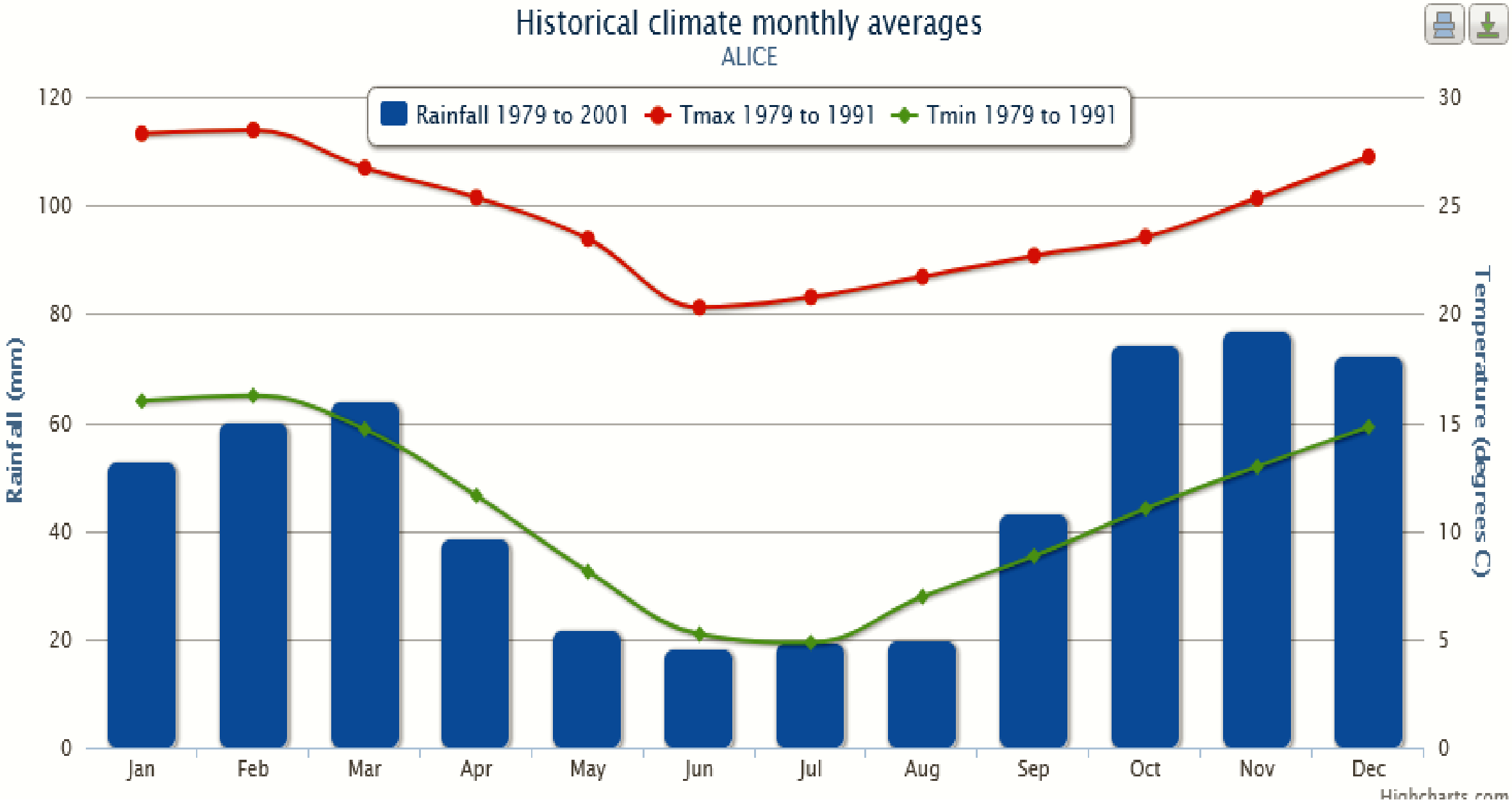
Using Seasonal forecast verification to guide farmer decision making before and during the growing season.

A case study in South Africa

9IVMW 2024
Peter Johnston

The climate in Alice



Questions?

- Will this season be like this?
- Can we expect higher/lower rainfall?
- Hotter or colder
- Give us a forecast!!!

Seasonal forecasts

What information do they provide?

How reliable are they?

What are their limitations?

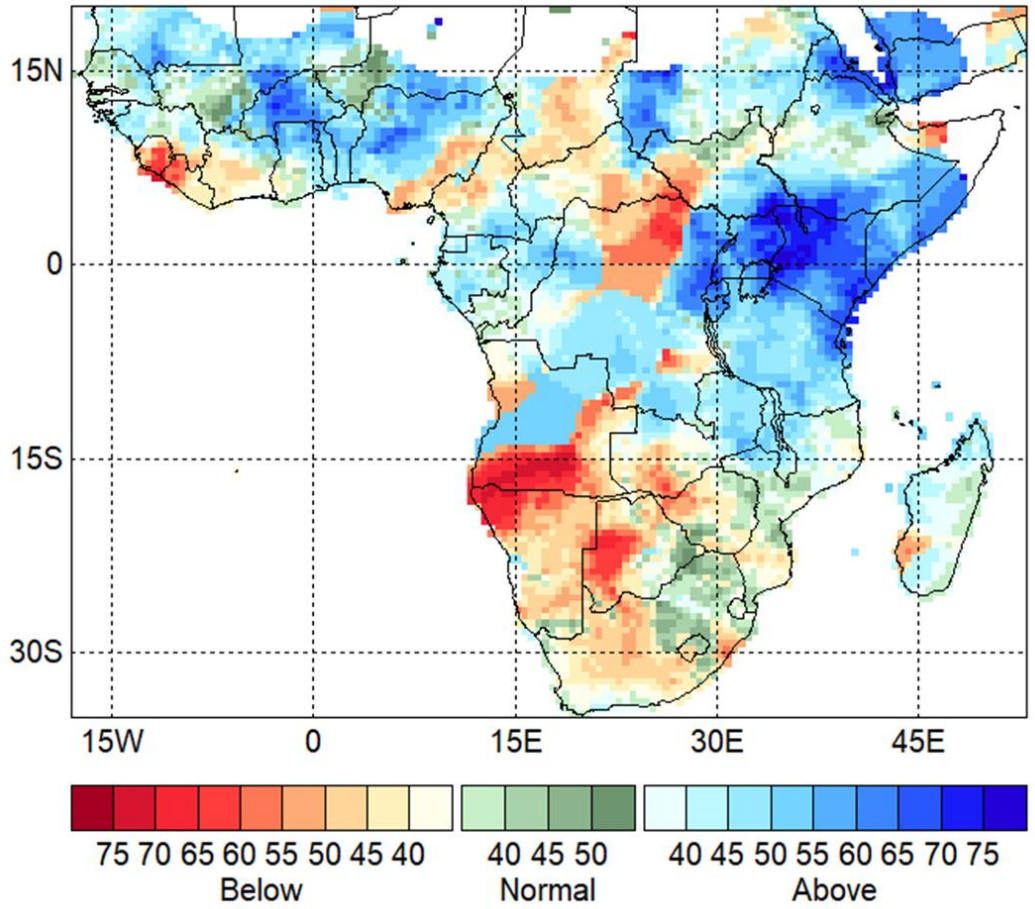
How are they produced?

User responses - Reliability

- **Accuracy – will it be correct?**
  - Probability/likely/confidence?
- **Skill – how often will a forecast be correct?**
- **Scale – usefulness for my sector?**
- **Consistency – will the forecast for a particular period change?**
- **Will I be able to interpret it correctly?**

Verification?????

Proposition: Seasonal forecasts may not always be skilful, but they can be useful!

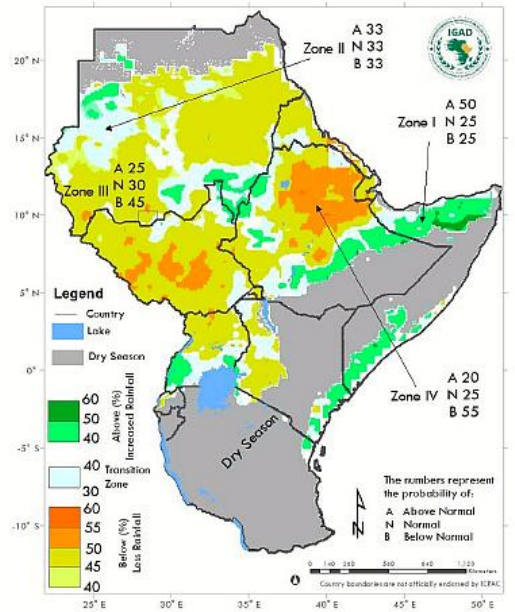


CSAG
CLIMATE SYSTEM ANALYSIS GROUP

Seasonal Forecast or Seasonal Folly?

- Do farmers have access to SFs?
- What do farmers find useful to assist decision making?
- Why are farmers not making better use of the current forecasts?
- Can farmers make ‘better’ decisions using SFs?
- Who should be providing this information?
- What sort of information should it convey and in what format?

Rainfall Probabilistic Forecast June - September 2023

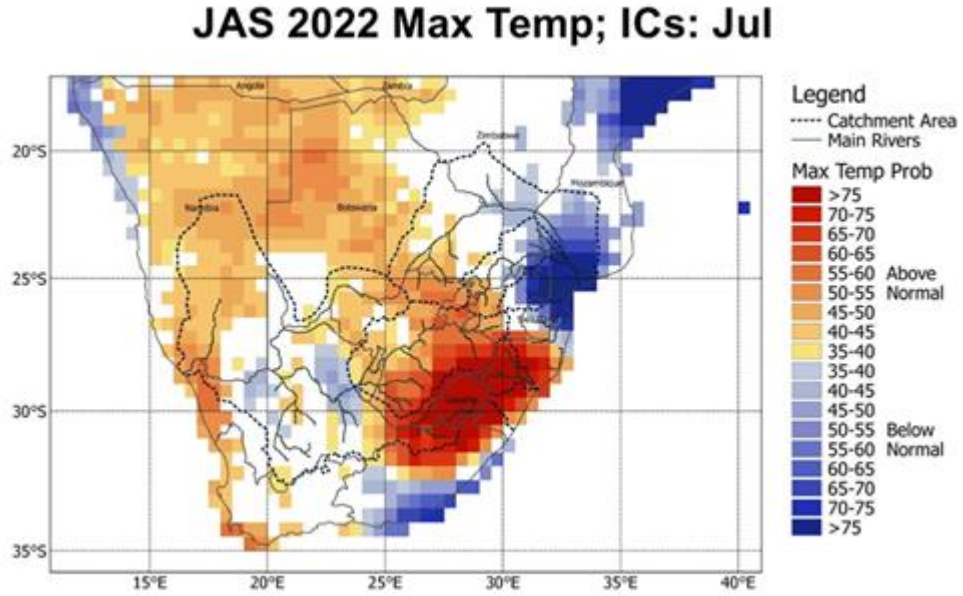


CSAG
CLIMATE SYSTEM ANALYSIS GROUP

CATER Schools

We surveyed over 150 commercial and small-scale farmers in the Western (winter rainfall) and Easter Cape (summer rainfall) provinces

- **Have you ever seen a seasonal forecast?**
- **Describe your experience with seasonal forecasts**
- **How useful are they?**
- **Are they freely and easily accessible?**
- **How can they be improved?**



CSAG
CLIMATE SYSTEM ANALYSIS GROUP

CATER Schools

What's NOT to understand?

CSAG
CLIMATE SYSTEM ANALYSIS GROUP

CATER Schools

Pick a forecast…any forecast

Seasonal Forecast Scorecard

- ACCESSIBILITY – where/how? = $^{2}/_{10}$
- VALIDITY - skill, accuracy = $^{3}/_{10}$
- PERTINENCE – scale, frequency, interpretation = $^{3}/_{10}$

Total $^{8}/_{30}$ = 26.7%

Comment: *Could Do Better!*

CSAG
CLIMATE SYSTEM ANALYSIS GROUP

CATER Schools

Responding to user comments

- Design a new format
- Incorporate high resolution (at least in selection)
- Show local data
- Offer sliding scales of season/month selection
- Indicate chance of DRY season
- Offer thresholds of dryness to select
- Give an indication of past performance
- Work through it with stakeholders

CSAG
CLIMATE SYSTEM ANALYSIS GROUP

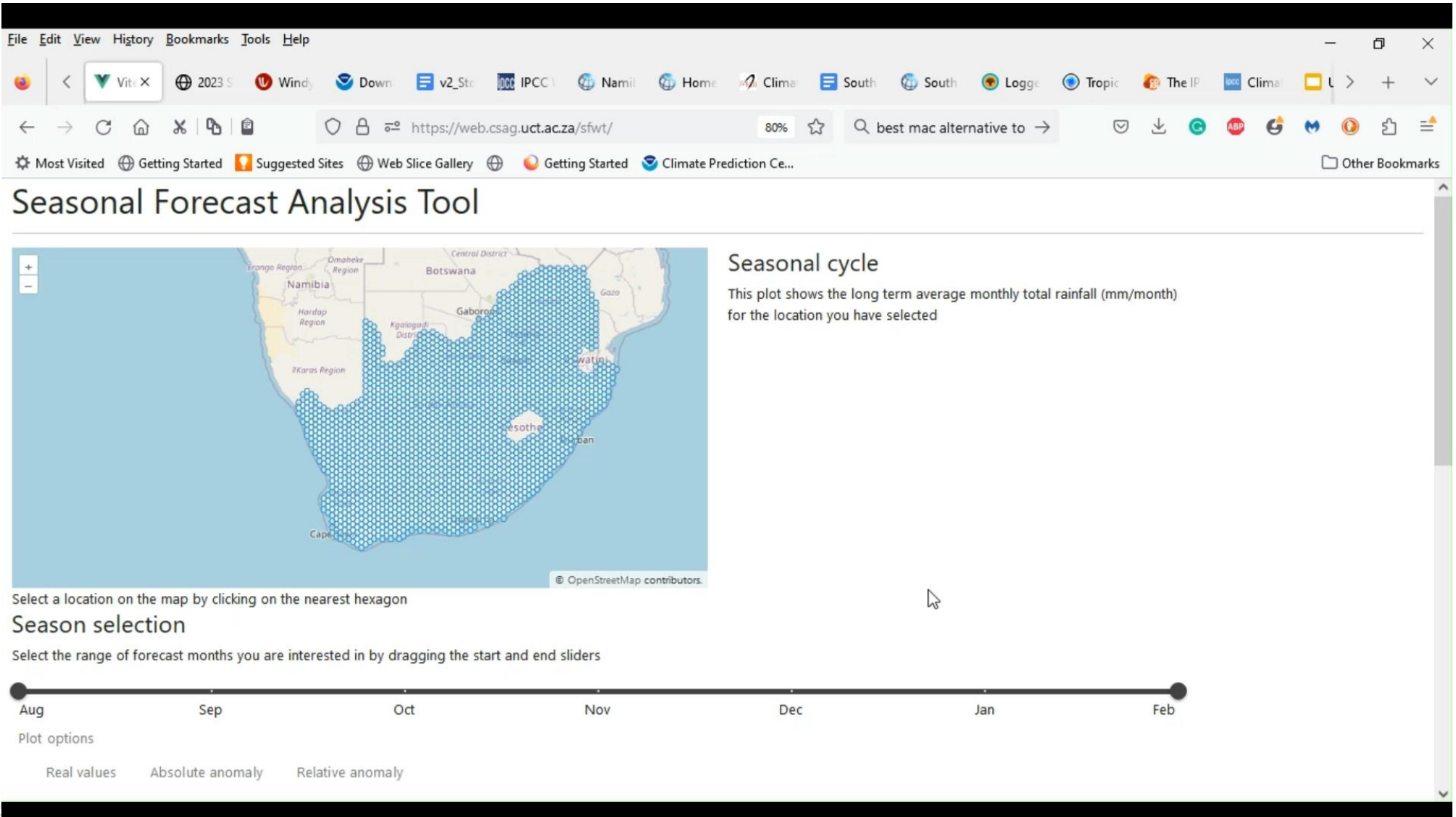
CATER Schools

What they could use:

- Higher resolution
- Selection of forecast period – useful for onset and phenological growth stages
- Thresholds were a new concept but embraced by farmers
- An indication of the historical skill

And so, we designed it for them!

https://web.csag.uct.ac.za/sfwt/



Verification???? Not your typical method!

Historical event occurrence

Rainfall less than **240 mm** between **Oct to Jan** has occurred **9 times** in the past 41 years

This means that the long term probability of this occurring is **21%**

Event forecast

The current forecast indicates a probability of **41%** of this occurring this year. This is **2.0 times** more than the long term probability

In previous years the model predicted this event as the most likely outcome **9 times**

- **4 times**, this forecast was correct and predicted the event
- **5 times**, this forecast was incorrect, the event did not occur

In previous years the model did not predict this event as the most likely outcome **5 times**

Continuing issues

- Access – needs internet and PC – mobile option struggles
- Threshold concept isn't well used
- Trouble finding their farm and recognising LT means
- Concern about skill
- Uptake will be monitored

BUT

- They loved the resolution
- They valued the sliding monthly scale
- They valued the local LT average data
- They began to appreciate the difficulty of skill!

CSAG
CLIMATE SYSTEM ANALYSIS GROUP

CATER Schools

Takeaway thoughts

- How can we make forecasts *even more* useful?
- Can we improve/tailor the concept of thresholds, and improve skill?
- Can we use innovative ways of disseminating them?
- Can we assist users to gain the best information to aid decision making?

Thank you!

Peter Johnston
peter@csag.uct.ac.za

https://web.csag.uct.ac.za/sfwt/