percentage of the days recorded between April and September 2019. The highest predominance is that of Ranaka, where 44.0 percent of the winds were from the south, followed by Baines Drift's predominantly east and Pandamatenga's east north east winds both at 42.6 percent. Figure 3 shows this graphically.

Table 10: Percentage predominant winds by station April to September 2019

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Baines Drift	1.1	1.1	14.8	42.6	18.6	2.7	1.1	0.5	1.1	1.6	5.5	2.7	4.4	0.5	0.0	1.6
Ghanzi	1.6	3.3	5.5	13.1	14.8	20.8	17.5	6.0	3.3	2.7	2.7	3.3	2.2	1.1	1.1	1.1
Goodhope	5.5	31.7	27.3	6.6	1.6	0.5	3.8	2.2	1.1	3.3	1.6	3.3	0.0	2.7	3.8	4.9
Lephephe	1.1	2.7	5.5	15.3	37.7	11.5	2.7	0.0	3.8	0.5	2.7	5.5	3.3	2.7	2.2	2.7
Lotlhakane East	2.1	4.2	15.3	24.3	26.4	4.9	2.8	0.7	0.7	2.1	2.8	5.6	1.4	1.4	4.2	1.4
Mababe	1.1	2.7	8.2	12.1	24.2	27.5	12.6	6.0	2.7	1.1	1.1	0.0	0.0	0.5	0.0	0.0
Mahalapye	10.9	20.2	32.2	11.5	1.6	0.5	0.5	0.0	0.0	1.1	2.2	2.2	3.8	4.4	3.3	5.5
Ngwatle	13.1	20.8	21.3	6.6	3.3	2.7	4.9	1.6	6.6	2.2	1.1	2.7	1.1	2.7	2.2	7.1
Pandamatenga	0.0	0.0	2.2	25.1	42.6	15.8	7.7	4.4	1.1	0.0	0.0	0.5	0.0	0.0	0.0	0.5
Ranaka	1.3	0.0	0.0	0.0	0.0	0.0	0.0	40.0	44.0	14.0	0.7	0.0	0.0	0.0	0.0	0.0
Shakawe	0.5	0.0	0.5	4.9	6.0	12.0	28.4	40.4	4.4	1.1	0.5	0.0	0.0	0.0	0.5	0.5
Sowa	0.0	0.0	2.7	9.8	16.4	41.0	12.6	6.0	2.7	1.1	2.7	2.7	1.6	0.0	0.5	0.0
Tsabong	9.8	26.2	18.6	6.6	3.8	0.0	1.6	1.1	2.7	8.7	7.7	1.6	1.6	2.7	2.2	4.9
Tshane	9.8	14.8	24.6	9.8	6.0	4.9	3.8	2.2	3.8	5.5	3.3	2.7	1.1	2.7	2.7	2.2
Tubu	0.5	2.2	9.3	13.7	25.7	32.8	8.2	3.8	2.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Werda	6.0	18.6	29.5	8.2	7.1	3.8	2.2	3.3	4.4	3.8	3.3	1.1	2.2	2.2	2.2	2.2

Source: Department of Meteorological Services and SASSCAL

Figure 3: Percentage predominant winds by station April to September 2019



4.4. National wind direction

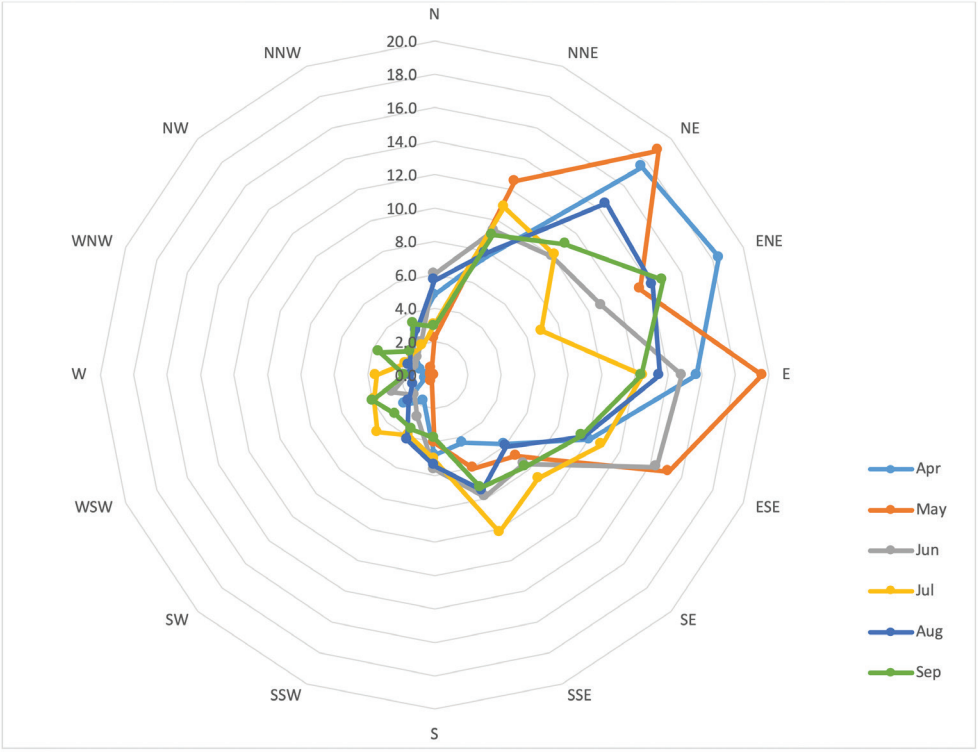
Table 11 shows the direction of the country's predominant winds for the period April to September 2019 as a percentage of the total number of days for that period. Nationally, winds were predominantly from the east 19.6 percent of the period and from the north east at 19.0 percent of the period, both recorded during the month of May 2019. This was followed by predominance of 18.4 percent from the east north east direction,recorded in April 2019. Figure 4 shows the country's predominant winds graphically.

Table 11: Wind direction by percentage of days April to September 2019

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
Apr	4.8	7.5	17.6	18.4	15.7	10.0	5.9	4.4	4.8	1.7	2.5	0.6	0.4	0.8	1.9	2.9	100.0
May	2.2	12.5	19.0	13.3	19.6	15.2	6.9	6.1	4.0	0.4	0.0	0.2	0.0	0.2	0.0	0.4	100.0
Jun	6.0	9.4	10.0	10.8	14.8	14.4	7.5	7.9	5.6	2.7	1.7	2.7	1.7	1.3	1.5	2.1	100.0
Jul	3.0	10.9	10.2	6.9	12.5	10.9	8.8	10.2	5.1	3.9	4.8	3.9	3.5	1.8	1.8	1.8	100.0
Aug	5.6	7.9	14.5	14.1	13.5	9.7	6.0	7.5	5.4	4.2	2.2	1.4	1.4	1.6	2.0	2.8	100.0
Sep	2.9	9.1	11.1	14.8	12.4	9.5	7.7	7.3	3.8	3.5	3.3	4.0	1.8	3.5	2.0	3.3	100.0

Source: Department of Meteorological Services and SASSCAL

Figure 4: National predominant winds (percentage days) April to September 2019



4.5. Maximum wind speed by direction

Maximum wind speed direction is an indication of the direction of the maximum wind speed recorded. It indicates the direction of the strongest winds for the stations and the country.

Table 12 and Figure 5 show the percentage maximum wind speed directions for the stations, which is, a percentage of the number of days the recordings were taken during the period April to September 2019.

Table 12: Percentage maximum wind speed directions by station April to September 2019

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
Mababe	1.6	6.6	22.0	16.5	25.8	9.9	4.4	6.0	3.3	0.5	0.5	1.6	0.0	0.5	0.0	0.5	100
Mahalapye	5.5	12.6	19.7	12.0	7.7	5.5	2.2	2.7	1.1	1.6	3.3	0.5	2.2	1.6	18.0	3.8	100
Ngwatle	16.4	18.6	16.4	7.7	3.8	2.7	3.3	4.4	2.7	4.9	1.6	1.6	0.5	2.7	4.4	8.2	100
Pandamatenga	0.5	3.3	25.1	33.3	19.1	7.7	4.4	2.7	1.6	1.1	0.5	0.5	0.0	0.0	0.0	0.0	100
Shakawe	0.0	1.6	6.6	10.9	6.6	23.0	30.1	12.0	5.5	0.0	1.1	0.5	1.6	0.0	0.5	0.0	100
Sowa	0.5	1.6	7.7	19.7	15.3	23.0	2.2	2.7	0.0	1.1	5.5	12.0	6.0	0.0	2.2	0.5	100
Tsabong	4.9	27.9	14.2	6.6	2.7	2.2	2.2	1.1	5.5	5.5	5.5	2.7	3.8	4.4	2.7	8.2	100
Tshane	12.6	12.0	11.5	10.4	8.2	4.9	2.7	3.3	4.9	1.6	4.4	3.3	2.7	3.3	5.5	8.7	100
Tubu	0.5	10.4	16.9	21.9	26.2	8.7	5.5	6.6	2.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	100
Werda	11.5	29.0	12.6	3.8	4.9	7.1	2.2	0.0	1.1	2.2	5.5	3.8	3.3	3.3	1.6	8.2	100

Source: Department of Meteorological Services and SASSCAL

The highest predominance by maximum wind speed is that for Pandamatenga with 33.3 percent of the days recording strongest winds blowing from the east north east, followed by Shakawe where 30.1 percent of the strongest winds blew from a south east direction, and Werda where 29.0 percent of the strongest winds blew from the north north east.

Figure 5: Percentage maximum wind speed directions by station April to September 2019

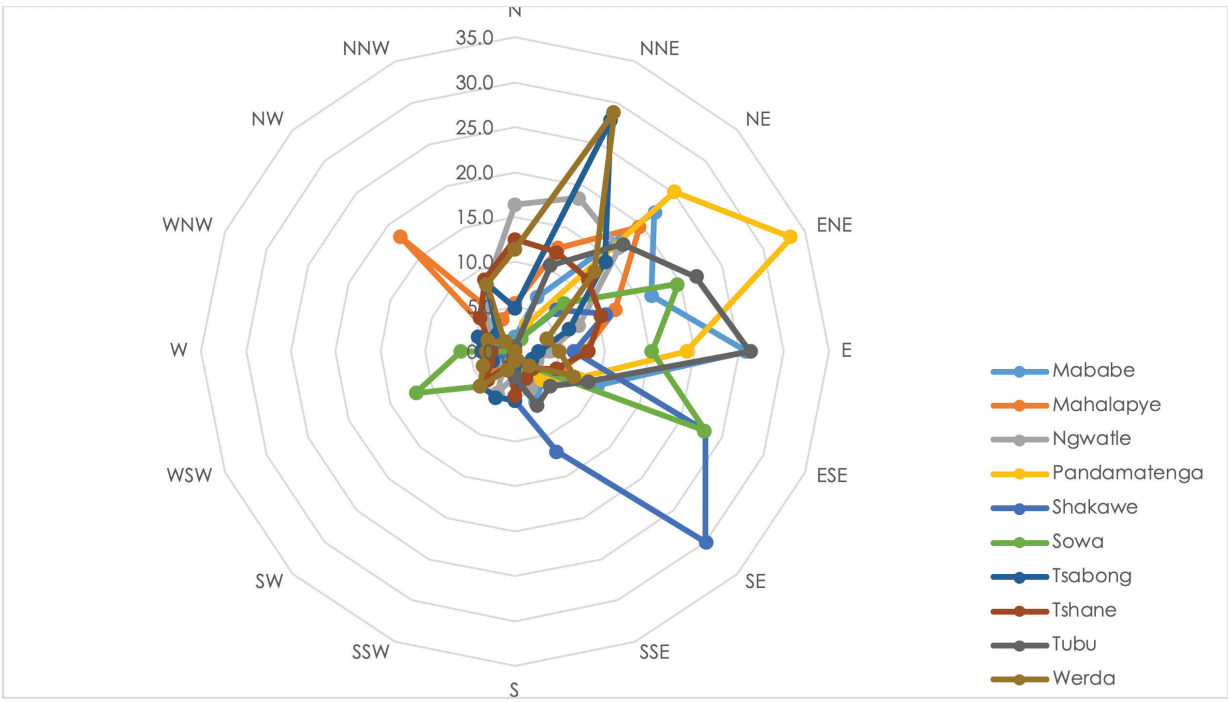


Table 13 and Figure 6 show the maximum wind speed directions for the country as a percentage of the days recordings were taken by month, for the period April to September 2019.

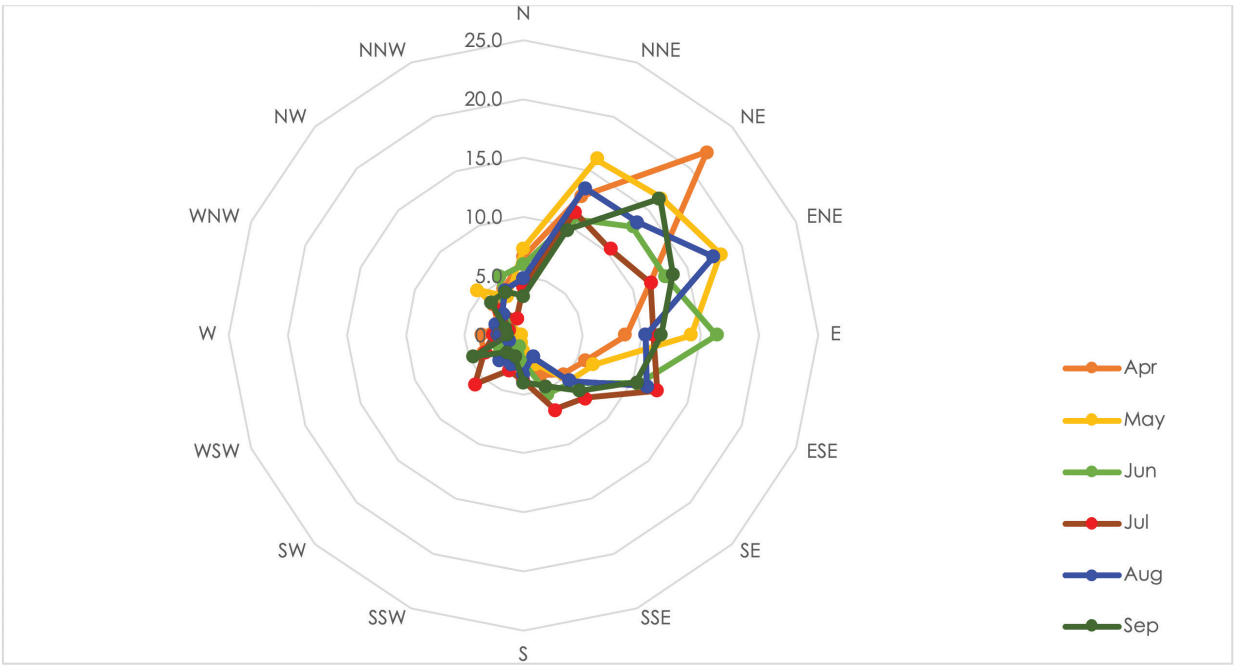
Table 13: National percentage maximum wind speed directions April to September 2019

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
Apr	6.7	12.7	22.0	11.7	8.7	5.7	4.7	3.7	2.3	2.0	2.3	3.7	3.7	2.3	3.7	4.3	100
May	7.4	16.1	16.5	18.1	14.2	6.5	5.5	2.6	1.3	0.6	1.0	0.6	0.3	0.3	5.5	3.5	100
Jun	6.0	10.7	13.0	13.0	16.3	10.7	5.7	5.3	2.3	1.0	2.7	2.3	2.0	1.3	2.3	5.3	100
Jul	4.2	11.3	10.4	11.7	11.0	12.3	7.4	6.8	3.9	3.2	5.8	3.6	2.6	1.3	2.9	1.6	100
Aug	4.8	13.5	13.5	17.4	10.3	11.3	5.5	1.9	3.2	2.6	2.9	1.3	2.3	2.6	2.6	4.2	100
Sep	3.3	9.7	16.3	13.7	11.7	10.3	6.7	4.7	4.0	2.0	2.0	4.7	1.3	1.7	4.0	4.0	100

Source: Department of Meteorological Services and SASSCAL

During the study period, the strongest winds for the country blew mainly from the north east at 22.0 percent of the days in April 2019, followed by east north east at 18.1 percent of the days in May 2019, and east north east at 17.4 percent of the days in August 2019.

Figure 6: National percentage maximum wind speed directions April to September 2019

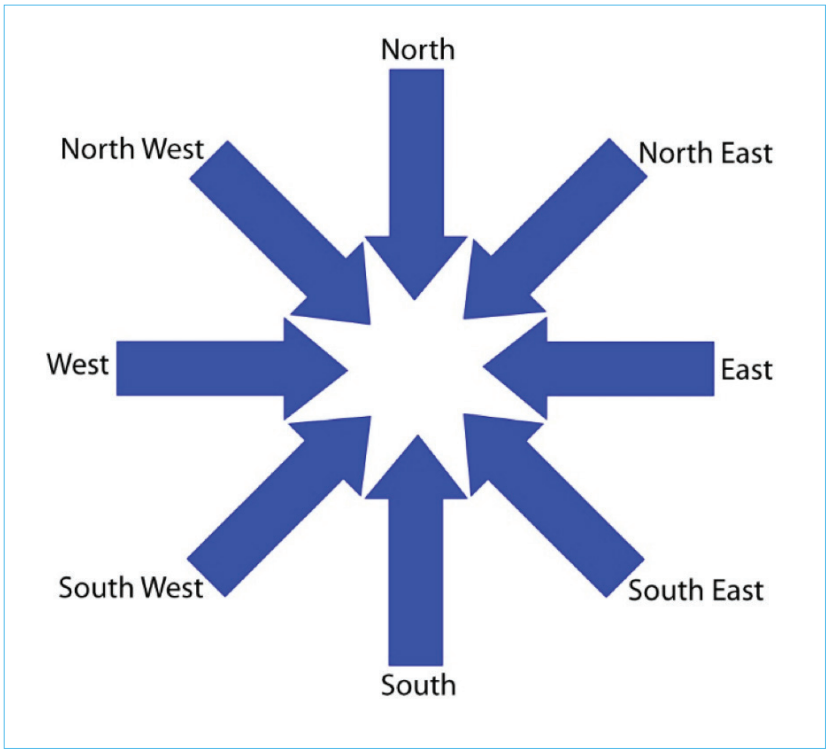


5. APPENDIX

Table 14: Wind Scale

m/s	Km/h	Beaufort scale	Label	Effects
0 - 0.2	1	0	Calm	Calm. Smoke rises vertically.
0.3-1.5	1-5	1	Light Air	Wind motion visible in smoke.
1.6-3.3	6-11	2	Light Breeze	Wind felt on exposed skin. Leaves rustle.
3.4-5.4	12-19	3	Gentle Breeze	Leaves and smaller twigs in constant motion.
5.5-7.9	20-28	4	Moderate Breeze	Dust and loose paper raised. Small branches begin to move.
8.0-10.7	29-38	5	Fresh Breeze	Branches of a moderate size move. Small trees begin to sway.
10.8-13.8	39-49	6	strong Breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
13.9-17.1	50-61	7	Near Gale	Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially by people on upper floors.
17.2-20.7	62-74	8	Gale	Twigs broken from trees. Cars veer on road.
20.8-24.4	75-88	9	Severe Gale	Larger branches break off trees, and some small trees blow over. Construction/ temporary signs and barricades blow over. Damage to circus tents and canopies.
24.5-28.4	89-102	10	Storm	Trees are broken off or uprooted, saplings bent and deformed, poorly attached asphalt shingles and shingles in poor condition peel off roofs.
28.5-32.6	103-117	11	Violent Storm	Widespread vegetation damage. More damage to most roofing surfaces, asphalt tiles that have curled up and/or fractured due to age may break away completely.
>32.7	>118	12	Hurricane	Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns. Debris may be hurled about.

Figure 7: Winds Direction illustration



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