CCDA-V
Africa, sustainable development and climate change
Prospects of Paris and beyond

ClimDev-Africa

Applying APSIM for evaluating intercropping under rainfed conditions: A preliminary assessment

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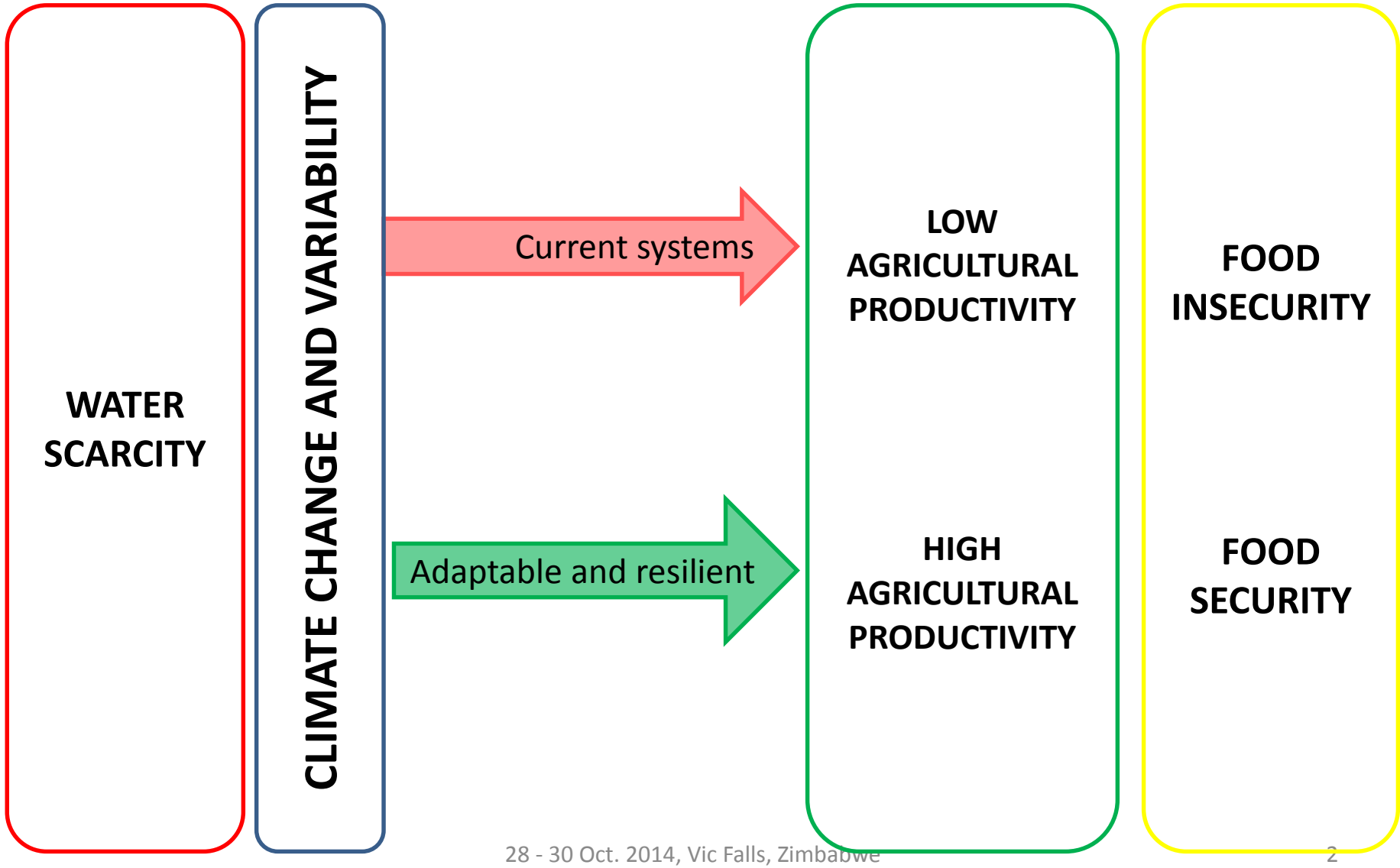
UNIVERSITY OF KWAZULU-NATAL

Introduction



Ecological based farming e.g. INTERCROPPING

Biodiversity

Resource capture and use

increase

Productivity

Resilience

Poor management

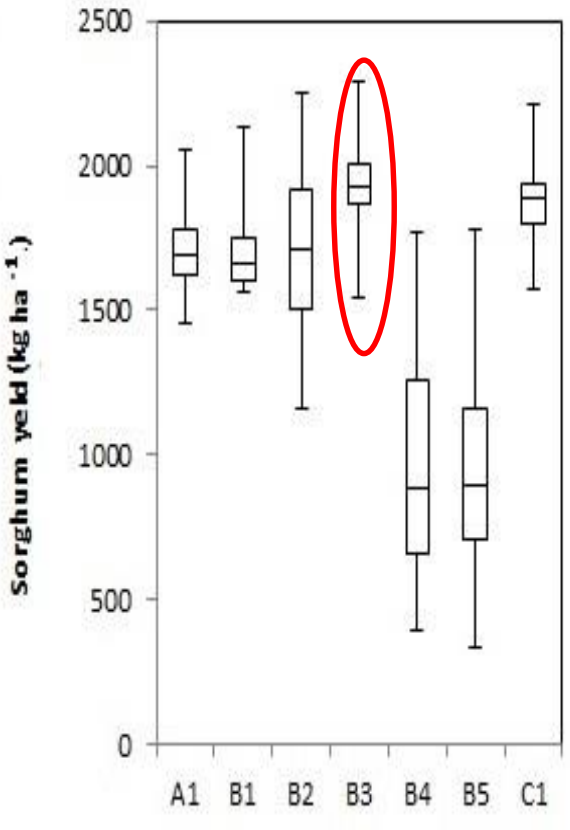
Good management

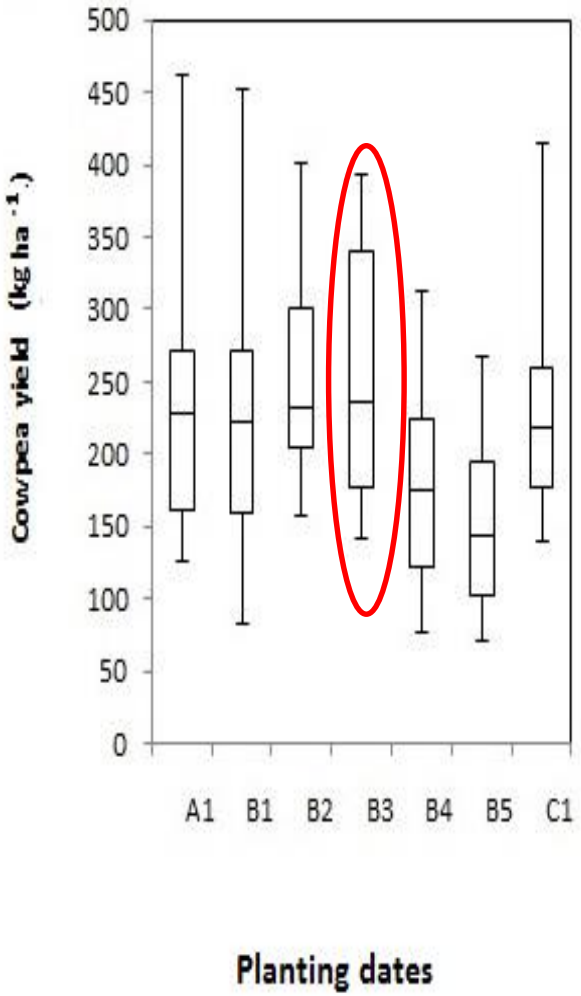
The objective:- apply a well-calibrated model of APSIM for a sorghum–cowpea intercrop in assessing different management scenarios for best management practices

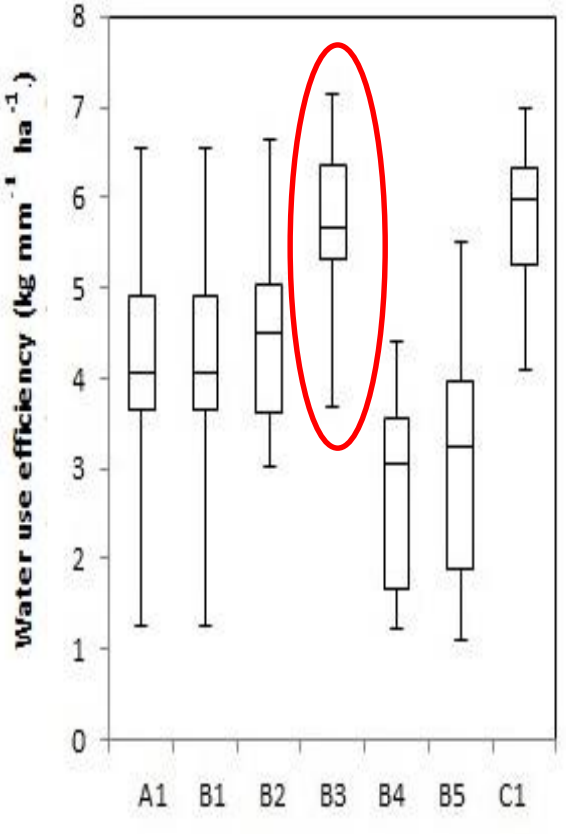
Agronomic factors considered

- Planting dates-
  - Trigger method [Rainfall vs Evapotranspiration]
  - Fixed date 15th Sep, Oct, Nov, Dec, Jan [early to late]
  - Model generated [Soil water content approach]
- Fertiliser (72 kg N/ha to achieve 2t/ha)
  - 0
  - 50%
  - 100% of recommended
- Irrigation
  - Deficit irrigation
  - Weekly irrigation based of rainfall

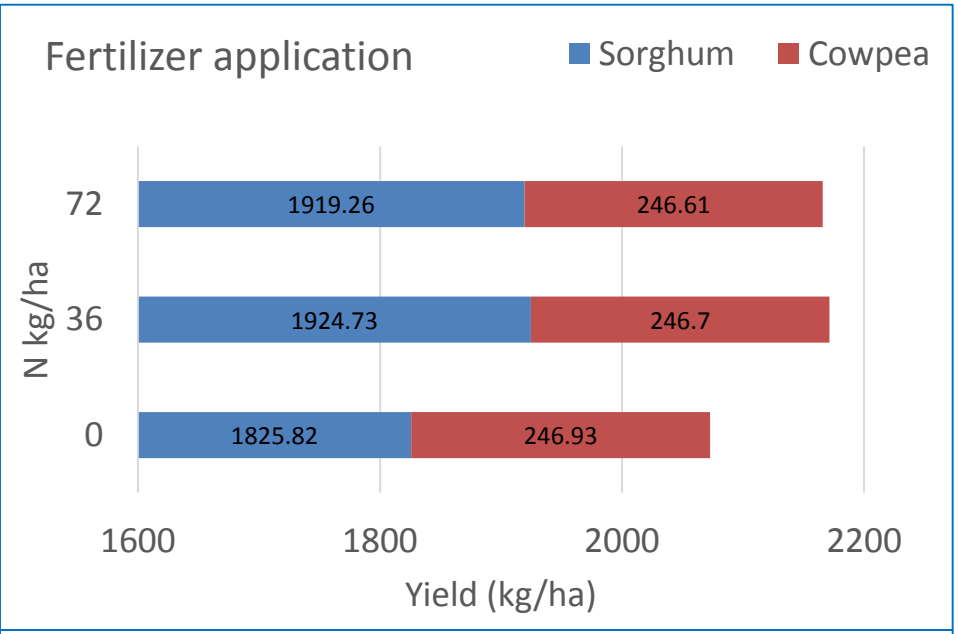
Results

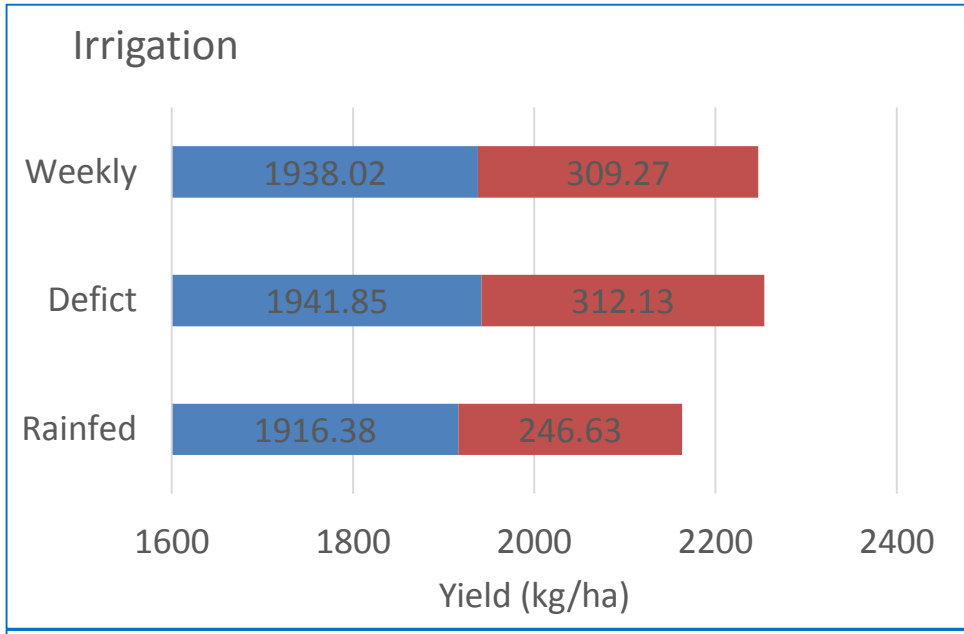

Sorghum yeld (kg ha -1)
2500
2000
1500
1000
500
0
A1
B1
B2
B3
B4
B5
C1

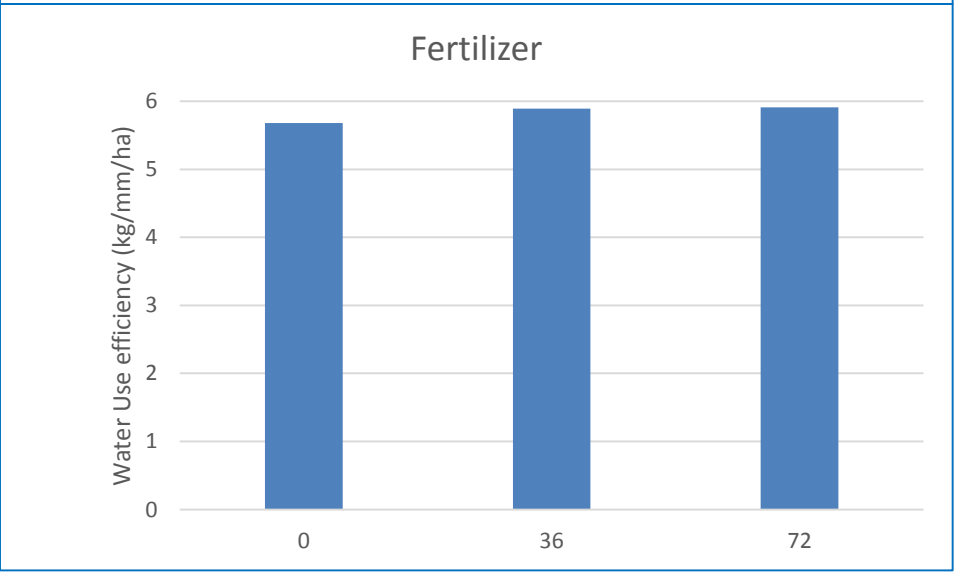

Cowpea yield (kg ha -1)
500
450
400
350
300
250
200
150
100
50
0
A1
B1
B2
B3
B4
B5
C1
Planting dates

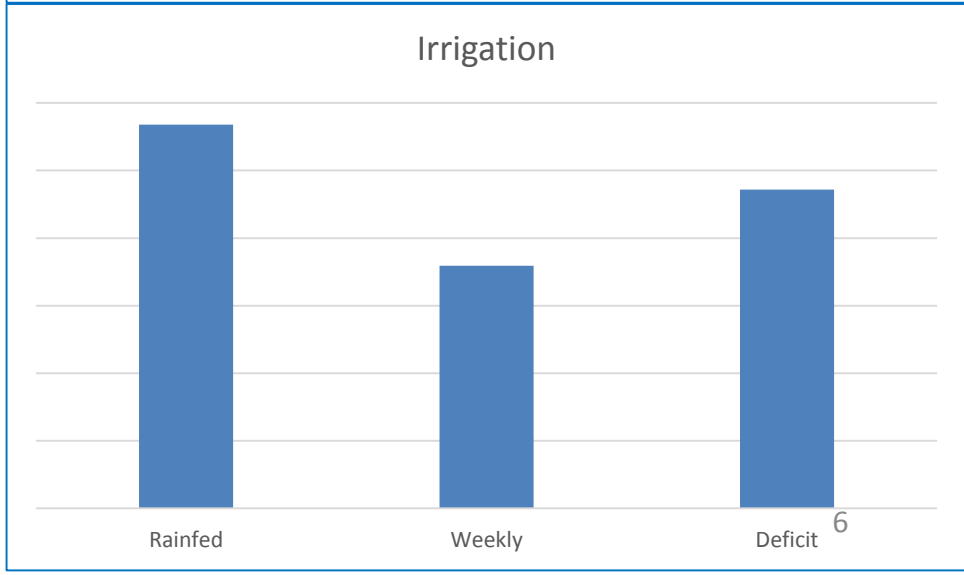

Water use efficiency (kg mm -1 ha -1)
8
7
6
5
4
3
2
1
0
A1
B1
B2
B3
B4
B5
C1

Results….


Fertilizer application
Sorghum
Cowpea
N kg/ha
72
36
0
1919.26
246.61
1924.73
246.7
1825.82
246.93
1600
1800
2000
2200
Yield (kg/ha)


Irrigation
Weekly
Defict
Rainfed
1938.02
309.27
1941.85
312.13
1916.38
246.63
1600
1800
2000
2200
2400
Yield (kg/ha)


Fertilizer
Water Use efficiency (kg/mm/ha)
0
1
2
3
4
5
6
0
36
72


Irrigation
Rainfed
Weekly
Deficit

Conclusions/Recommendations

- Under optimum management options intercropping can improve productivity in semi-arid and arid agro-ecologies
- Best management practices are crucial for increased resilience against climate uncertainties
- Optimum planting dates should always be considered for improved yield and WUE – site specific
- Promote the development of efficient irrigation systems for improved yield and WUE, especial for areas under economic water scarcity