



# **“SCIENTIFIC RESEARCH ON CLIMATE CHANGE AND AGRICULTURE IN ZIMBABWE”**

**SADC REGIONAL WORKSHOP ON CLIMATE CHANGE ADAPTATION IN  
AGRICULTURE,  
5-6 DECEMBER 2013, CROSSROADS HOTEL, LILONGWE, MALAWI**



**VERONICA N. GUNDU &**

**MUNYARADZI. D. SHEKEDE.**

**ZIMBABWE**

# INTRODUCTION



- ❖ Zimbabwe is a land locked country in Southern Africa
- ❖ It is located between latitudes  $15^{\circ}$  and  $23^{\circ}$  South of the Equator and longitudes  $25^{\circ}$  and  $34^{\circ}$  East of the Greenwich Meridian.
- ❖ Total Area: 390,580 sq km
  - land: 386,670 sq km
  - water: 3,910 sq km
- ❖ Tropical climate with rainy season from November-March

# ZIMBABWE'S AGRICULTURAL SECTOR

- ❖ Agriculture contributes about 15% to the GDP.
- ❖ Provides 66% of total employment.
- ❖ The major crops are maize (staple food), pearl and finger millet, sunflower, ground nuts, and industrial crops such as cotton and tobacco.
- ❑ Over 70% of Zimbabwe's population live in rural areas and are dependent on rainfed agriculture.
- ❑ Yet rainfall is highly variable in space and time thus making it sensitive to changes in climate.



# WHAT HAS BEEN OBSERVED SO FAR?

- Effective rains coming late November
- Early termination of rainy season
- Mid and End of season dry spells
- Distribution poor and patchy with marked differences in neighbouring areas- 5km radius
- Mid Season dry spell- normally experienced in January but now even in December and February
- ❖ Droughts becoming more severe
- ❖ More frequent extreme temperature events- hot days, hot nights and heat waves
- ❖ Annual mean temperature for Zimbabwe has increased by about 0.4 Degrees Celsius between 1900 and 2000

# WHAT HAS BEEN OBSERVED SO FAR?

- ❖ Rainfall has declined by about 5% in the past four decades
- ❖ Rainfall events have become more intense
- ❖ Extreme events are becoming more intense and of longer duration



# AGRICULTURE RESEARCH INSTITUTES IN ZIMBABWE

- ❖ Agricultural Research in Zimbabwe is undertaken by various international, regional, public sector, parastatals and private sector institutions.
- ❖ NGOs are also involved in adaptive research.
- ❖ Some research institutions include:
  - ❖ University of Zimbabwe
  - ❖ Bindura University of Science and Technology
  - ❖ Midlands State University
  - ❖ Africa University of Science and Technology
  - ❖ Chinhoyi University of Science and Technology
  - ❖ Lupane State University
  - ❖ SIDRC
  - ❖ AGRITEX
  - ❖ CIMMYT
  - ❖ ICRISAT



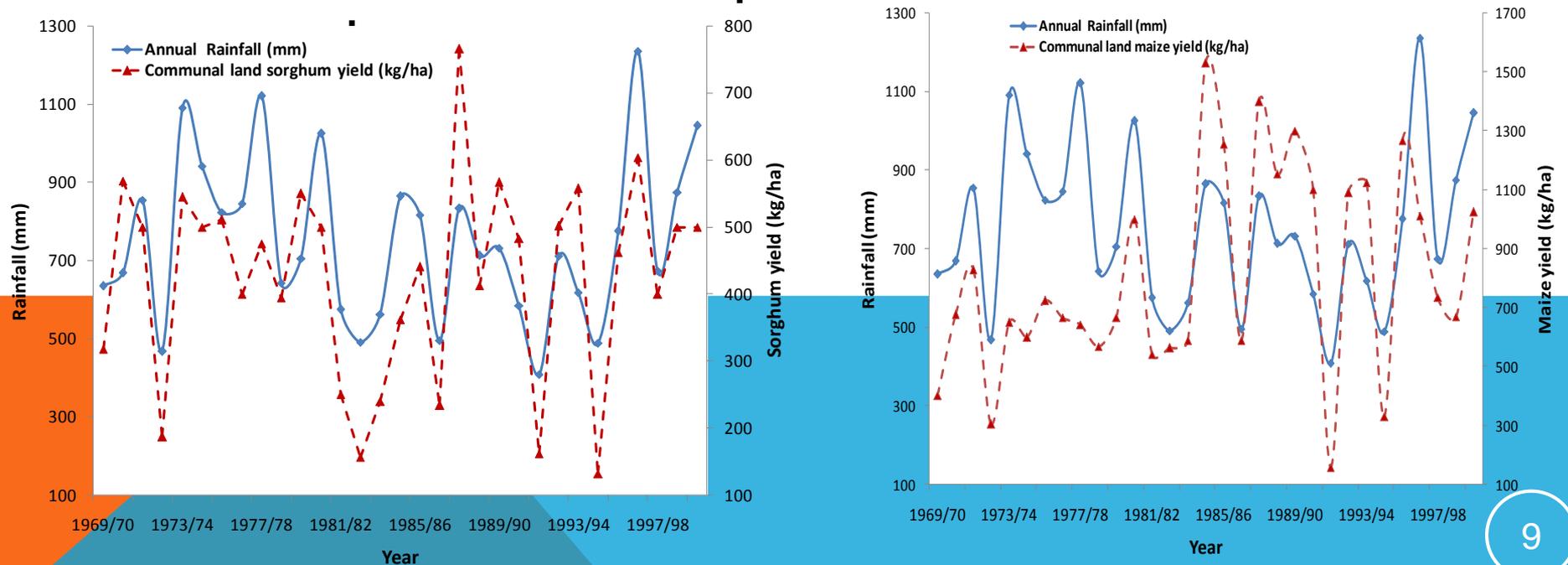
**RESEARCHES ON CLIMATE  
CHANGE AND THE  
AGRICULTURAL SECTOR**



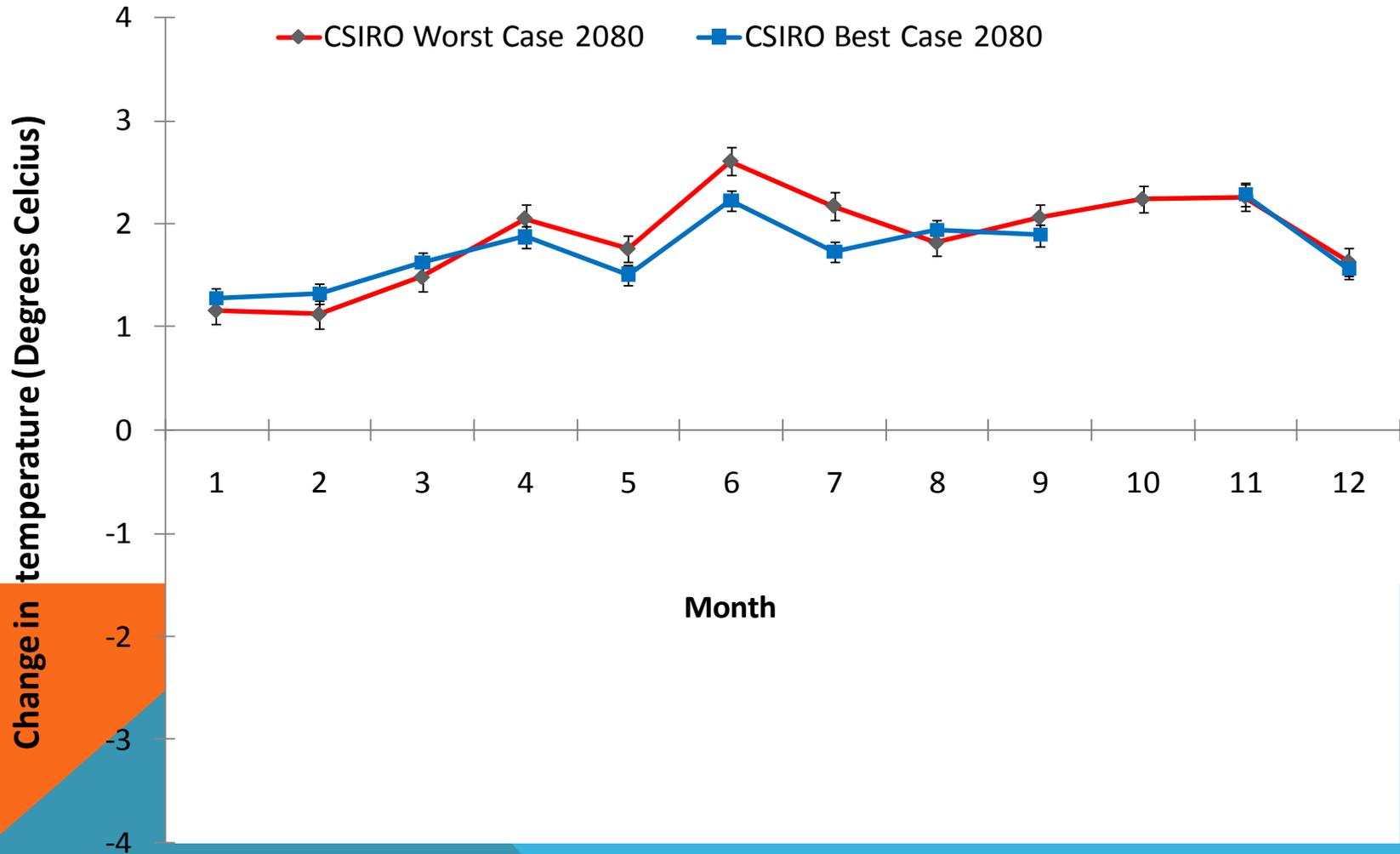
# CLIMATE CHANGE AND AGRICULTURE: CORRELATION STUDIES

❖ Research in this area is focused on understanding the sensitivity of the agricultural sector to climate change and variability.

❖ Some of the examples include maize &



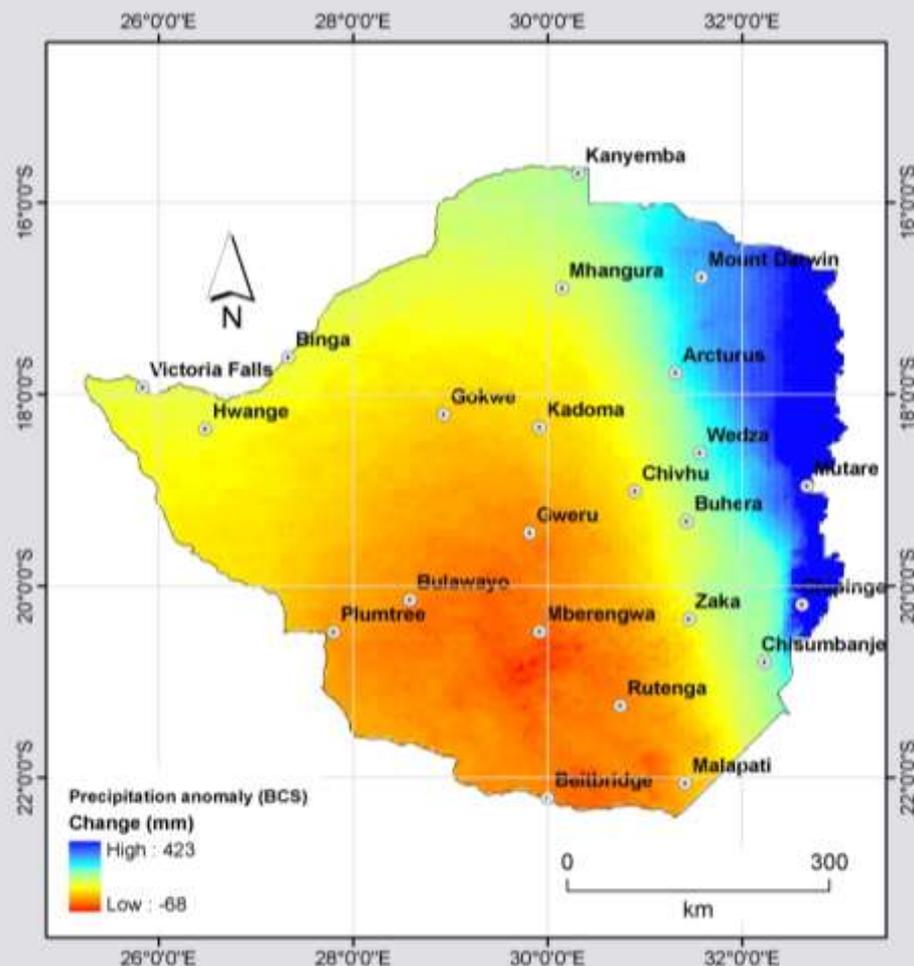
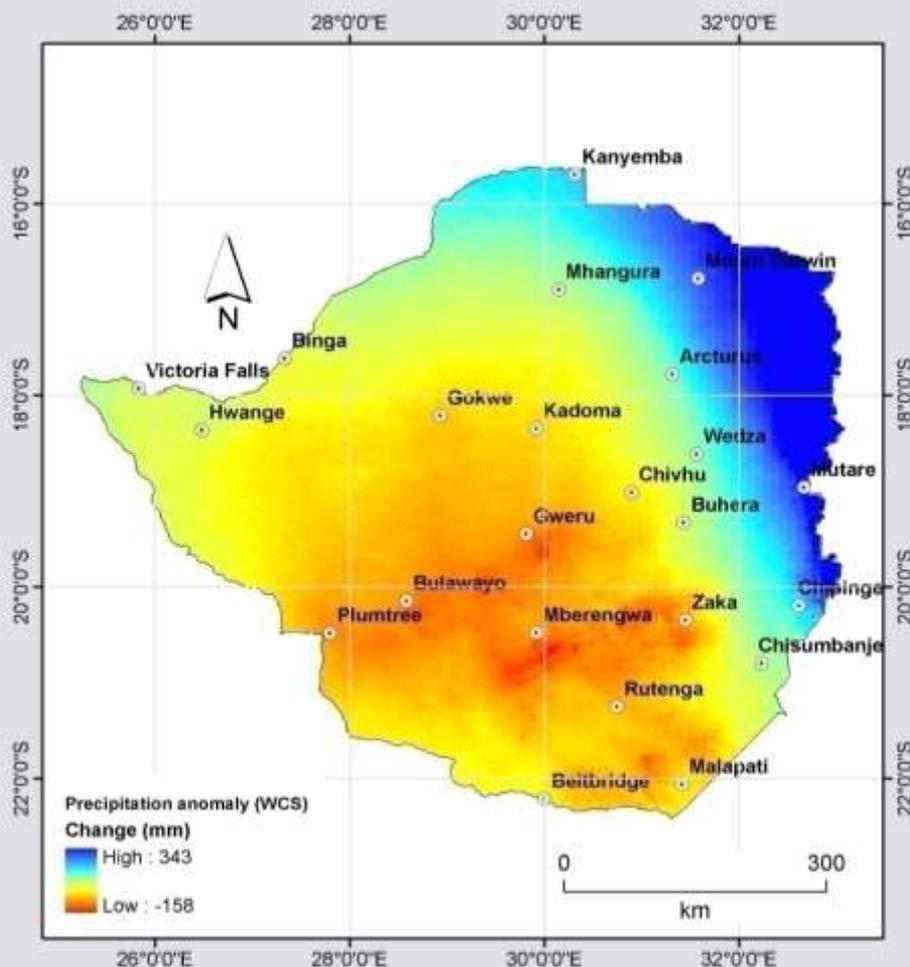
# FUTURE CLIMATE SCENARIOS: TEMPERATURE ANOMALIES (CSIROMK3)



# FUTURE CLIMATE SCENARIOS: RAINFALL ANOMALIES (CSIROMK3)

**(A)** Worst Case 2080

**(B)** Best case 2080



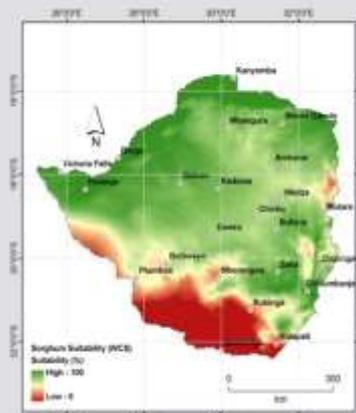
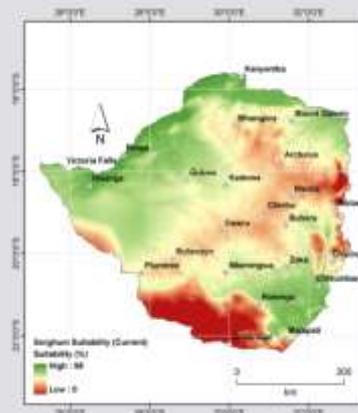
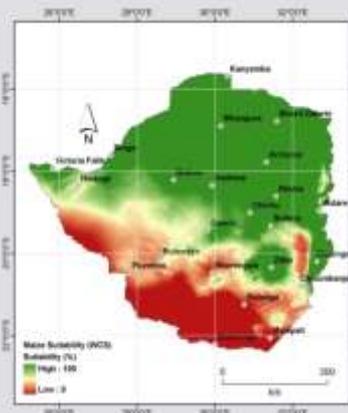
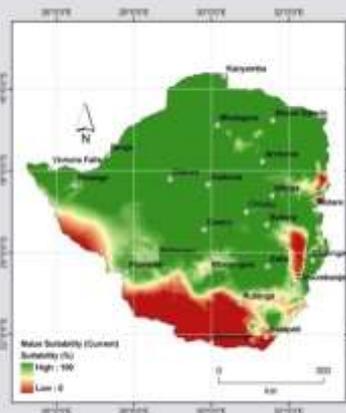
# CLIMATE CHANGE AND AGRICULTURE: MODELLING STUDIES

❖ Research in this area is focused on understanding future climate change impacts on the agricultural sectors through the use of downscaled future climate based on GCM:

❖ These have mainly been used in predicting the expansion or contraction of

for a  
rains

.g.



# CLIMATE CHANGE AND DROUGHT TOLERANT VARIETIES

- ❖ Research in this area is carried out by seed houses and the main focus is on the development of new seed varieties that have:
  - ❖ Drought tolerance
  - ❖ High water use efficiency
  - ❖ Short season variety
  - ❖ Resistant to pests and diseases
- ❖ SIRDC- Sirda maize 113
- ❖ Seed-co: 300 series

# CLIMATE CHANGE AND RAINFALL CHARACTERISTICS

- ❖ Research focuses on understanding the seasonal distribution of rainfall (AGRITEX, Met Services Department, Universities).
- ❖ Understanding of:
  - ❖ onset and cessation of rainfall season
  - ❖ inter-and intra-season dry spells
  - ❖ Probability of receiving planting rains and drought occurrence
  - ❖ Season duration

# CLIMATE CHANGE AND CONSERVATION

## FARMING

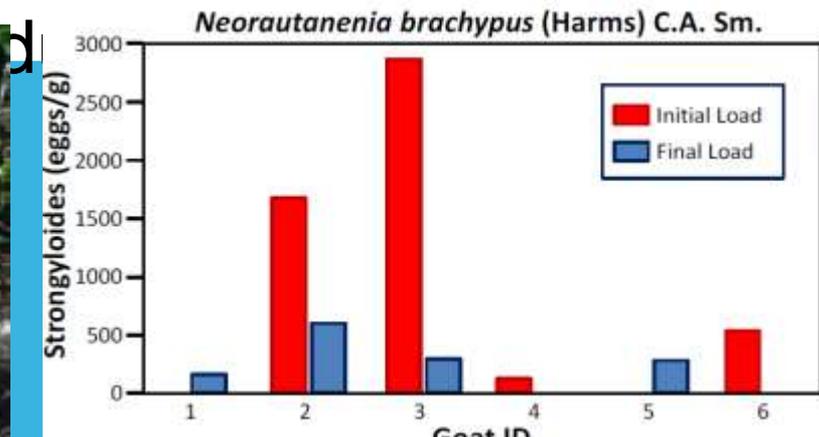
- ❖ Research focuses on understanding the feasibility of Conservation Agriculture as a method of adapting to climate change:
- ❖ Some of the organisations involved in CA include ICRISAT, AGRITEX, FAO, NGOs, COMESA
  - ❖ minimum soil disturbance, legume-based cropping and use of organic mulch
- ❖ By 2012, there were 372 200 farmers engaged in CA (MoA, 2012).

# UNDERSTANDING LIVESTOCK CARRYING CAPACITY IN A CHANGING ENVIRONMENT

- ❖ Researches in this area aim at modelling Net Primary Productivity (amount of organic matter fixed per unit time per unit area)
- ❖ Determining current and future carrying capacity of rangelands
- ❖ Thus understanding climate change on rangelands and livestock

# MITIGATION OF DROUGHTS THROUGH USE OF SUPPLEMENTARY NATURAL FEEDS

- ❖ Researches are assessing the medicinal and nutritional properties of plants as a viable supplementary alternatives during drought periods.
- ❖ Plants being experimented with include: Acacias, tubers e.g. *Neorautanenia brachypus*, *Colophospermum mopane*.
- ❖ *N. brachypus* is commonly used during critical



# CLIMATE CHANGE AND INDIGENOUS KNOWLEDGE

- Studies are being carried out on combining weather forecasts with traditional means of forecasting so that farmers have a reliable system which can help them respond to weather extremes.
- However, these studies are just starting and there are no meaningful results to comment on at the moment.

# Key Gaps in Research

- While several studies have been carried out on climate change in the country there is need for the following key researches:
- Experimental studies that manipulate climate change variables (CO<sub>2</sub>, Temperature & Rainfall) in order to fully understand the impact of climate change on the agricultural sector.
- Research into understanding low uptake of small grains by communities living in areas with low or erratic rainfall.
- There is also need for studies that aims at downscaling climate data
- Upscale climate change studies

**THANK YOU! TATENDA! SIYABONGA!**

