

# BUILDING CLIMATE RISK RESILIENCE FOR MAIZE FARMING – FACT SHEET

## Free State – Welkom region

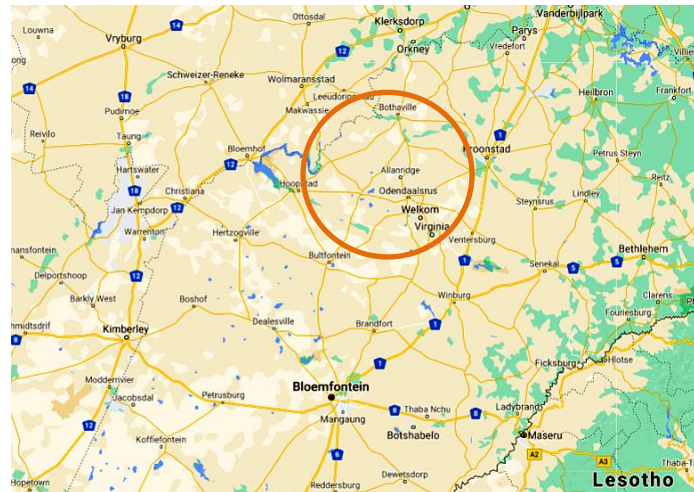
**Characteristics:** Mixed farming region with mostly rainfed cropping. Common crops are maize, wheat, soya, sunflowers, oats, potatoes, sugar beans and vegetables. Livestock in the form of cattle, sheep are very common with goats and pigs also kept.

**Planting dates for maize** vary between October to late-December. If the rainfall onset is after the end of December, then maize is not planted; instead, sunflowers, or oats, beans or teff for forage, is cultivated. Average **maize yields** vary between 2 – 4t/ha, but in recent years these have increased to between 6 – 8t/ha.

**Existing climatic threats** include: Late-onset; drought; early frost (in April); hail; very hot days during planting and subsequent weeks; late rain during the grain drying period, late season heat unit shortage, excessive wind.

**Rainfall** averages around 480mm per annum (more or less elsewhere in the region), with a slight decreasing trend detectable over the last 60 years. Variability is not high with an annual rainfall of below 300mm rare (2007/08 had only 190mm) and a maximum of 730mm (1966/76). Rainfall occurs between September and April, with over 70% of annual rainfall being recorded between October and March.

**Temperatures** are generally mild varying between average maxima of 18 degrees in Jun (winter), and 31 degrees in January. Very hot days (over 32 degrees are common (8-12 days per month in summer).



### Existing rainfall averages of selected stations in the region

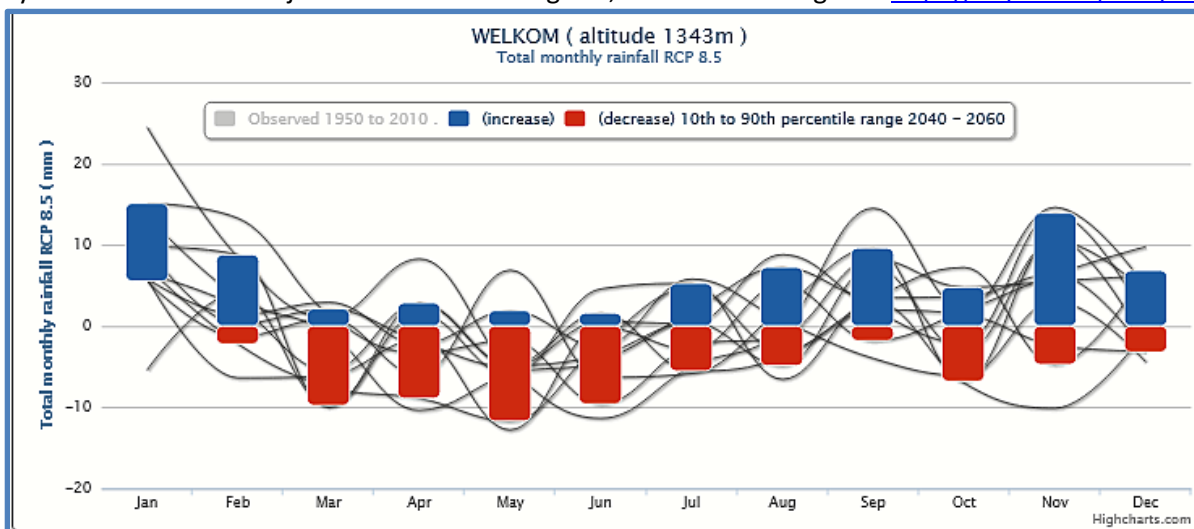
| Welkom RAINFALL |         |
|-----------------|---------|
| Month           | Average |
| Jan             | 80      |
| Feb             | 63      |
| Mar             | 63      |
| Apr             | 41      |
| May             | 18      |
| Jun             | 7       |
| Jul             | 6       |
| Aug             | 8       |
| Sep             | 17      |
| Oct             | 50      |
| Nov             | 66      |
| Dec             | 72      |
| Total           | 491     |

| Virginia RAINFALL |         |
|-------------------|---------|
| Month             | Average |
| Jan               | 89      |
| Feb               | 74      |
| Mar               | 68      |
| Apr               | 43      |
| May               | 22      |
| Jun               | 7       |
| Jul               | 8       |
| Aug               | 11      |
| Sep               | 15      |
| Oct               | 54      |
| Nov               | 74      |
| Dec               | 69      |
| Total             | 534     |

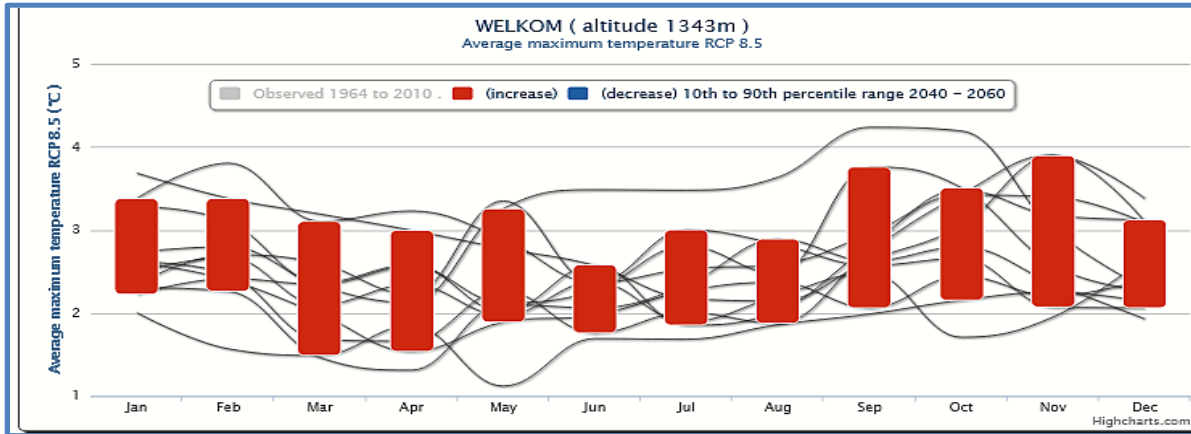
| Bothaville RAINFALL |         |
|---------------------|---------|
| Month               | Average |
| Jan                 | 81      |
| Feb                 | 59      |
| Mar                 | 64      |
| Apr                 | 39      |
| May                 | 14      |
| Jun                 | 6       |
| Jul                 | 3       |
| Aug                 | 8       |
| Sep                 | 13      |
| Oct                 | 50      |
| Nov                 | 60      |
| Dec                 | 67      |
| Total               | 464     |

### Expected Future Conditions:

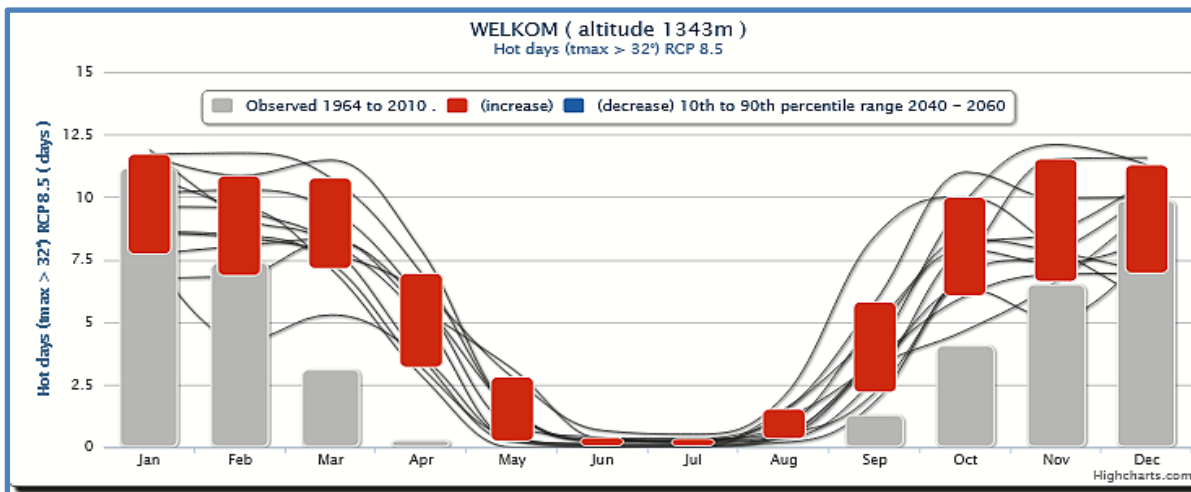
**Rainfall:** Overall, lower rainfall is predicted with significant uncertainty. Projections show that rainfall is expected to **increase (blue bars)** by about 5-15mm (with high confidence) in **January** by 2040-2060. Other months show degrees of uncertainty (both red and blue bars). Where both red and blue bars are present, it indicates a likelihood of increase but also the likelihood of decrease rainfall projected. Different models predict varying projections as seen by the black lines. To adjust timeframe and regions, see the following link: <https://tinyurl.com/57myv5rf>.



**Temperature:** Projections show **increases** of temperature in all months of between 1.5-3.7 degrees by 2040-2060



**Very hot days:** Projections show that the number of very hot days (>32 degrees) will **increase** in all months, with **8-12 more** such days in **January** and approx. **7-11 more** in February March, November, and December, by 2040-2060. (Grey bars show the existing frequency)



### Impacts and responses expected in the future

- Later rainfall onset means that sunflowers and dry beans are becoming a more possible alternative in this region
- A shorter planting window means there is an urgency to plant quickly and efficiently
- The change from ploughing to minimum till preparation, and soil cover is becoming imperative.
- Appropriate seed breeding and selection for warmer temperatures is required
- Pests and diseases are becoming resistant to existing treatments and warmer temperatures can lead to more frequent outbreaks
- Fires are becoming more likely in the dry season and during dry spells in late summer
- More appropriate climate information is becoming available
- Suitability for maize is still moderate to high for this region, though **increasing temperatures and a doubling of very hot days** is a serious threat

### Recommendations

- Conservation agriculture which focuses on soil health and soil water conservation is becoming more important to build resilience to climatic risk
- Farmers need to cooperate with each other and various input supplies, marketing agents, and keep up to date with the latest research
- Climate forecasts and information are available and should be accessed and compared to records kept.

### Resources

Seasonal forecasts: University of Pretoria: <https://www.up.ac.za/geography-geoinformatics-and-meteorology/article/2872667/seasonal-forecast-worx>  
 International Research Institute: <https://tinyurl.com/df3kr46k>  
 SA Weather Service: <https://www.weathersa.co.za/home/seasonalclimate>  
 Climate change projections and impacts: Graphs above: <https://tinyurl.com/57myv5rf>  
 El Nino Southern Oscillation update: <https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>