APPLYING APSIM FOR EVALUATING INTERCROPPING UNDER RAINFED CONDITIONS: A PRELIMINARY ASSESSMENT

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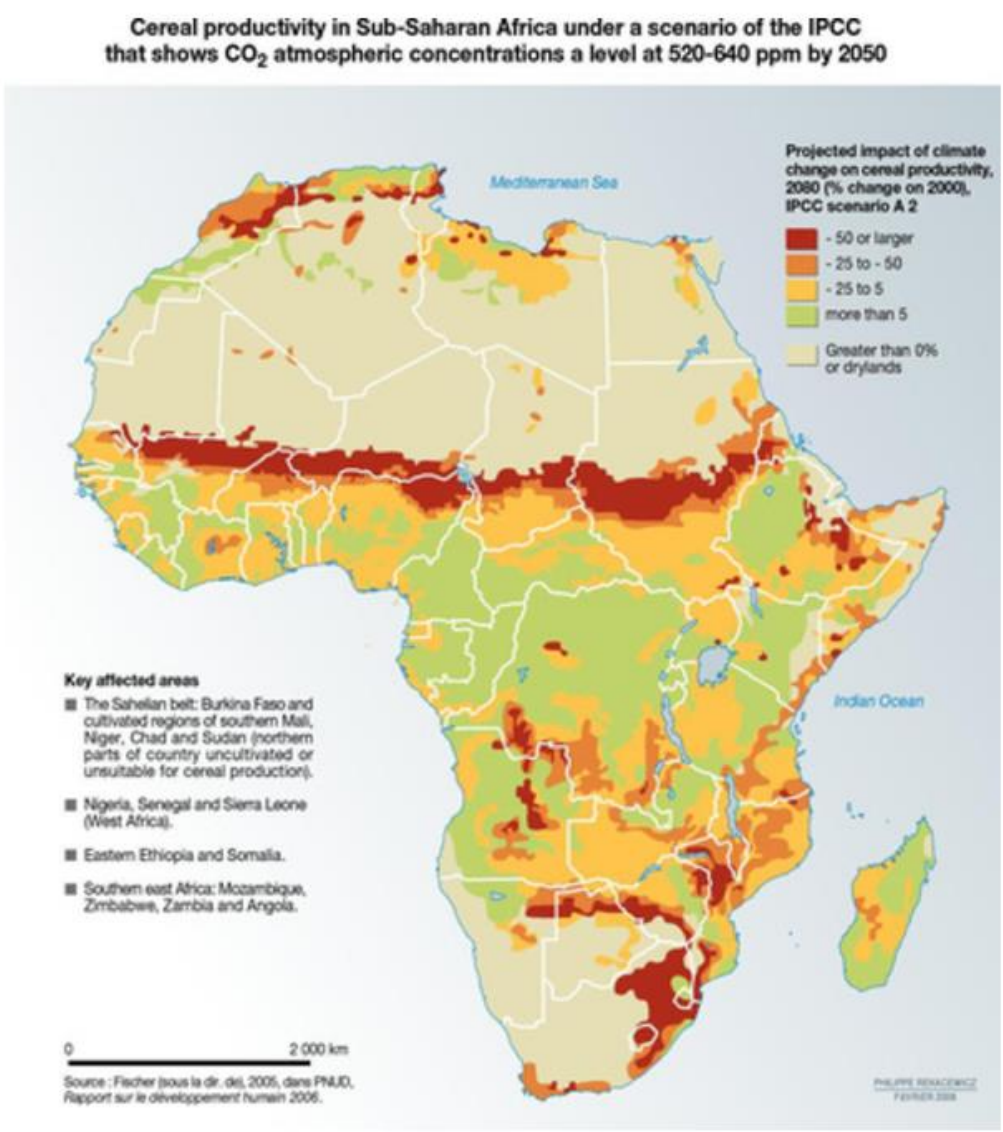
Introduction

Africa **-** Climate change threatens livelihoods

- Shift in agroecological boarders
- Shrinking arable land
- Increased incidence and severity of drought and floods
- Increased incidences of pests and diseases
- Market volatility



ADAPTING TO CLIMATE CHANGE in Agriculture

…….. Lower the risk imposed by climate change

- Technical developments

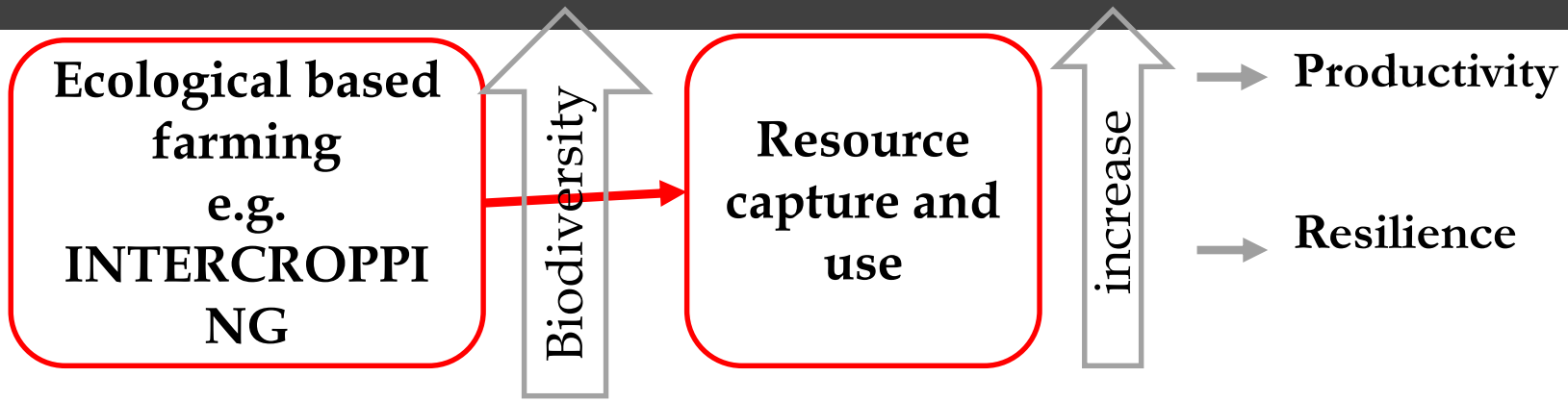
  Crop breeding, weather and climate forecasting, crop system and land use modifications

- Farm production practices

  Crop diversification, use of adaptable crop species and varieties, increase resource use efficiency

- Government programs and insurances

  Subsidy and support programs, farm insurance,

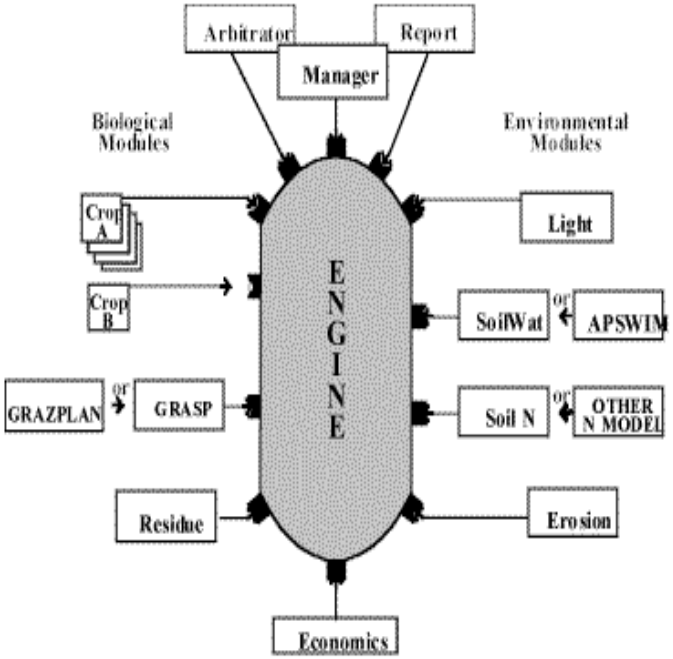


Poor management

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

Agricultural Production Systems Simulator (APSIM)



Field trials

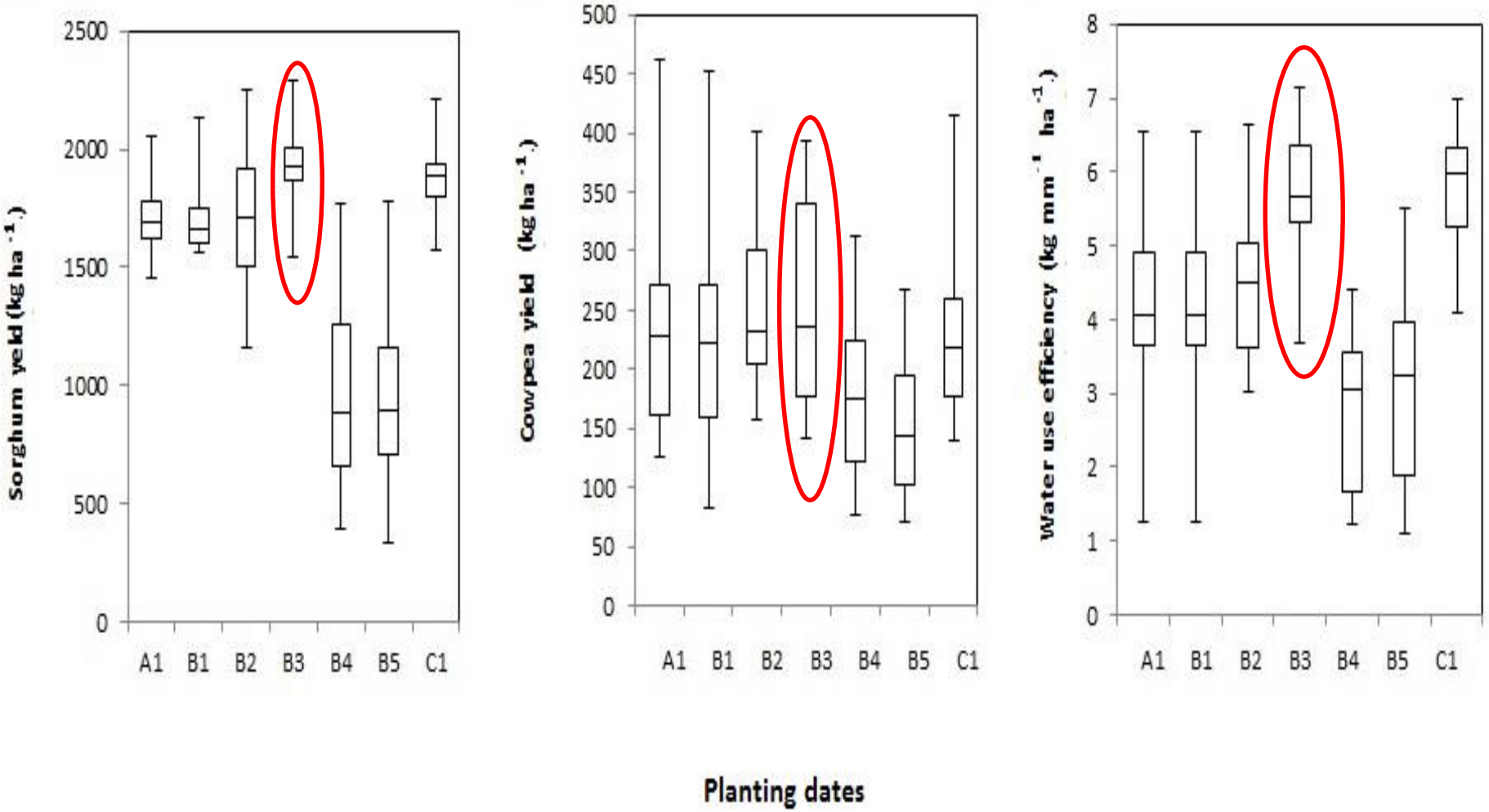
Model calibration and validation

Scenario analyses

Agronomic factors considered

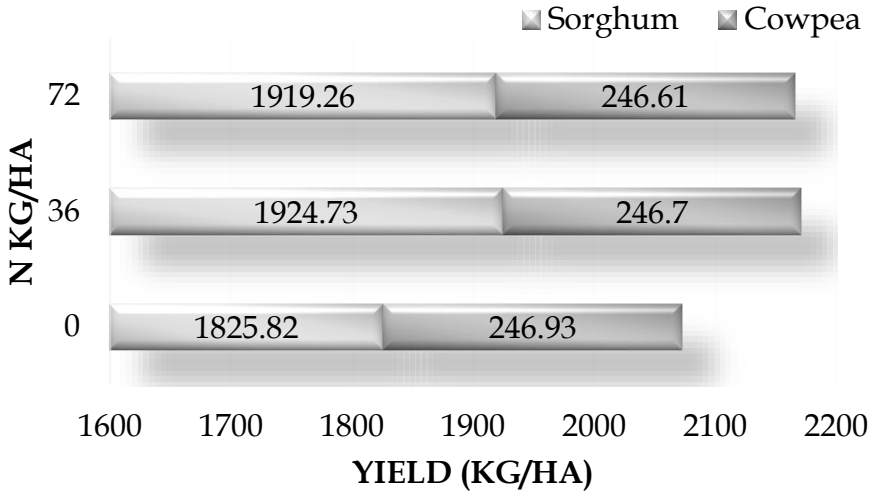
- Planting dates-
  - Trigger method [Rainfall vs Evapotranspiration]
  - Fixed date 15th Sep, Oct, Nov, Dec, Jan [early to late]
  - Model generated [Soil water content approach]
- Fertiliser (72 kg N/ha to achieve 2t/ha)
  - 0
  - 50%
  - 100% of recommended
- Irrigation
  - Deficit irrigation
  -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

Results

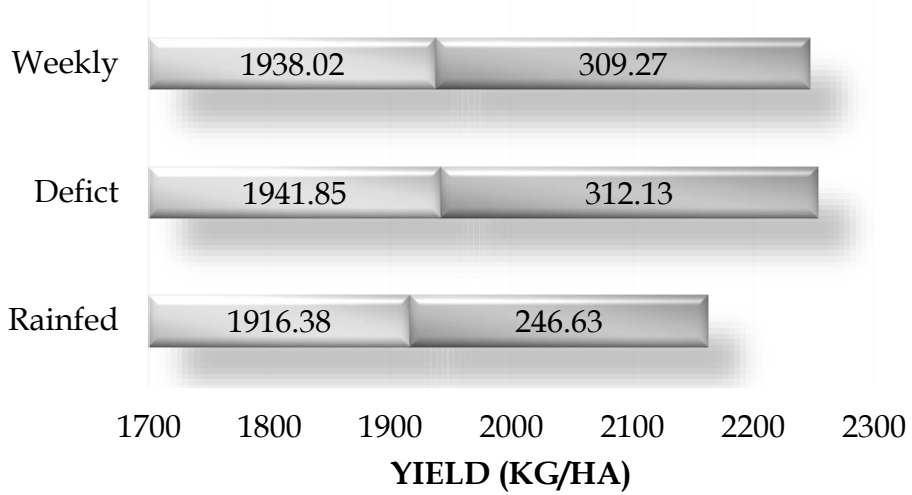

Sorghum yeld (kg ha -1.)
2500
2000
1500
1000
500
0
A1 B1 B2 B3 B4 B5 C1
Cowpea yield (kg ha -1.)
500
450
400
350
300
250
200
150
100
50
0
A1 B1 B2 B3 B4 B5 C1
Water use efficiency (kg mm -1 ha -1.)
8
7
6
5
4
3
2
1
0
A1 B1 B2 B3 B4 B5 C1
Planting dates

Results….

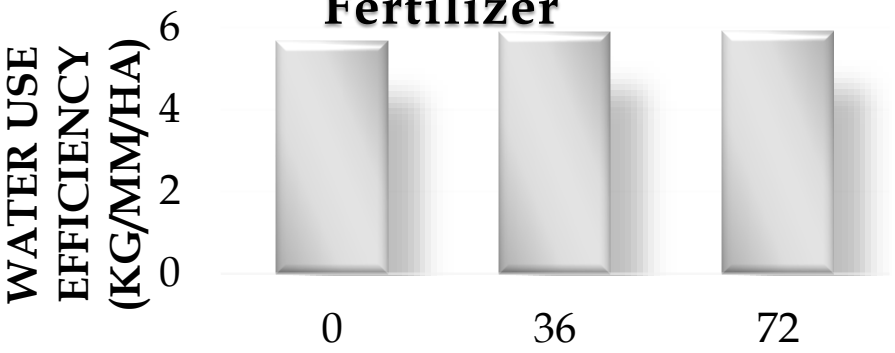
Fertilizer application



Irrigation

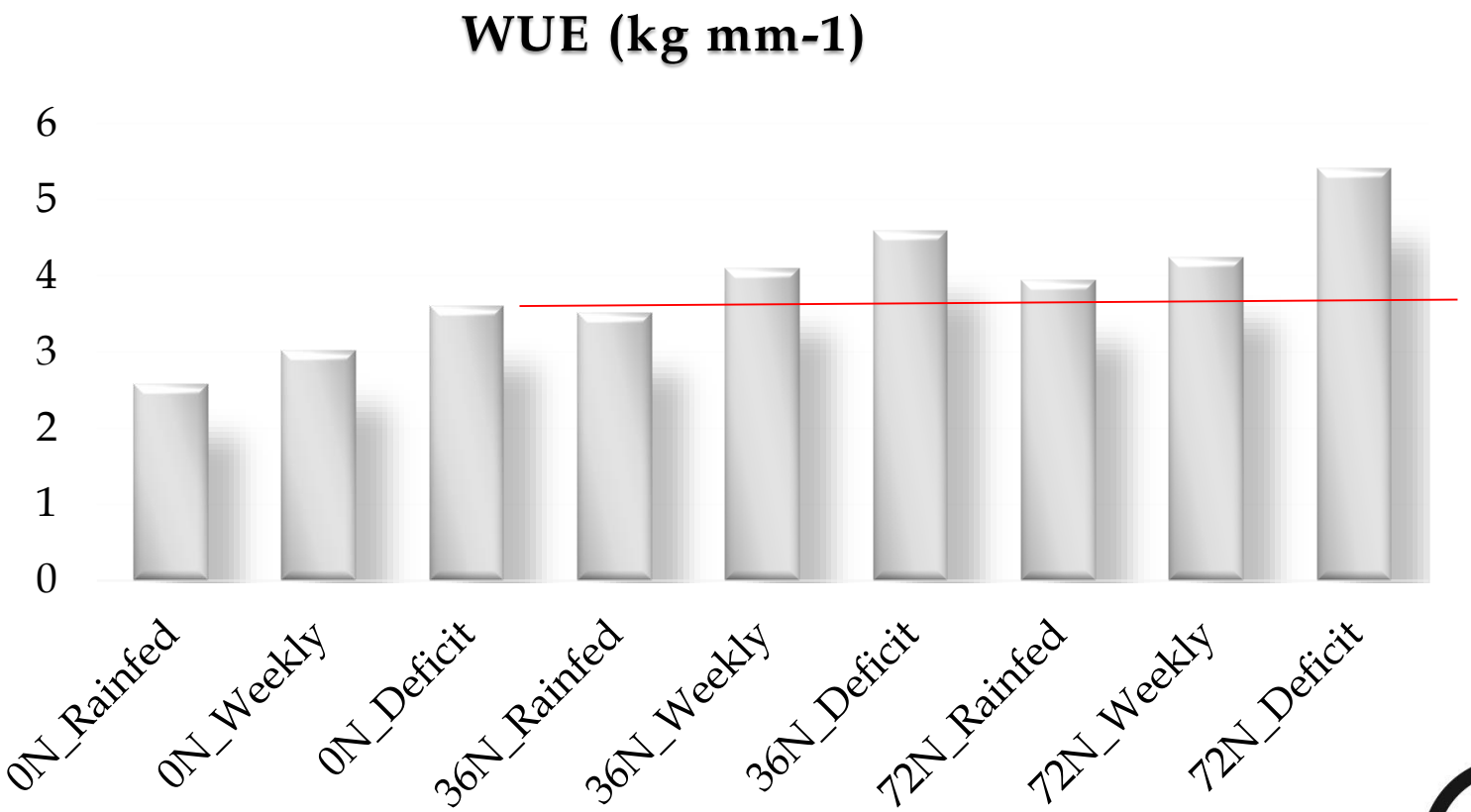


Fertilizer

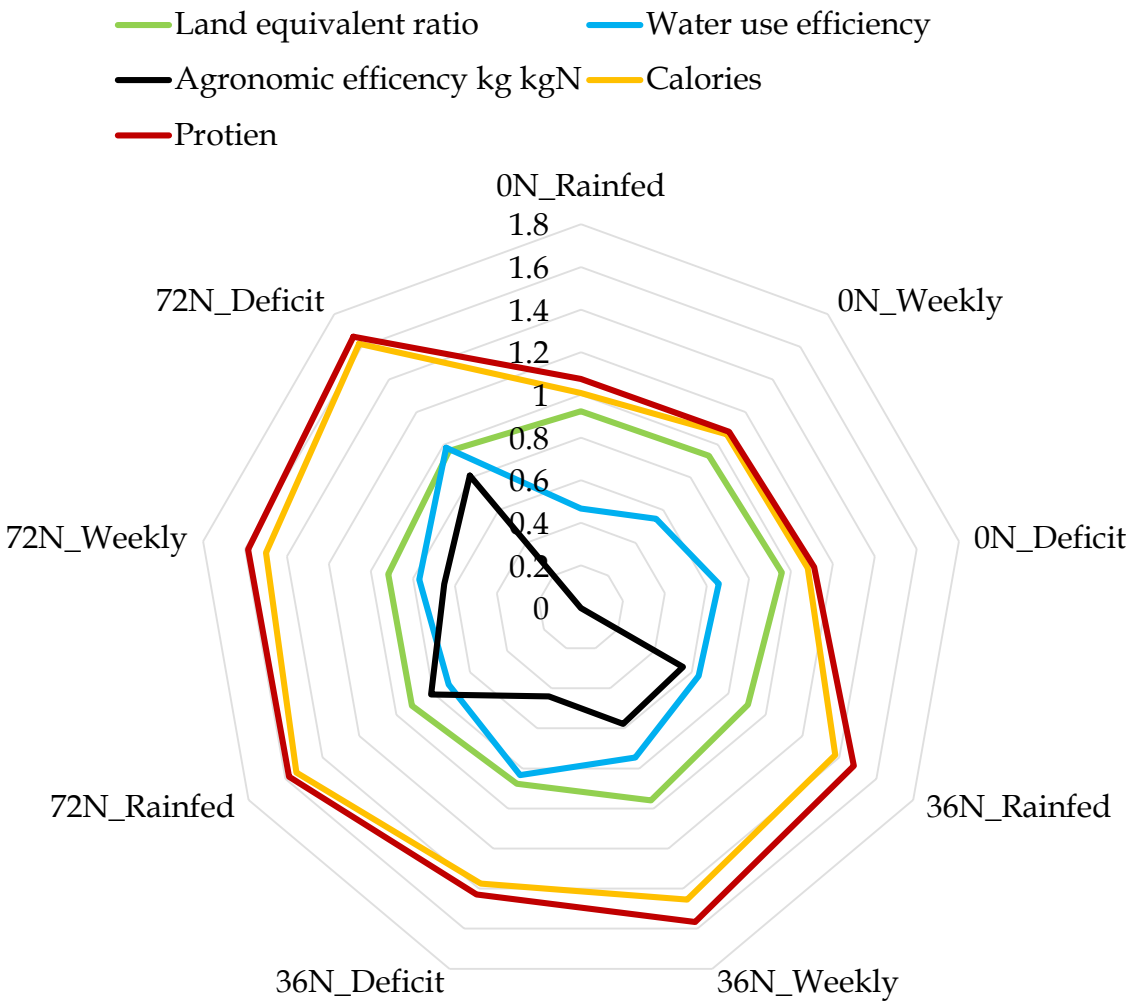


Irrigation

Management combinations



Summary of results

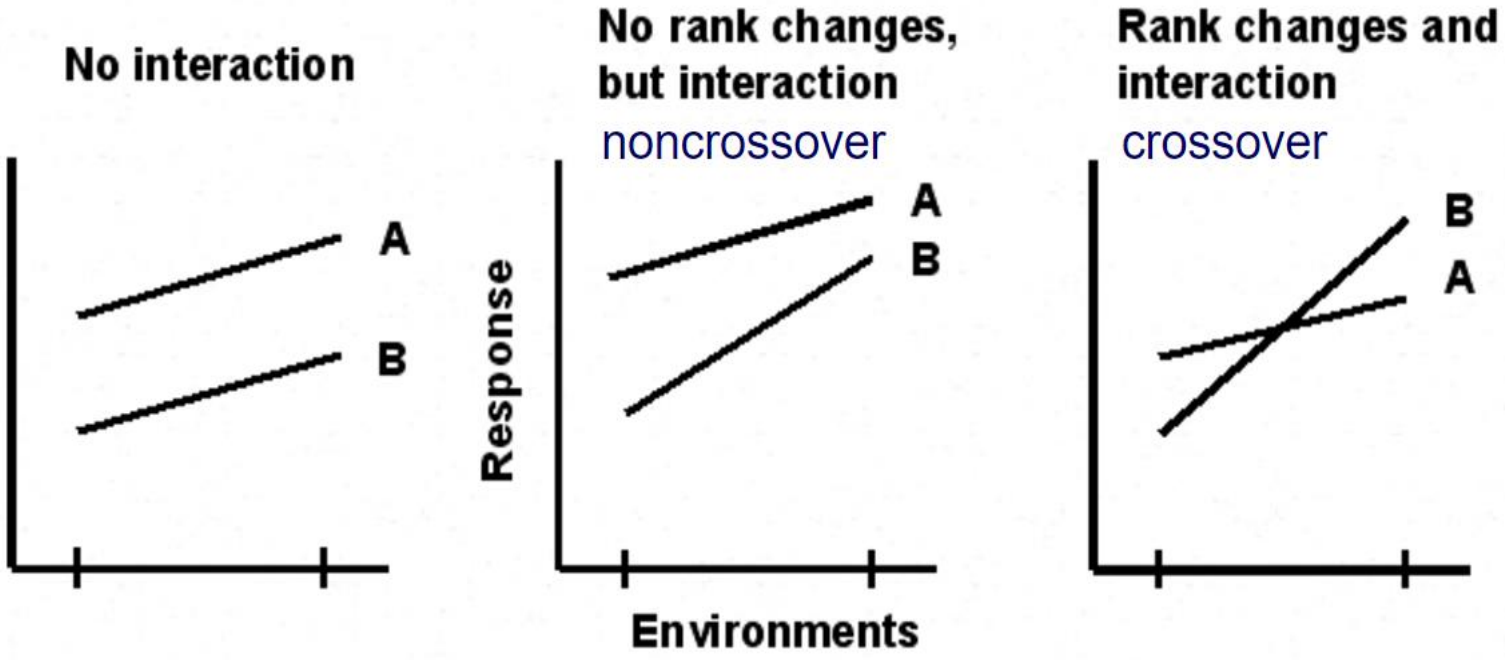


Discussion

- 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

Way forward

Fitting new technologies into new environments : Genotype/technology by Environment interaction study



Conclusions …

Acknowledgements

- The Water Research Commission of South Africa is acknowledged for initiating, funding and directing the study through WRC Project No. K5/2274//4 'Determining water use of indigenous grain and legume food crops' (WRC, 2014).
- "Green team" research group
- Prof AT Modi and Tafadzwa
- Field and technical staff at Ukulinga