Multi-stakeholder partnerships

Moraka N Makhura, PhD

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10 PhD graduates

33% Female
61% Black
66% International students

65 journal papers published

23 post-graduates supported

Boosted staff capacity with **19** experts

3 new modules

9 visiting professors

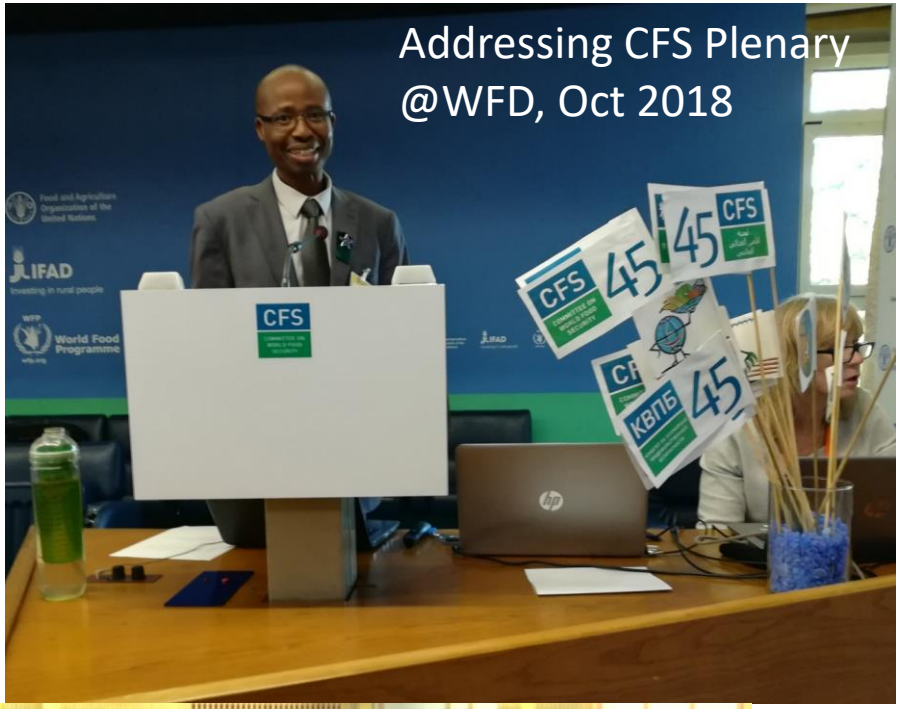
142 Collaborative masters students supported in 2018/9

4 permanent staff recruited

5 postdoctoral fellows

HLPE Project Team Leader

Projet Team



Conference | Advancing agricultural transformation in Africa: Capaci

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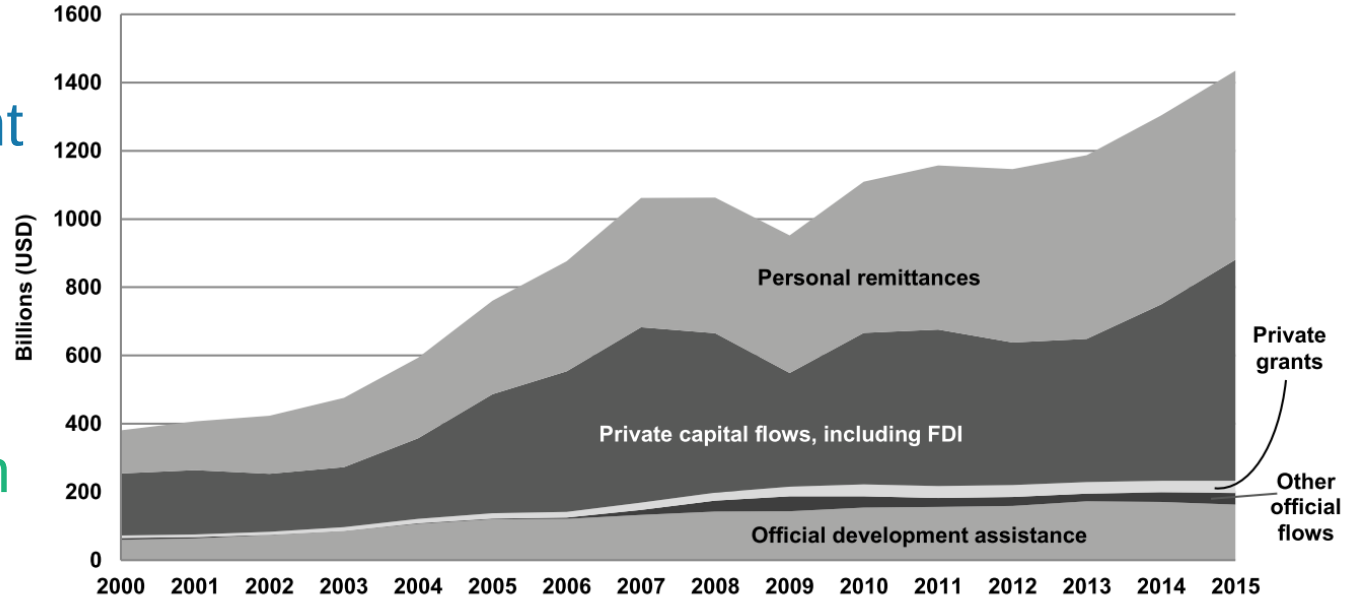
Why now? Financial needs

3 categories of investment needs:

- Basic needs
- National sustainable development needs
- Global challenges

Total investment gap: USD 2.5 tirllion / per year (UNCTAD, 2014)



Decline in the relative importance of ODA with the increase of private capital flows (including FDI) and of personal remittances.

Recommendations of the HLPE Report

1. Establish a policy framework to ensure that MSPs effectively contribute to the progressive realization of the right to adequate food
2. Improve mobilization, coordination and targeting of financing for FSN through MSPs
3. Strengthen transparency and accountability in MSPs through effective governance and management principles
4. Increase the impact of MSPs through effective monitoring, evaluation and experience sharing
5. Integrate different forms of knowledge and explore further areas of research on MSPs to finance and improve FSN

HLPE report provides

- **MSPs definition**: any collaborative arrangement among stakeholders, pooling their resources together, sharing risks and responsibilities in order to solve a common issue, to realize a common objective
- **Qualities of MSPs:** Results & process
- **Categories of MSPs:** Knowledge cogeneration & CB, Advocacy, standards setting, Action, fund raising & resource mobilization

Collaborative Centre (CoC)

Partnership purpose

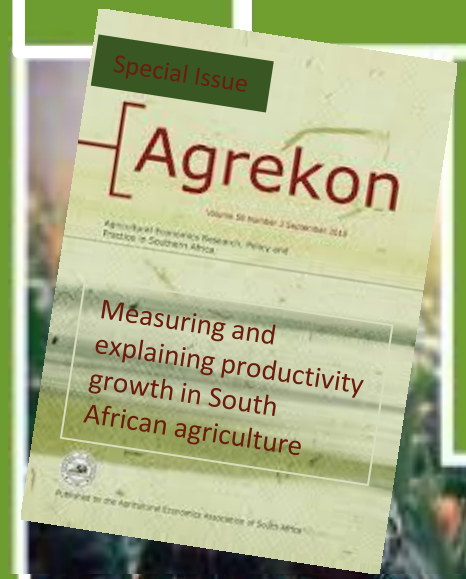
To identify, measure and demonstrate the impact of investments in agricultural research and development on the agricultural sector in South Africa

Our value proposition

To rescue, digitize and make agricultural data available to provide evidence of the return and benefit of investing in agricultural research for development

CoC achievements 2015-2019

- 3 PhDs, 8 Masters Graduated
- 1 PhD and 5 Masters candidate
- 12 Journal papers
- 9 Research reports
- 8 Impact study reports
- 1 Data base
- 4 Partner institutions
- Over 30 conference presentations
- AESA best conference paper 2018
- AESA best conference poster 2017
- 3 Colloquia



Partners during Colloquium & Writeshops

Themes/Focus Areas

- Productivity
- Livestock
- Tool box for analytical methods
- Productivity/Climate Interface
- Economic growth trends versus technology and policy

Effects of Climate Variability on Productivity of Sorghum in Three Provinces of South Africa

Modiselle, S[1]. , Madyo. S[1], Maku, M.[2], Makhura, M[3]., Mazwane, S.[1 3] and Hassan, R. [3]

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[3]University of Pretoria

Introduction

- Agricultural production is vulnerable to climate variability and its extremes.
- Climate variabilities include, global temperature rise, changing precipitation patterns, frequent and intensified major natural hazards (droughts, heat waves, floods & fires).
- Under changing climatic conditions, drought-tolerant crop such as sorghum has a renewed importance in Sub Saharan Africa.
- There are however, few studies on sorghum and thus far, there is no study relating to climate variability on sorghum in South Africa.
- Sorghum is of strategic importance in South Africa:
  - Sorghum discussions led by Department of Agriculture, Land Reform and Rural Development consider sorghum as neglected and not hardy crop.
  - A need to add grains to diversify crops for diets and feeds.
- There is continual variation in the temperature and rainfall that affects grain production.
- There is also a reduction in sorghum area planted and yield over the period 1990-2018.

Objective

- To determine the effects of climate variability on sorghum productivity in three provinces.

Methods and materials

Data and sources

- Data used in the study includes: sorghum yield, average daily minimum and maximum temperatures and rainfall in Free State, Mpumalanga and North West provinces for the period 1987 to 2018.
- It was sourced from the Agricultural Research Council - Soil, Climate and Water Institute and Department of Agriculture, Land Reform and Rural Development

Analytical techniques

Assessed correlation and cointegration
Cointegrating equation:

$$Y_{it} = \alpha_i + B_i X_{it} + \varepsilon_{it}$$

Where Y_{it}, X_{it}, represent the output of sorghum and the factors (rainfall and temperature indexes) that affect the mean of the output, respectively, in location i at time t. α_i and B_i are parameters to be estimated.

Results

Table 1 Correlation

Provinces		Yield	Ave rainfall	Ave temp cmb
North west	Yield	1.000000		
	Ave Rainfall	-0.067419 0.7186	1.000000	
	Ave Temp cmb	-0.289200 0.1146	-0.293042 0.1096	1.000000
Free State	Yield	1.000000		
	Ave Rainfall	0.023062 0.9020	1.000000	
	Ave Temp cmb	-0.090037 0.6300	-0.350811 0.0530	1.000000
Mpumalanga	Yield	1.000000		
	Ave Rainfall	0.163003 0.3810	1.000000	
	Ave Temp cmb	0.266821 0.1468	-0.150637 0.4186	1.000000

Table 2 Cointegration results

Free State				
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
LFS	-4.161320	0.0391	-23.24826	0.0234
LFS_AVE_TEMP_CMB	-3.288198	0.1862	-16.28280	0.1618
LFS_AVG_RAINFALL	-5.928224	0.0008	-32.49957	0.0006
North West				
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
LNW_YIELD	-4.069747	0.0469	-20.38279	0.0560
LNW_AVG_RAINFALL	-4.940707	0.0075	-27.42413	0.0054
LNW_AVE_TEMP_CMB	-3.828154	0.0742	-20.26445	0.0580
Mpumalanga				
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
LMP_YIELD	-1.161815	0.9513	-4.692887	0.9003
LMP_AVETEMPCMB	-5.250788	0.0037	-29.89110	0.0020
LMPAVERAINFALL	-3.962956	0.0576	-21.10763	0.0454

Correlation

North West: Productivity has negative relationship with both average rainfall and average temperature.
NW province is resilient to both climate variables.

Free State: Productivity has positive relationship with average rainfall and negative relationship with average temperature. FS sorghum productivity is affected by rainfall more than temperature.

Mpumalanga: Productivity has positive relationship with both average rainfall and average temperature. MP is affected by changes in rainfall and temperature.

Cointegration

There is cointegration among variables for the Free State and North West provinces. This suggests an existence of a long run equilibrium mechanism among variables.
There is no cointegration in Mpumalanga .

Conclusion and Recommendations

- Cointegration existed among variables in the FS and NW provinces.
- Correlation established that sorghum yield per hectare did not respond to *'small'* changes in climate in all the three provinces. There was no significant relationship between sorghum yield and climate variables.
- The variability of temperature and rainfall, does not have strong association with sorghum productivity - thus emphasizing resilience of the crop.
- Policy implication: science and technology policy should account for effect of climate on production of sorghum.
  - Breeding of improved sorghum cultivar varieties- priority can be given to productivity prone areas

Naledzani, Z, Chaminuka, P, Nhundu, K, Machethe, CL & Liebenburg, F .2019. Economic value of quality restrictions on the wheat industry in SA. *Agrekon* 58(1)

Mose, Mushunje,Ngarava, Molebatji. 2019. Determinant of ICT use in livestock development programme. Case of KyD cattle development Scheme. AEASA Conference 2019

Themes and Teams

	Thematic Area	Team
1	Productivity Analysis	Gandidzanwa, Mushunje, Mahlangu, Mazwane
2	Livestock	Mdlulwa, Ngarava, Masemola & Rasweswe
3	Tool box for analytical methods for the economics of R&D	Nhundu, Mamabolo, & Nemakhavhani
4	Productivity/Climate Interface	Makhura, Modiselle, Madyo, Maku, Oluwatayo
5	Economic growth trends versus technology and policy	Oluwatayo, Chaminuka, Kau, Makhura, Mushunje

CoC as Model for Value-add in Partnerships

- Results perspective:
  - Growing evidence of positive impact of investing in research
  - Capacity to mobilize and use resources better
- Process lessons:
  - Encourage value-added and inclusiveness
  - Continuous dialogue, engagement and consensus building: mutual accountability
  - Transparency in planning and aggregating outputs
  - Reflexivly adjust processes
  - Continuously build capacity

Thank you

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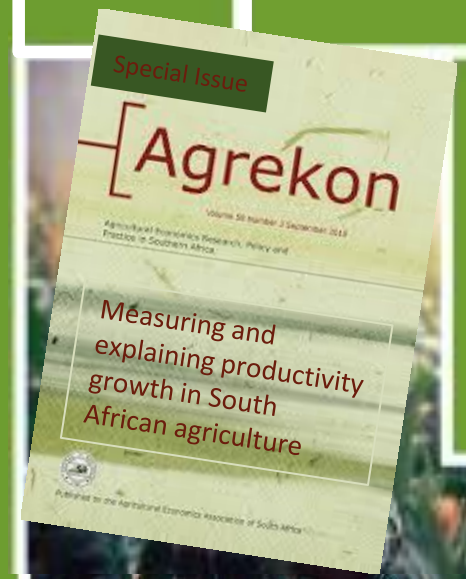

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