

SUPPORTING GROWTH AND TRANSFORMATION

in South African Agriculture



LEVSA/AEASA conference 2016

Dates: 14 to 16 September 2016 •
Venue: Misty Hills Conference venue, Muldersdrift, Gauteng



AEASA as an association should strive to serve the full profession of agricultural economists: – those employed in government, agribusiness, financial sector, commodity organisations and academia. This year we would like to have more input and discussions from our members in practice while we still continue with the separate day/session for academics and students. We will also bring in more debate about current issues and use the Davos style as a way to organise the sessions. We would therefore like to encourage agricultural economists in national government, parastatals, agribusinesses and provincial governments to prepare short (non-academic) inputs for any of the themes of the conference.



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We wish to extend a sincere thank you to all our sponsors for their generous support and involvement in the 54th Annual Conference of AEASA

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GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA



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WELCOME 02

MEC message for AEASA conference



THE GAUTENG PROVINCE IS about 1,699,000 ha in extent being the smallest of all the nine provinces of South Africa. This figure represents about 1.4 per cent of the total national land area. It is however the most urbanized province in South Africa. About 97% of the population is urbanised, and roughly 3% of its population live in its rural areas.

Due to its size and high industrialization, Gauteng falls mainly within the highly intensive, diversified commercial and subsistence agricultural zones of South Africa coupled with grain cropping, ranching and dairy, poultry and piggery. A significant component of the agricultural sector in the Province is maize production, while ground-nuts, sunflowers, cotton and sorghum are grown in the Bronkhorstspuit, Heidelberg and Cullinan areas. Although the smallest province in the country, Gauteng contributes 34.37% to the country's Gross Domestic Product (GDP). The ten year average (2005–2014) of the contribution of agriculture towards GVA in Gauteng was 0.5% or R5.3 billion in 2014.

The large urbanized component of the Province places a huge pressure on its available agricultural land. The agricultural secondary and tertiary sectors in Gauteng are the largest in the country. The four major fresh produce markets as well as most food processors are situated in the Province. The Province also has a well-developed road, air and rail networks as well as first world information and telecommunications infrastructure. World class tertiary academic institutions with agriculture and veterinary science faculties as well as basic and applied sciences are located in Gauteng. The research and development institutions either affiliated to the academic institutions or independent such as the CSIR and a number of institutes of the ARC are also found in the Province.

In terms of agriculture, the GDARD's focus over the next five (5) years will be to firmly harness and maximise the economic potential of the sector.

The GDARD will ensure that the sector in Gauteng contributes significantly to this target. It will also ensure that the sector is active in all interventions designed to radically transform, modernise and re-industrialise Gauteng in line with the broad objectives of the NDP.

Between 2005 and 2014, employment in the agro-processing industry of Gauteng grew by an annual average growth of 3.35 percent. This indicates the potential of the agro-processing sector as a job driver within the province and hence the importance of the strategy. Agro-processing sector created about 62, 595 jobs in 2005. By 2014 the figure had grown to about 87 771 employment opportunities. Gauteng is strategically located to use agriculture and agro-processing as a catalyst for growth and prosperity. The diversity of the Province enables variation in the types of farming and levels of agricultural production, however, there needs to be a radical improvement of the mandatory services that are provided by the Department, together with innovative delivery models. The Department aims to:

- Encourage a shift towards more labour-intensive agricultural subsectors;
- Strengthen the capacity of the smallholder farmers to participate effectively in the agricultural value chains;
- Promote food and nutrition security;
- Strengthening the smaller stratum of large-scale commercial farms, which account for a disproportionate share of farm jobs;
- Promote a better balance between large-scale commercial farms and smallholder farms through agricultural development within the Province and

- Promote the active participation and integration of youth, women and people living with disabilities in agriculture and rural development programmes and projects.

According to the SONA in February 2015 the key strategy to promote rural development and rural economic transformation will be the roll out of Agriparks in all Districts. Agriculture remains as a catalyst for growth and food security. Working with the private sector, the Gauteng Provincial Government developed an Agricultural Policy Action Plan which has already led to the establishment of 8 Agriparks in the Province. Since the Gauteng province consists of two district municipalities, namely: Sedibeng and West Rand, work has already started with one mega Agri-Park in the West Rand. This mega park will be composed of primary vegetable production, livestock and dry land crops. It is envisaged that all the production process will be linked to value chain development. The Agri -parks strategy is closely linked to the existing Rural Development framework and should not be seen as new or separate. The strategy simply refines this approach further requiring a more focussed and integrated value chain approach to achieve the following key objectives:

- Kick start Rural Economic Transformation – NDP “inclusive rural economy”
- Grow smallholder sector –
- Increase production – bring fallow land back into production
- Increase participation in value chains, producer ownership
- Strengthen partnerships within government and with private sector
- Increase employment – 1 million jobs in agriculture sector – across value chain

These are some of the questions that we hope will receive attention during this conference of industry specialists and agricultural economists from across the country and beyond. I therefore on behalf of local organising committee, take this opportunity to invite each and every one of you to join in participating in what will hopefully be robust debate in promoting the Transformation, Modernisation and Re-Industrialisation programme of the Province and the broad objectives of the NDP. I am convinced that the department investment in the conference will yield positive returns for all delegates, the Province and country at large.



*Mr Lebogang Maile
MEC for Gauteng Economic
Development, Environment,
Agriculture and Rural
Development*

WELCOME 03

Message from the Local Organising Committee

THE 2016 CONFERENCE IS being held in the aftermath of the most severe drought the country has experienced in the last 100 years. In the first quarter of 2016, growth in the agricultural sector declined by 6.5%, whilst the country's economy as a whole shrunk by 1.2%, quarter-on-quarter. Despite encouraging statistics just released for the second quarter of 2016, showing quarter-on-quarter increase in economic growth of 3.3%, the agricultural sector growth remained negative. The sector growth contracted by 0.8%, maintaining the downward trend for the 6th quarter in a row. Besides the unfavourable weather conditions, the prolonged poor performance of the sector is exacerbated by factors such as depreciation of the rand and electricity shortages.

Furthermore, poor growth of smallholder agricultural output and slow integration of farmers into mainstream markets continue to hinder transformation of the sector. It cannot be disputed that there is a need for measures to stimulate growth and transformation in the economy as a whole, and particularly the agricultural sector. Considering that the New Growth Path identifies the agricultural sector as one of five priority areas for job creation, there is an opportunity to explore how agriculture can meet this expectation despite the downward trend in the sector's growth. The theme for the conference this year is therefore aptly 'SUPPORTING GROWTH AND TRANSFORMATION IN SOUTH AFRICAN AGRICULTURE' and it creates a

platform for a variety of stakeholders in the public and private sector to debate critical issues and jointly advance solutions relevant to transformation and growth in the agricultural economy.

This year's conference takes a somewhat different format from past conferences. Following concerns raised by the younger members of the Association that conferences were 'too academic' and not catering sufficiently for the diverse interests of AEASA, the conference is structured in a way that permits greater participation through panel discussions and debate, led by members in government, agribusiness, financial sector and commodity organisations. The programme facilitates input from AEASA members in practice and other key speakers, through debates on various transformation and sector growth issues structured in the 'Davos style', whilst still allowing presentations of papers by academics and students. In an attempt to maximise use of the conferencing time, the gala dinner has also been moved to a Friday on a trial basis.

On behalf of the Local Organising Committee I welcome all AEASA members to Gauteng and to the 2016 conference, and invite you to actively take part in the programme. There's no better place to give birth to new ideas than in The Cradle of Humankind! We are looking forward to receiving feedback from members on any aspect of the conference to assist the AEASA MANCOM in organising better conferences. **#SPEAKYOURMIND**.



*Petronella Chaminuka (PhD)
Chair of the 2016 Local
Organising Committee*

ORGANIZING

04

Comittee

Petronella Chaminuka, Agricultural Research Council

Johann Kirsten, Bureau of Economic Research, University of Stellenbosch

Danie Jordaan, University of Pretoria

Mmatlou Kalaba, University of Pretoria

Bonani Nyhodo, National Agricultural Marketing Council

Thabi Nkosi, Public Investment Corporation

Motlatjo Moholwa, Gauteng Department of Economic Development

Madime Reuben Mokoena, Department of Agriculture, Forestry and Fisheries

Tinashe Kapuya, Agbiz

Nontobeko Ndaba, Land Bank

Tediso Molepo, Gauteng Agriculture and Rural Development

DEPARTMENT OF Science and Technology 05



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

THE DEPARTMENT OF SCIENCE AND TECHNOLOGY aims to promote the development of science and technology through the enabling mechanism of the National System of Innovation (NSI). It strives towards introducing measures that put science and technology to work to make an impact on growth and development in a sustainable manner, in areas that matter to all the people of South Africa. Its strategic goals are to:

- develop the innovation capacity of the national system of innovation to contribute to socio-economic development
- enhance South Africa's capacity for generating knowledge to produce world class research outputs and turn some advanced findings into innovation products and processes
- develop appropriate human capital in the science, technology and innovation sector to meet the needs of society
- build world class infrastructure in the science, technology and innovation sector to extend the frontiers of knowledge, train the next generation of researchers, and enable technology development and transfer as well as knowledge exchange
- position South Africa as a strategic international research and development and innovation partner and destination through the exchange of knowledge, capacity and resources between South Africa and its regional and other international partners, thus strengthening the national system of innovation.

Much of the Department's work is ultimately carried out by Entities reporting to the Minister of Science and Technology, i.e.

- the National Research Foundation of South Africa, which receives a substantial proportion of the DST budget to carry out various research support tasks, including supporting key national research infrastructure ("National Research Facilities"), scientific research grant administration and a student grant scheme
- the Council for Scientific and Industrial Research, which acts as a quasi-privatised research and development agency with a specific focus on research of application to industry;
- the Technology Innovation Agency, which serves to provide funding to turn innovative research into commercial products;
- the South African National Space Agency, which covers space-related research and development initiatives;
- the Human Sciences Research Council (South Africa), which focuses its research on human health and disease.

The current Minister is Naledi Pandor, who previously held the post from 2009-2012. Dr. Phil Mjwara, is the Director-General.



WORKSHOPS 06



WORKSHOP 1 – Nutritious Seeds for a Sustainable Future

Parallel session led by the Department of Science and Technology (DST) at the AEASA Conference - 14 September 2016

Venue: Pelindaba

Abstract

PULSES – EDIBLE BEANS THAT are harvested dry – are well known for their high protein content and benefit the soil by fixing nitrogen. 2016 was declared by the United Nations as the International Year of Pulses (IYP2016). This year is dedicated to promoting the use and cultivation of pulses as part of sustainable food production for improved food security and nutrition.

This discussion session precedes the main AEASA Conference on 14 September. The session is presented jointly by the Department of Science and Technology (DST) and the National Science and Technology Forum (NSTF). Speakers are included from: the international Food and Agriculture Organisation (FAO) which is responsible for worldwide implementation of the IYP2016, the World Health Organisation (WHO), the (South African) Department of Agriculture, Forestry and Fisheries (DAFF), and the Agricultural Research Council (ARC). The University of the North-West will contribute to the discussion by highlighting the role of Indigenous Knowledge (IK) in food security.

The themes that are interwoven in this discussion, and which we aim to explore are:

- Nutrition and food security, vs pulses as a commodity
- Sustainable agriculture, including coping with water shortages
- The crucial role of research and innovation
- What lessons can be learned from IK to work on sustainable solutions

This discussion links with previous discussions held during the year. On 2-3 June 2016, a discussion forum was hosted by the NSTF, sponsored by the DST, and partnered by DAFF and (the company) AGT Foods Africa. Some of the recommendations will be presented during this session on Pulses.

Moderator: Ms Jansie Niehaus (Executive Director: National Science and Technology Forum - NSTF) 10h00-10h15

10:00 - 10:15	Welcome and Opening	Ms Jansie Niehaus NSTF
10:15 - 10:35	Global Pulses Production and Consumption Trends: The Potential of Pulses to Achieve the Food and Nutritional Security Goals	Dr Lewi Howe, Food and Agriculture Organisation (FAO)
10:35 - 10:55	Policies regarding food security, research and crop science	Mr Molatelo Mamadi, Department of Agriculture, Forestry and Fisheries (DAFF)
10:55 - 11:15	The role of Indigenous Knowledge (IK) in combating food insecurity	Mr Motheo Koitsiwe, North West University (NWU)
11:15 - 11:35	The importance of scientific research in enhancing the production of Pulses	Mr Wikus Snijman, Researcher, Agricultural Research Council (ARC)
11:35 - 11:55	Nutritional benefits of Consuming Pulses	Dr Sarah Louise Barber, World Health Organisation (WHO)
11:55 - 12:15	Drought resistant crops, including pulses	Dr Nthabiseng Motete, Group Executive: Crop Sciences, ARC
12:15 - 12:30	Outcomes and recommendations from the NSTF Pulses and Food Security Discussion Forum (2-3 June 2016)	Ms Jansie Niehaus, NSTF
12:30 - 12:50	Questions and Answers	All
12:50 - 13:00	Vote of Thanks and Closure	Ms Jansie Niehaus NSTF



WORKSHOPS 06



WORKSHOP 2 – Tracking Smallholder Market Access in South Africa

Venue: Springbok

Abstract

THE NAMC PROPOSES A methodology for measuring and tracking market access for smallholder farmers in South Africa namely, the Smallholder Market Access Index (SMAT). The rationale for the creation of such an index stems from the general perception and, in some cases, study findings, pertaining to or indicating lack of progress in addressing integration of smallholder farmers in South Africa's mainstream economy, a majority of them black. An AEASA pre-conference has been organised to provide a platform

for discussion of the best approaches for the development of the SMAT. The workshop programme has been designed to ensure that there is ample time for discussions on the proposed indicators, selected pilot commodity, data collection methods, data collection instrument and the general approach in the development of the SMAT. The discussions will feature members of the SMAT reference group (a group of stakeholders appointed to advise on the SMAT), AEASA membership and the NAMC.

Time	Item	Responsibility
08:00 – 08:30	Registration	ALL
08:30 – 08:40	Welcome and introductions	ALL
08:40 – 09:20	Recent research on smallholder market access	SA Food Labs
09:20 – 10:00	The SMAT concept	NAMC Team
10:00 – 10:20	TEA BREAK	
10:20 – 11:00	The pilot survey & findings	Nonie Mokose
11:00 – 12:00	Discussions	ALL
12:00 – 12:30	Way forward & closure	NAMC Team

WORKSHOPS 06



South African
Land Observatory

WORKSHOP 3 – Panel on land and agriculture in South Africa: What (in)exists, challenges and the way forward

Venue: Impala

Abstract

EVIDENCE-BASED AND INCLUSIVE decision-making over land resources in South Africa is becoming increasingly important in view of the land reform proposals and the National Development Plan. It has become apparent that unless agricultural and land data is generated, analysed and made available, inclusive decision-making on land at national and decentralised levels may not be realised and that would exacerbate challenges that already exist on issues related to land. Although data exists in isolated pockets of government and private sector, there is a growing concern about data accessibility. Experience has shown that either data does not exist, or where it does, accessibility is a challenge. Constraints to data access are in two forms; the cost of data is prohibitive or data is availed only to a limited few, who in most cases seldom use it. Such a scenario calls for urgent need

to rethink data generation, data accessibility and data usability in South Africa. This includes wider stakeholder participation in data development and the establishment of knowledge portals as ways to address the aforementioned challenges.

Consequently, a panel of data experts has been put together to brain storm on i) what is being done presently and ii) what can be done to improve data availability and accessibility and to foster avenues through which data can be utilised for evidence-based decision making.

The following experts will share their experiences and propose a way forward.

Name	Institution	Focus
Dr Jack Armour	Free State Agriculture	Land audit in FS: Challenges
Ms Landi Kruger	Grain SA-Data Science Coordinator	SA Ag-Mobile App developers –GIS based - for big data management
Dr Dirk Troskie/Mr Louw Pienaar	Western Cape Department of Agriculture	Land audit in WC: Challenges
Prof. Ferdi Meyer	Bureau for Food and Agricultural Policy (BFAP)	Agricultural data: Challenges Spatial land use planning and legislation
Mr Itani Magwaba	Statistics South Africa	Agricultural land in SA-Large Sample Surveys. StatsSA's perspective: Challenges
Dr Frikkie Liebenberg	University of Pretoria	Data-what in(exists) on agriculture & land: Challenges
Dr Thinah Moyo	University of Pretoria-South African Land Observatory	One-stop-shop data portal and interactive platform: Challenges
Open discussion	What can be done to remedy the situation?	



PROGRAMME 07

Wednesday 14th September 2016

9:00 – 13:00	Registration and Workshops Workshop 1: Nutritious Seeds for a Sustainable Future – Hosted by the Department of Science and Technology Venue: Pelindaba Workshop 2: Tracking Smallholder Market Access in South Africa – Hosted by the National Agricultural Marketing Council (NAMC) Venue: Springbok Workshop 3: Land and agriculture in South Africa: What (in)exists, challenges and the way forward – Hosted by the South African Land Observatory Venue: Impala
11:30 – 14:00	Lunch
14:00 – 15:45	Plenary Session: Opening and Presidential Address <i>Chair: Dr Litha Magingxa (Agricultural Research Council)</i> Venue: Pelindaba
14:00	Welcome by LOC: Dr Petronella Chaminuka
14:05	Official opening: Mr Lebogang Maile (MEC of Gauteng Department of Agriculture and Rural Development)
14:25	Presidential address: Ms Bongiswa Matoti (Department of Agriculture, Western Cape Government)
15:00	Simon Brand Memorial Address: “The Analysis of Market integration in an African Context – Results and Implications” Prof Stephan von Cramon-Taubadel (University of Göttingen, Germany)
15:45 – 16:15	Tea / Coffee
16:15 – 17:30	Plenary session: Venue: Pelindaba The role of agricultural and resource economists in agriculture faced with climate shocks, water stress and resource constraints <i>Chair: Prof Eric Mungatana (University of Pretoria)</i> An overview of the role and work of environmental economists in an era of climate change. Lessons for the future. Prof Rashid Hassan – Director CEEPA (University of Pretoria) The agricultural economist and research on the economics of water: Dr Gerhard Backeberg (Water Research Commission)
Questions and debate: 30 minutes: Prof Theo Kleynhans (University of Stellenbosch) and Prof Bennie Grove, (University of the Free State)	
18:00	Drinks and informal braai evening Venue: Carnivore Restaurant

PROGRAMME 07

Thursday 15th September 2016

08:30 – 10:00	<p>Plenary session: Venue: Pelindaba</p> <p>Policy frameworks and funding for agricultural growth</p> <p><i>Chair: Prof Johann Kirsten (BER, University of Stellenbosch)</i></p> <p>A review of state expenditure in agriculture: A need to ensure convergence between policy and budget:</p> <p>Dr Frikkie Liebenberg (University of Pretoria) and Dr Moraka Makhura (University of Pretoria)</p> <p>The performance of agricultural support programmes such as CASP, MAFISA and RECAP</p> <p>Prof Charles Machethe (University of Pretoria)</p> <p>Agricultural Policy Action Plan: “old wine in new bottles?”</p> <p>Ms Elaine Alexander, DDG: (Department of Agriculture, Forestry and Fisheries) (DAFF)</p>
10:00 – 11:00	Session for visual presentation of contributed papers (Posters)
11:00 – 13:00	Session 1 of parallel contributed papers (5 sessions of 4 papers each):
	<p>Session 1a: Venue: Impala</p> <p>Price Transmission and economy wide effects</p> <p><i>Chair: Mr Motlatjo Moholwa</i></p> <p>Spatial market integration and asymmetry in the Ethiopian maize market</p> <p>Yami, M., Meyer, F., Hassan, R.</p> <p>Price Transmission in the Beef Value Chain – The Case of Bloemfontein, South Africa</p> <p>Lombard, H.L., Ogundeji, A.A., Maré, F.A.</p> <p>Economy-Wide Effects of Drought on South African Agriculture: A CGE Analysis</p> <p>Ntombela, S., Nyhodo, B., Ngqangweni, S., Phahlane, H., Lubinga, M.</p> <p>Estimating the relationship between rainfall variability and performance of different agricultural sub-sectors in South Africa</p> <p>Mdlulwa, Z., Masemola, M., Chaminuka, P.</p> <p>Session 1b: Venue: Springbok</p> <p>Agribusiness and farming businesses</p> <p><i>Chair: Dr Petronella Chaminuka</i></p> <p>An essay on fragility in agribusiness value chains: A novel perspective on system coordination challenges</p> <p>Jordaan, D., Kirsten, J.F., D’Haese, M.</p> <p>Measuring the competitive performance of the South African stone fruit industry</p> <p>Boonzaaier, J., Van Rooyen, J.</p>



PROGRAMME 07

11:00 – 13:00	Session 1 of parallel contributed papers (5 sessions of 4 papers each) continued:
	<p>To process or not to process: An investigation of the contribution of processed and unprocessed agricultural exports to economic growth in South Africa</p> <p>Mlambo, C., Mukarumbwa, P., Megbowon, E.</p> <p>Ways of Farming: Exploring the Advantages and Disadvantages of Family Farming Versus Non-Family Farms within South Africa’s Smallholder Sector</p> <p>Aliber, M., Antwi, M., Mdhuli, D.</p> <p>Session 1c: Venue: Tusker</p> <p>Smallholder production and farming systems</p> <p><i>Chair: Dr Madime Mokoena</i></p> <p>Determinants of Household Participation in Agricultural Production in Mpumalanga Province, South Africa: A Double Hurdle Approach</p> <p>Mathebula, J., Chaminuka, P., Muchopa, C.</p> <p>Homestead garden in South Africa: policy implication for food security and sustainable development</p> <p>Tlalang, B.E., Bahta, Y.T .</p> <p>An economic evaluation of the National Red Meat Development Programme in the Eastern Cape Province, South Africa</p> <p>Fakudze, B.D., Kirsten, J.F., Ngqangweni, S.</p> <p>Determinants of Livelihood Strategies among Households in Smallholder Farming Systems: A Case of Kwazulu-Natal, South Africa</p> <p>Yobe, C.L., Mudhara, M., Mafongoya, P.</p> <p>Session 1d: Venue: Leopard</p> <p>Water, irrigation and production</p> <p><i>Chair: Dr Henry Jordaan</i></p> <p>Smallholder Irrigation and Rural Livelihoods in Limpopo Province of South Africa: What is the Contribution to Household Food Security and Income?</p> <p>Moyo, T., Machethe, C.L.</p> <p>Quantifying the water savings benefit of water hyacinth (Eichhornia crassipes) control in the Vaalharts Irrigation Scheme</p> <p>Arp, R.S., Fraser, G.C.G., Hill, M.P.</p> <p>Explaining irrigation water use productivity using psychological capital: case studies from small producers in Ndumo B and Makhathini irrigation schemes, KwaZulu-Natal, South Africa</p> <p>Phakathi, S., Wale, E.</p> <p>Accounting for heterogeneity in small-scale irrigation farming: Implications for entrepreneurial development, KwaZulu-Natal, South Africa</p> <p>Chipfupa, U., Wale, E.</p>



PROGRAMME 07

11:00 – 13:00	Session 1 of parallel contributed papers (5 sessions of 4 papers each) continued:
	<p>Session 1e: Venue: Pelindaba</p> <p>Finance and economic performance</p> <p><i>Chair: Prof Edilegnaw (Wale)</i></p> <p>Classification Accuracy of Logistic Regression and Neural Networks: The Case of a South African Agricultural Credit Provider Bougard, D.A., Henning, J.I.F., Jordaan, H., Matthews, N.</p> <p>Entrepreneurial Competencies and Financial Performance of Farmers in South Africa Nieuwoudt, S., Henning, J.I.F., Jordaan, H.</p> <p>A comparative analysis of rural and urban household savings behavior in South Africa Chimeri, R.H., Chaminuka, P., Muchopa, C.L.</p> <p>Community Perceptions and Attitudes towards Integrated Wildlife/Livestock Land-Uses: The Case of Greater-Giyani Rural Communities, Limpopo Province Baloi, V.A., Chaminuka, P.</p>
13:00 – 14:00	Lunch
14:00 – 15:30	<p>Plenary session: Venue: Pelindaba</p> <p>Agricultural economists, agricultural transformation and the NDP: A reflection after 5 years on Chapter 6 of the NDP</p> <p><i>Chair: Dr Moraka Makhura (University of Pretoria)</i></p> <p>Speakers in debating format: Ferdi Meyer (UP), Nick Vink (US), Tsakani Ngomane (DPME, Presidency), Thabi Nkosi (PIC), Elaine Alexander (DAFF), Michael Aliber (UFH)</p>
15:30 – 16:00	Tea /coffee
16:00 – 18:30	<p>AEASA Annual General Meeting</p> <p>Venue: Pelindaba</p>
20:00	<p>Networking evening</p> <p>Venue: Boma</p>



PROGRAMME 07

Friday 16th September 2016

08:30 – 10:00	<p>Plenary Session: Venue: Pelindaba</p> <p>Agricultural growth requires investment: Who will invest? (A panel discussion)</p> <p><i>Chair: Tinashe Kapuya (Agbiz)</i></p> <p>Panellists:</p> <p>Russell du Preez, Russell Stone Group</p> <p>Andrew Makenete, Musa Capital</p> <p>Cobus Oberholster, BKB</p> <p>Herman Marais, AgriVie</p> <p>Bassie Maisela, NBC holdings</p>
10:00 – 10:30	Tea and coffee
10:30 – 12:30	<p>Plenary Session: Venue: Pelindaba Plenary : Upgraded Papers</p> <p>Upgraded contributed papers</p> <p><i>Chair: Ms Bongiswa Matoti (Department of Agriculture, Western Cape Government)</i></p> <p>Modelling Skewness of Crop Yield Distributions: Irrigated Maize as a Case Study</p> <p>Matthews, N., Grové, B.</p> <p>Small-scale farming and food security: the enabling role of cash transfers in South Africa's former homelands</p> <p>Von Fintel, D., Pienaar, L.</p> <p>The catalytic effect of farmer networks on (honest) information sharing to inhibit the opportunistic behaviour of farmers</p> <p>Van der Merwe, J.F., Trienekens, J.H.</p>
12:30 – 13:30	Lunch
13:30 - 15:30	Session 2 of parallel contributed papers (5 sessions of 4 papers each) continued:
	<p>Session 2a: Venue: Springbok</p> <p>Investment in agriculture and agribusiness chain</p> <p><i>Chair: Dr Simphiwe Ngqangweni</i></p> <p>Between Promise and Profit: Chinese Agro-Investment and the Challenges of Operating in South Africa</p> <p>Harding, A., Jiang, L., Anseeuw, W., Alden, C.</p> <p>An analysis of the security and transferability of land tenure as a critical institution towards ensuring food security: A Principal Component Analysis of developing countries on the African continent</p> <p>Du Preez, R., Scheepers, D., Jansen van Vuuren, A.</p> <p>Framing the future: Using the five capitals to structure 'hybrid' scenario analysis in the context of sustainable development</p> <p>Davenport, M.L., Delpont, M., Hichert, T., Blignaut, J.N., van der Burgh, G.</p>
15:30 – 16:00	Tea / Coffee

PROGRAMME 07

13:30	Session 2 of parallel contributed papers (5 sessions of 4 papers each) continued:
	<p>Agricultural Labour during Apartheid, the Story of Maize? Greyling, J., Liebenberg, F., Vink, N.</p> <p>Session 2b: Venue: Impala Environment <i>Chair: Prof Gavin Fraser</i></p> <p>Influence of Governance Institutions on Households' Willingness To Pay for Improved Solid Waste Management in the Peri-Urban Settlements Of Matsapha, Swaziland Ndlovu, N.</p> <p>Influence of governance institutions on households' willingness-to-pay for wetland resources conservation in khalong-la-lithunya wetland area, Lesotho Jacob, G.</p> <p>Assessing Economic Milk Production Losses in a changing climate: Case Study in three selected Semi-arid regions of Free State, South Africa Wondwossen, H., Ogundeji, A., Tesfuhune, W.</p> <p>Crop yield sensitivity to climate variability in South Africa Shoko, R.R., Chaminuka, P., Belete, A., Senyolo, M.P.</p> <p>Session 2c: Venue: Tusker Total factor productivity <i>Chair: Mr Bonani Nyhodo</i></p> <p>Total factor productivity on commercial dairy farms, and how it relates to sustainability Galloway, C., Conradie, B.</p> <p>Productivity Differentials of Tobacco and Non-Tobacco Farms in Uganda Namome, C., Conradie, B., van Walbeek, C., Leiman, T.</p> <p>Examining technical efficiency of commercial and smallholder tomato production: A Meta-frontier approach Gwebu, J., Matthews, N.</p> <p>Long Term Relationships in Agricultural Tractor Prices in South Africa amidst Technological Change Gandidzanwa, C.</p> <p>Session 2d: Venue: Leopard Cooperatives and rural development <i>Chair: Dr Jan Hlongwane</i></p> <p>The Role of Potato Seed Cooperative in Improving the Livelihood of Rural Households: The Case of East Harerghe, Ethiopia Fitawek, W.B., Legesse, B.</p> <p>The Role of Cooperatives in Empowering Smallholder Farmers to Access Markets. A Case Study of Eastern Cape and KwaZulu Natal Cooperatives in South Africa Mpuzu, S.M., Abyssinia, M.</p>



PROGRAMME 07

13:30	Session 2 of parallel contributed papers (5 sessions of 4 papers each) continued:
	<p>Determinants of efficiency of emerging farms: The case of wool in the Transkei/Ciskei and interventions by the National Wool Growers Association Gerwel, H., Conradie, B.</p> <p>Fostering inclusive rural development” International Fund for Agricultural Development, Rural Development Report 2016 Binswanger, H.</p> <p>Session 2e: Venue: Elephant</p> <p>Innovation <i>Chair: Prof Michael Aliber</i></p> <p>Analysing the cost-effectiveness of using Latrine Dehydrated and Pasteurization (“LaDePa”) agricultural pellets and struvite as new fertilizers: Experimental evidence for maize, wheat and sugarcane in KwaZulu-Natal, South Africa Chapeyama, B., Wale, E., Odindo, A.</p> <p>Would you purchase milk from a milk ATM? Consumers’ attitude as a key determinant of preference and purchase intentions Kataike, J., Butali, E., De Stuer, H., Mugenyi, A.R., Gellynck, X.</p> <p>Assessing the Impact of Biological Control of Maize Stemborers on Productivity and Poverty in Kenya using Continuous Treatment Regression Approach Midingoyi, S., Kassie, M., Affognon, H., Macharia, I., Ong’amo, G., LeRu, B.</p> <p>Rent Seeking Behaviour: Promoting Agricultural Consumption at the Expense of Productivity in South Africa Ngarava, S., Mushunje, A.</p>
16:00 - 17:30	Plenary session: Venue: Pelindaba
	<p>Agro-processing: The silver bullet for agricultural growth? <i>Chair: Lulama Ndibongo-Traub (University of Stellenbosch)</i></p> <ul style="list-style-type: none"> • A panel discussion between agricultural economists and representatives of DRLDR, AGBIZ, and others on Agri-parks. The panel will debate the pros and cons of the Agriparks idea based on basic agricultural economic realities and principles <p>Panellists:</p> <ul style="list-style-type: none"> • DDG Leona Archary and Chief Director Mr Clinton Heimann (DRDLR), • Andre Louw, (UP) • Thula Mkhabela, (Agribusiness Development Agency) • John Purchase (AGBIZ) • Tediso Molepo (Gauteng Department of Agriculture and Rural Dev) • Louise de Klerk (Timbali)
19:00 - 00:00	Gala Dinner and award ceremony Venue: Pelindaba



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Session: Upgraded contributed papers**Modeling Skewness of Crop Yield Distributions: Irrigated Maize as a Case Study**

Matthews, N., Grové, B.

Currently available stochastic linear plateau functions fail to accurately replicate observed crop yield skewness of input use. The main objective of this research is to explore a state contingent representation of risk with plateau type transformation functions to model skewness of nitrogen applications and to determine risk efficient fertilizer use. Modified Mitscherlich functions were found to fit state specific responses to nitrogen the best. The simplified approach of specifying a separate function for each production year capture changes in skewness of production under varying fertilizer application rates. Nitrogen fertilizer is classified as a risk reducing input with positive yield skewness at optimal levels of input use. The conclusion is that the state contingent approach to modeling crop yield skewness has potential. The sustainability of the approach to model skewness for datasets that include random effects of biotic factors such as pest and disease needs to be investigated.

Small-scale farming and food security: the enabling role of cash transfers in South Africa's former homelands

Von Fintel, D., Pienaar, L.

Cash transfers successfully alleviate poverty in many developing countries. South Africa is a case in point, implementing one of the largest unconditional cash transfer programmes internationally, and with substantial benefits to household well-being along multiple dimensions. Yet, grants discourage formal labour market attachment, creating dependencies on the fiscus. This study uses a fuzzy regression discontinuity design to establish that state-funded Old Age Pensions encourage non-market economic activity (in the form of small-scale farming), and improve the self-reported food security of rural households that farm, vis-à-vis those that do not. The role of small-scale farming is of broader interest in rural development, given the context of the 1913 and 1936 Land Acts that constrained this form of livelihood in former apartheid homelands. This paper's contribution is two-fold: grants are an effective channel to actively promote rural development through small-scale farming, and they improve food security by non-market mechanisms.

The catalytic effect of farmer networks on (honest) information sharing to inhibit the opportunistic behaviour of farmers

Van der Merwe, M., Trienekens, J.H.

Recent meat scandals, both in Europe (horse meat scandal) and in South Africa (donkey and water buffalo scandal), as well as news headlines such as "What's really on your plate?" communicates messages of misconduct in global meat supply chains. In the presence of asymmetric information and conflicting interests between two bounded rational individuals, misconduct in the form of opportunistic behaviour is bound to prevail. The differentiation of supply chains, by adding claims such as "free range" or from a specific "region of origin" ultimately increases the probability of opportunistic behaviour. The purpose of this study is twofold; firstly, to determine the factors that impact on a farmer's tendency to behave opportunistically, and secondly, to recommend strategies to eradicate opportunistic behaviour especially in differentiated meat supply chains. The PLS-SEM path modelling approach focuses on theory development and to suggest relationships between the hypothetical constructs by estimating path coefficients. The PLS-SEM results revealed a significant negative effect between information sharing and opportunistic behaviour, hinting at information sharing as a strategy to prevent the opportunistic behaviour of farmers.

Session 1a: Price transmission and economy wide effects**Spatial market integration and asymmetry in the Ethiopian maize market**

Yami, M., Meyer, F., Hassan, R.

This article investigates the performance of white maize wholesale grain markets in Ethiopia during the post-agricultural market liberalisation period from July 2004 to March 2016. Unlike previous studies on market integration in Ethiopia that form basis on conventional time series analysis, we examine the presence of structural breaks and asymmetric adjustment in the dynamic links among integrated maize market price pairs. Results from the Johansen tests indicates that out of 14 maize market pairs, long-run relationship is confirmed in 10 market pairs. Nevertheless, the conclusion for cointegration tests altered when breakpoints are considered in the analysis. The consideration of structural breaks in the price series results in the cointegration of all regional maize market pairs with the central maize market. Cointegration of all maize market pairs reflects better spatial maize market linkages in Ethiopia after the introduction of a



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Structural Adjustment Program (SAP). Not only spatial market integration has improved, but complete pass-through of price signals has also improved substantially with little evidence of asymmetric price transmission in the wholesale maize market in Ethiopia. It has been argued in this study that the recent surge in maize price in Ethiopia has little to do with asymmetric price transmission in maize market. However, further research is needed on this issue, government interventions in agricultural market through macroeconomic intervention of foreign exchange restriction and direct involvement in grain import could be blamed for the recent surge in maize price in Ethiopia.

Price Transmission in the Beef Value Chain – The Case of Bloemfontein, South Africa

Lombard, H.L., Ogundeji, A.A., Maré, F.A.

The deregulation of the South African agricultural market in 1996 led to an undisclosed difference between the producer and retail prices of beef, which raised concerns among producers. These concerns were caused by the possibility of asymmetry in the market. Producers believe that they were carrying all the risk and that retailers fixed their prices, irrespective of the market price at that stage. This study examines the price transmission mechanisms in the Bloemfontein beef market using the producer price (A2/A3) and retail prices at four retail outlets (S1, S2, S3 and B) collected over a period of 3 years. It further estimates the causality links between the producer and retail prices. The traditional (Engle-Granger) and standardized (Enders & Siklos) Augmented Dickey-Fuller procedures were used to test for co-integration and asymmetry in price transmission. Four competing models, namely, Engle-Granger, Threshold Autoregressive (TAR), Momentum Threshold Autoregressive (M-TAR), and Momentum Consistent TAR models were applied. The following results were found: asymmetric price transmission between producer and retail prices, the results on the flow of market information indicated that a flow of market information did exist in the markets of three of the four retailers. The price transmission relationship of two of the retailers are beneficial to the consumers, as the marketing margin declined over time, while the relationship of the other two retailers are detrimental to consumers.

Economy-Wide Effects of Drought on South African Agriculture: A CGE Analysis

Ntombela, S., Nyhodo, B., Ngqangweni, S., Phahlane, H., Lubinga, M.

The South African agricultural sector is comprised of field crops (e.g. maize, wheat, sugar, beans, barley, sorghum and oilseeds); horticulture (e.g. fruits, nuts, flowers and vegetables); and livestock (e.g. beef, poultry, game, sheep and others). Like in many high income developing countries, agriculture in South Africa accounts for a relatively low share in the economy, employment

and exports. In the South African context, agriculture contributes just below 3% to gross domestic product (GDP). Agriculture generated more than R144 billion in 2015 from foreign markets and supplied intermediate inputs to secondary industries. During 2015/16, South Africa experienced the worst drought in over 100 years, which has resulted in grievous effects on agriculture, with eight provinces being declared disaster areas. The need to understand the severity of drought on agriculture as well as on the economy as a whole is drawing attention from researchers and policy makers in the country. To better capture the effect of drought on agriculture in the broader economic contexts, a general equilibrium framework is adopted in this study. Four scenarios are analysed namely: impact on field crops only; impact on livestock only; impact on aggregated agriculture output; and impact on aggregated agriculture output plus impact of drought relief. It was found that all scenarios reflected a negative impact on aggregate GDP, employment and exports. In Scenario 4, drought relief was found to have saved some jobs, albeit not significantly. The overall conclusion from this study is that the 2015/16 drought has resulted in a significant negative impact in South Africa's economy.

Estimating the relationship between rainfall variability and performance of different agricultural sub-sectors in South Africa

Mdlulwa, Z., Masemola, M., Chaminuka, P.

Agriculture in South Africa can be disaggregated into three main subsectors; animal production, horticulture and field crops. The magnitude and timing of the drought's impact on the different subsectors therefore also differs. Notwithstanding the fact that supply and demand in these sub-sectors is not only affected by local factors, but also by global markets which interact with local markets through trade inflows and outflows, it is important to understand the effect of rainfall on the specific agricultural sub-sectors overtime. This study quantifies the long term (45 years) relationship between rainfall and the performance of different agricultural sub-sectors of the economy, as indicated by the percentage contribution to agricultural GDP of the sub-sectors. The data on contribution of field crops(FC), animal production (AP) and horticulture (HORT) sectors to the proportional agricultural GDP was obtained from the South African Abstract of Agricultural Statistics published annually by the Department of Agriculture, Forestry and Fisheries (DAFF). Rainfall data was obtained from (SAWS). ARIMA models that can be used to analyse these relationships and forecast the sub-sector contribution to GDP are explored, developed and tested. Diagnostic tests for specification error, serial correlation, and heteroscedasticity were performed on the models. The study concludes that the nature of the relationship of the different sub-sectors with rainfall differs and hence aggregated analyses might generalise findings that do not apply to specific sub-sectors.

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Session 1b: Agribusiness and farming businesses**An essay on fragility in agribusiness value chains: A novel perspective on system coordination challenges**

Jordaan, D., Kirsten, J.F., D'Haese, M.

Contemporary agricultural value chains are being organized in ways that are lean and efficient. As a result the agricultural chains have become progressively integrated with greater levels of interdependency across the system. However, increasing interdependency through more tightly aligned coordination introduces new and less concrete risks to chains and makes the system fragile. Accelerating effects in response to disturbances in the chain are the obvious symptoms of this fragility which are topical issues in the agribusiness system while these are not properly defined nor sufficiently understood.

This paper positions the concept of fragility in the landscape of agribusiness research and also develops a framework to assess fragility across all actors in the value chain. Using a filtering process and expert opinions from red meat, fruit and mohair value chains a set of theoretical factors is reduced to an operational, empirically refined and reliable group of factors to assess value chain fragility. The result confirms that elements which make a chain perform are also what a chain is vulnerable to.

Fragility provides a novel perspective on disturbances and their consequences in value chains and provides a fresh approach to managing and studying disturbances in the chain. The framework developed in this paper specifically enables the analysis of the fragility of chains. This ultimately allows for a number of academic and management trajectories to develop including measuring fragility, analysing the trade-off between chain performance and chain fragility, value chain coordination, strategic planning, risk management, etc.

Measuring the competitive performance of the South African stone fruit industry

Boonzaaier, J., Van Rooyen, J.

The aim of the study is to enquire about the global competitive performance of the South African stone fruit industry for the period 1961 - 2012. A five-step analytical framework was applied, using approaches by Balassa (revealed comparative advantage, RCA), Vollrath (relative trade advantage, RTA) and the Porter Diamond Model, together with statistical methods such as cluster analyses and principle component analyses to reflect differences in stakeholder opinions and views within the value chain. South African stone fruit was found to perform consistently at high, but fluctuating competitive levels in highly contested global markets (RTA values of between 0.41 and 5.61 since 1961); particularly since the economic deregulation of the

industry in the mid 1990's. A strategic planning framework was drafted with participation from key industry role-players, identifying eleven industry level strategic focus areas. These included improved strategic communication within the value chain and improved industry intelligence systems.

To process or not to process: An investigation of the contribution of processed and unprocessed agricultural exports to economic growth in South Africa

Mlambo, C., Mukarumbwa, P., Megbowon, E.

The paper attempts to empirically test the contribution of unprocessed and processed agriculture of exports to economic growth. The study used time series data which spanned from 1986 to 2012. A Johansen cointegration approach was used to test for cointegration after the unit root tests had shown that all variables were non stationary at levels. Cointegration results showed that there was one cointegrating equation. Subsequently, a VECM was used as the estimation technique. The study found that processed agricultural exports have a positive relationship with economic growth whereas unprocessed agricultural exports have a negative relationship with economic growth. This shows that manufactured agricultural exports contribute significantly to economic growth. The study recommends that the South African government should promote and stimulate investment in the processed agricultural commodities sector. There should be more production and expansion in the manufacture agricultural commodities sector. Processed manufactured goods usually are sold at a much higher price and this may generate more income for South African firms.

Ways of Farming: Exploring the Advantages and Disadvantages of Family Farming Versus Non-Family Farms within South Africa's Smallholder Sector

Aliber, M., Antwi, M., Mdhuli, D.

'Family farming' came into the policy spotlight in the 1990s largely due to policy developments in Brazil. From there international attention to family farming grew, culminating in the United Nations declaring 2014 as the International Year of Family Farming. The paper explores the relevance of the concept of 'family farming' to South Africa's smallholder sector. It does this in large part through qualitative research involving family farms and 'non-family farms' in Eastern Cape, North West and Mpumalanga, wherein 'non-family farms' include both smallholders who farm mainly with hired labour, and group projects. The evidence suggests that rural households generally dislike group projects, but see them as a strategic means of accessing government support. Family farmers tend to rely on family labour because of cash-flow constraints and/or because they regard family labour



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as more reliable and trustworthy; however, some family farmers perceive family labour to be unreliable. Smallholders who rely mainly on hired labour, in some cases do so for lack of family labour, but more often out of preference, in that they find hired workers more reliable and manageable. The findings sit uneasily with the body of thought which suggests that reliance on family labour makes small-scale farmers more efficient.

Session 1c: Smallholder production and farming systems

Determinants of Household Participation in Agricultural Production in Mpumalanga Province, South Africa: A Double Hurdle Approach

Mathebula, J., Chaminuka, P., Muchopa, C.

Household labour allocation decisions in developing economies are dynamic and influenced by both internal household factors as well as external local economy factors. Such decisions when aggregated, can have an impact on the growth and development of agriculture in rural areas and household livelihoods. This study examined factors influencing household participation in agricultural activities, and the subsequent amount of time allocated by households to agricultural production in Shatale Region of Mpumalanga Province, South Africa. Primary data was obtained from 86 households in the region sampled through multi-stage random sampling procedures. The double hurdle model comprising a probit and truncated regression model was employed in the analysis of socio-economic factors influencing the participation and time allocation decisions respectively. The results of the first hurdle illustrated that gender of the household head, level of education, occupation, farming experience, land size, access to irrigation water and extension service influenced household participation in agricultural production. In the second hurdle, marital status of the household head, land size, farming experience and access to irrigation water influenced the amount of time allocated in agricultural production. The results show that the decision to participate in agriculture by a household is not influenced by the same factors that influence the number of hours allocated to agricultural activities per week.

Homestead garden in South Africa: policy implication for food security and sustainable development

Tlalang, B.E., Bahta, Y.T., Donkor, E., Mokhatla, P.

This paper has determined the impact of homestead garden programme on food security status among 500 rural farmers in Gauteng Province of South Africa. Household food insecurity average score index was employed to measure the food security status among rural farmers. A two-stage probit model was used to estimate the impact of homestead garden on food security. Food security level appears to be low in South Africa.

However, implementation of homestead garden programme tended to contribute significantly to promoting food security. Furthermore, household characteristics and capital resource endowment significantly influenced homestead garden programme participation. We recommend that policy measures should gear towards promoting high participation in homestead garden programme so as to address food security issues in rural economy and promoting food security through homestead garden is a sustainable strategy to achieve the post 2015 development agenda (2030 agenda - succeed the Millennium Development Goals) for sustainable development goals targets ending poverty and hunger.

An economic evaluation of the National Red Meat Development Programme in the Eastern Cape Province, South Africa

Fakudze, B.D., Kirsten, J.F., Ngqangweni, S.

The National Red Meat Development Programme (NRMDP) was established with the aim of improving income from animal husbandry and to create opportunities for communal farmers to commercialise, as well as participate in the formal markets. This article, therefore, sought to establish if the NRMDP is a relevant solution in linking communal farmers to formal markets and to assess the factors that contribute to improved market participation of communal farmers as a result of the NRMDP. The off-take rate has increased after the implementation of the NRMDP from 5 % to an approximated average of 12.5 %. An Ordinary Least Squares (OLS) model was applied within the transaction costs framework. The following variables were statistically significant: access to market extension services, education level, stock size, participating in the NRMDP and distance to market. The conceptual and empirical evidence suggests that farmers participating in the NRMDP are aware of the requirements of the market, and that they produce high-value products and comply by delivering cattle of good quality. Nevertheless, there are some hurdles that influence participation of communal farmers in high-value markets. To improve the impact of the programme, it was recommended that such programmes should be aligned with other initiatives implemented by government to maximise formal market participation and prevent duplication of similar programmes.

Determinants of Livelihood Strategies among Households in Smallholder Farming Systems: A Case of Kwazulu-Natal, South Africa

Yobe, C.L., Mudhara, M., Mafongoya, P.

This paper identified the factors influencing the choice of livelihood strategies among smallholder farmers in South Africa. Four hundred rural households from Umzimkhulu and Ndwedwe local municipalities of KwaZulu-Natal province were randomly selected and interviewed. The multivariate analytical approach which employs the use of Principal Component Analysis (PCA) and K-means cluster analysis was used. PCA was applied on dummy variables of livelihood activity participation. Rotated

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factor loading from PCA served as input into the K-means cluster analysis. K-means clusters were considered as livelihood strategy choices at the household level. The multinomial logistic (MNL) regression was applied to outcomes of K-means cluster analysis to determine the factors influencing households' livelihood choices. The results indicate that household heads' years of formal education, household size, dependency ratio, arable dryland area accessed by the household, savings, location of the household and the source of agricultural information are the main determinants of livelihood choice.

Session 1d: Water, irrigation and production

Smallholder Irrigation and Rural Livelihoods in Limpopo Province of South Africa: What is the Contribution to Household Food Security and Income?

Moyo, T., Machethe, C.L.

Smallholder irrigation farming is potentially transformative to poor communities. This paper examines the contribution of smallholder irrigation farming to household income and food security of rural households in Limpopo Province of South Africa. The study involved comparing livelihoods of irrigation and non-irrigation households. Data analysis employed semi-parametric propensity score matching methods. The results provide sufficient evidence that smallholder irrigation farming makes a significant contribution to rural livelihoods through its effect on household income and food security. This provides a strong motivation for continued investment in smallholder irrigation farming as part of a strategy to grow the rural economy and improve rural livelihoods, in support of the National Development Plan of South Africa. The contribution of smallholder irrigation farming to rural livelihoods can be further enhanced by implementing policies that promote female participation in irrigation farming, equip farmers with entrepreneurial skills, and facilitate farmers' membership of associations. The study contributes further knowledge on the importance of smallholder farming to rural livelihoods, which is at the core of the African development debate.

Quantifying the water savings benefit of water hyacinth (*Eichhornia crassipes*) control in the Vaalharts Irrigation Scheme

Arp, R.S., Fraser, G.C.G., Hill, M.P.

Global fresh water resources are threatened by a growing population and continued economic development, highlighting the need for sustainable water management. Invasive alien plants pose a particular problem for water scarce countries and South Africa is not immune to this global phenomenon. Water hyacinth (*Eichhornia crassipes*) presents a direct threat to economically productive water resources, such as irrigation water.

Through high levels of evapotranspiration, water hyacinth leads to substantial water losses that could otherwise be used productively, thereby creating an externality on irrigation fed agriculture. This study provides an economic valuation of the benefits of water hyacinth control, using Warrenton Weir on the Vaalharts Irrigation Scheme as a case study. A Residual Value Method was employed to estimate the average production value of irrigation water, to serve as a proxy for the value of water lost via evapotranspiration by water hyacinth. Three evapotranspiration to evaporation ratios at three levels of invasion were used to estimate the annual water loss at Warrenton Weir. The average production value of irrigation water was estimated to be R38.71/m³, which translated into an annual opportunity cost of water loss of between R1.18 billion and R54 million. The research highlights the need for invasive plant control, particularly in economically productive water resources. Alien plant control policy should prioritise invasions of this nature, as they present significant costs to the economy and threaten the sustainability of fresh water resources.

Explaining irrigation water use productivity using psychological capital: case studies from small producers in Ndumo B and Makhathini irrigation schemes, KwaZulu-Natal, South Africa

Phakathi, S., Wale, E.

This study investigates water use productivity and value of water among farmer's typologies in Makhathini and Ndumo areas using a sample size of 81 scheme irrigators (60 and 21 from Makhathini and Ndumo B respectively), 36 independent irrigators, 18 home gardeners and 13 community gardeners. It further assesses how psychological capital and other factors affect productivity. The intergration of psychological capital is meant to explain the individual mind-set that induces or hinders individual initiatives to take advantages of opportunities available in small-scale irrigation farming. We apply the residual valuation method (RMV) to evaluate water values, principal component analysis (PCA) to generate the psychological capital composite index and the general linear model to investigate factors affecting water values. The results from residual valuation method indicated that scheme irrigators achieved the highest water value of ZAR11.42/m³ in cabbage production while community gardeners, independent irrigators, and home gardeners had the highest water values for tomato enterprise at ZAR12.95/m³, ZAR11.03/m³, and ZAR0.85/m³, respectively. The results from general linear model indicated that the type of farmer, irrigation technology, farming experience, the main occupation of a farmer, and psychological capital index significantly influenced variation in water values. The results showed the importance of psychological capital in the success of smallholder irrigation farming. Farmers with positive psychological capital were found to be more persistent and productive despite prevailing constraints and challenges while those with negative psychological capital had developed dependency syndrome, expecting the government to do everything for them. It is recommended that farmers should have mentors,



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where experienced, established, industrious and resourceful farmers mentor young farmers. The mentorship program will help in building positive mind-set along with various training programs that can be offered to small-scale farmers.

Accounting for heterogeneity in small-scale irrigation farming: Implications for entrepreneurial development, KwaZulu-Natal, South Africa

Chipfupa, U., Wale, E.

Improving the performance of small-scale irrigation is complicated by farmer heterogeneity due to differences in livelihood resources and the ability to utilize opportunities in the sector. Understanding heterogeneity of small-scale farmers can inform on-farm entrepreneurship development. Using a combination of PCA and cluster analysis the study sought to develop farmer typologies for small farmers operating in and around Ndumo-B and Makhathini irrigation schemes. The findings are used to develop pathways to on-farm entrepreneurship, among small-scale irrigators in South Africa. The research uniquely integrates psychological capital to the study of farmer typology, to capture salient features of a farmer, otherwise missed by the generic Sustainable Livelihoods Framework. The study identifies six farmer typologies and concludes that heterogeneity among small-scale irrigation farmers has to be accounted for in future interventions. Agricultural policies, development interventions and extension services have to be tailor-made if they are to achieve the desired impact. Entrepreneurial skills development, increasing farmer's participation in high-value markets, access to credit, water access, intensive crop production and integration of crop and livestock enterprises are important aspects of focus for entrepreneurship transformation in South Africa's smallholder sector. The study also recommends that psychological capital should be made a priority area of focus for research and policy.

Session 1e: Finance and economic performance

Classification Accuracy of Logistic Regression and Neural Networks: The Case of a South African Agricultural Credit Provider

Bougard, D.A., Henning, J.I.F., Jordaan, H., Matthews, N.

The main objective of this study was to compare the classification capabilities of logistic regression and neural network in the agricultural sector. The study was conducted in South Africa, with the use of a scenario where a financial organisation provided the necessary credit application data with decisions. Logistic regression and neural network were used to construct the credit scoring models that can be used to classify credit applications in the agricultural sector. A principal component regression (PCR) was used to reduce multi-collinearity and to reduce the number of variables in the application of the logistic regression. The logistic regression

results indicated that the variations in 15 variables are significant ($p < 10\%$) in explaining the variation in the outcome of the credit application. Results indicated that the variation in the following variables have an impact on the classification: amount, business with bank, account standings, credit history, collateral, production costs, interest expense, number of enterprises on the farm (diverse two, diverse three and more), owner, age, experience and, lastly education level (no education, post graduate and no indication). The results from the neural network are not easily interpretable to identify the variables that have an influence on the predicted outcome. The neural network did however outperform the logistic regression procedure in the accuracy of the classifications in terms of higher percentage correctly predicted overall and a lower percentage of Type II error classifications. Logistic regression has an overall classification percentage of 93% and 5.5% in classifying Type II errors compared to the overall classification of the neural network at 99.22% and 0.78% in classifying Type II errors. The main conclusion from this research is that the statistical methods are able to classify credit applications in the agricultural sector. Further research is however needed to ensure the correct model and variables are included in the classification and the classification results of the models are tested and monitored over a period of time to ensure the accuracy and prediction are acceptable according to the financial organisations.

Entrepreneurial Competencies and Financial Performance of Farmers in South Africa

Nieuwoudt, S., Henning, J.I.F., Jordaan, H.

The main objective of this study was to explore the relationship between the entrepreneurial competencies of farmers and their financial performance. The study was conducted in South Africa, on the clients, consisting of farmers, of a commercial financial organisation. The financial performance of the farmers was calculated by means of financial ratios which then were used to compile a single performance indicator, operating efficiency. The operating efficiency indicator was calculated using a financial based Data Envelopment Analysis (DEA). The entrepreneurial competencies instrument of Man (2001) was used to measure the entrepreneurial competencies of the farmers. Ordinary Least Squares (OLS) regression was used within the Principal Component Regression (PCR) framework to explore the relationship between entrepreneurial competencies and financial performance. The results indicated there is a positive relationship between entrepreneurial competencies and financial performance of farmers. Each of the individual competencies also indicated positive correlation between the entrepreneurial competencies and financial performance. Therefore, an increase in a specific entrepreneurial competencies behaviour may increase the operating efficiency of the farm. Educational opportunities exist to educate farmers on the potential benefits of using their entrepreneurial behaviour to their advantage (to benefit their operating efficiency). Sectors involved with agricultural, for example agricultural advisors, financial advisors and educational institutes, should emphasize the importance of utilising the competencies of farmers.

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A comparative analysis of rural and urban household savings behavior in South Africa

Chimeri, R.H., Chaminuka, P., Muchopa, C.L.

The study focuses on comparing rural and urban household savings behaviour in South Africa, using household data from the Income and Expenditure Survey (IES) for the period 2010/2011. The dynamic linear saving functions originating from the Absolute Income and Permanent Income Hypotheses were estimated separately for the different household types using the Ordinary Least Squares (OLS) method. Thereafter, panel data analysis was carried out by pooling together the cross-sectional household types over the twelve-month period. The study established that urban households earn higher incomes and have more average savings than rural households in South Africa. A positive significant relationship was found to exist between current saving decisions and income across all household types in South Africa. Another interesting finding was that rural households have more marginal saving rates than urban households in the short-term and in the long-run. The Fixed Effects Model was deemed to be the best estimator in estimating saving functions across all household types in South Africa, as validated by the Hausman and Redundant Fixed Effects tests. Policy-wise, this paper recommends increased support in agriculture, extension of the provision of food and health subsidies to rural and more vulnerable households in South Africa.

Community Perceptions and Attitudes towards Integrated Wildlife/Livestock Land-Uses: The Case of Greater-Giyani Rural Communities, Limpopo Province

Baloi, V.A., Chaminuka, P.

Livestock production in South Africa is faced by a myriad of challenges which have drawn interest towards wildlife-based land-use practices as an alternative to livestock production. Wildlife-based land-uses are not vulnerable to problems such as stock theft and high disease mortality and have potential to generate incomes and create employment for communities in wildlife rich areas. However, problems such as human-wildlife conflict, livestock depredation and crop destruction have been identified in wildlife rich areas. This study investigated perceptions of rural households living in areas adjacent to the Kruger National Park (KNP) regarding integrated wildlife/livestock land-use practices. Data were collected from 130 households in nine villages. Respondents were stratified into cattle owning households and non-cattle owning households, to determine differences in perception towards wildlife. Results from multinomial regression indicated that demographic and socio-economic factors such as age, gender, education, occupation, marital status, monthly income and cattle ownership had a significant impact in distinguishing between pairs of groups and the odds of being in one dependent variable group rather than the other. Most of the households showed interest in participating in wildlife-based land-uses irrespective of whether or not they own cattle. Of

those household that indicated dislike of the proposed land-use practice, most were practicing cattle and crop production, as they perceived wild animals to be a threat to agricultural production. The negative perceptions, can however, be managed if benefits to households and community are clearly defined and compensation for losses from wildlife is made a priority.

Session 2a: Investment in the agriculture and agribusiness chain**Between Promise and Profit: Chinese Agro-Investment and the Challenges of Operating in South Africa**

Harding, A., Jiang, L., Anseeuw, W., Alden, C.

This article examines the new wave of Chinese agro-investments in South Africa, against the backdrop of new investments into previously 'untouched' regions across the continent. This is particularly relevant due to the increased foreign investments in the country over the last couple of years in a sector that is regarded as especially sensitive. Four investments were analysed- South Africa-China Agricultural Technology Demonstration Centre, Chinese Pomelo project, Chinese Dairy farm and the Val de Vie Wine farm. Our article describes the projects, assessing them in the framework of South Africa's agrarian evolution and analyses them in the framework of broader agro-investment dynamics on the rest of the continent. These projects not only reflect the differing dynamics and practicalities occurring on the ground in Chinese agro-investments more generally, they also highlight the distinctive features of the South African context and its

An analysis of the security and transferability of land tenure as a critical institution towards ensuring food security: A Principal Component Analysis of developing countries on the African continent

Du Preez, R., Scheepers, D., Jansen van Vuuren, A.

The topic of land ownership is not a new debate to the world and has been fought for centuries across most of the globe, including countries today considered to be developed economies. South Africa is lately also no stranger to this debate as issues of land ownership regularly features on the political agendas of local politicians. A couple of major differences between the land ownership struggles of centuries ago vs modern times is, firstly, the availability of data, literature and case studies which now allows for the execution of informed decisions as opposed to social experiments and thus demands accountability from the policymakers. An additional complexity and pressure making correct land policy essential is the ever increasing pressure on food security, increasing populations, increasing land scarcity and the necessity of especially developing countries to become food independent. Independence is hardly independence if a country is dependent on others to feed it. This paper will identify and discuss the relevance of long-term security and transferability of land as an institution



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to explain the largest amount of variation in food security in the western, eastern and southern parts of Africa.

This paper gives a literature overview of New Institutional Economics to contextualise Property Rights Theory, its significance in creating adequate land tenure systems and food security. This study performed a variable reduction technique to provide valuable insight into understanding the most influential variables that explain the highest variation in food security.

Amongst its results this study will show Zimbabwe, Chad and Burkina Faso to be characterised by the poorest scores for the Global Food Security Index (GFSI) indicator as well as being the lowest scoring for the indicators related to the security and free transferability of land. In contrast Morocco, which has scored the highest for food security also has the most amount of agricultural land registered under free-hold title.

Framing the future: Using the five capitals to structure 'hybrid' scenario analysis in the context of sustainable development

Davenport, M.L., Delport, M., Hichert, T., Blignaut, J.N., van der Burgh, G.

Researchers have increasingly acknowledged the relative strength of 'hybrid' approaches to scenario analysis for exploring the futures of coupled human-nature systems. However, a major weakness of hybrid scenario analysis relates the conversion of linguistic assumptions embedded in narrative storylines to quantitative inputs for numerical modelling. Although a number of innovative protocols have been proposed to overcome the conversion problem in hybrid scenario analysis, these methods tend to downplay the importance of 'soft' (i.e. intangible, difficult-to-quantify) drivers and have demanding technical and time requirements which are impractical for resource-constrained government agencies, researchers, decision-makers etc. working in the crucial, but challenging, domain of sustainable development. In this paper, we explain, demonstrate and evaluate the usefulness of a simple analytical framework, based on five categories of capital assets, as part of a protocol for overcoming the conversion problem in hybrid scenario analysis. Based on a preliminary application of the framework to a case study in South Africa, we suggest that the five capitals framework has the potential to improve the expedience and counter the bias against 'soft' drivers in hybrid approaches to scenario analysis. However, in light of the methodological trade-off between rigour and expedience, we suggest that future research needs to compare the available protocols for hybrid scenario analysis by weighing up the relative gain in scenario quality versus the relative cost of scenario construction.

Agricultural Labour during Apartheid, the Story of Maize?

Greyling, J., Liebenberg, F., Vink, N.

South African agricultural employment increased from just over 0.8 million

persons immediately after the Second World War to peak at around 1.8 million by the early 1960s, but showed a continued decline thereafter to reach a low of just over 1.1 million workers by the end of Apartheid in 1994. There is a striking consensus in the literature that this trend was the result of structural change within the field crop sector, specifically maize, where capital and labour acted as compliments before the 1970s and substitutes thereafter. This study presents a disaggregated perspective on employment during Apartheid (1948-1994) through newly constructed district level panel constructed from the annual Censuses of Commercial Agriculture. This panel consisting of more than 250 districts disaggregates employment and wages by worker type and demography. This panel also corrects previously and newly identified challenges with seasonal employment numbers. Our results show that the aggregated narrative conceals specific regional differences and we find that changes post 1970 was systemic but with the maize industry making a substantial, but declining, contribution in driving the macro trend. This follows from the relative decline of maize sector as a result of the growing importance of export orientated labour intensive crops and livestock. We also show that the continued increase real wages in the rest of the economy acted as an important pull factor of agricultural labour from the sector.

Session 2b: Environment

Influence of Governance Institutions on Households' Willingness To Pay for Improved Solid Waste Management in the Peri-Urban Settlements Of Matsapha, Swaziland

Ndlovu, N.

This study uses double-bounded willingness to pay (WTP) bid elicitation format to test whether the institution providing improved solid waste management (SWM) services in the Matsapha peri-urban area of Swaziland significantly influences households' WTP. The WTP for improved SWM by households was thus elicited and compared when the service provider was an independent public agency (Matsapha Town Council), a traditional community development agency (Kwaluseni Inkhundla), and a private contractor. Mean WTP for improved SWM was highest when the service provider was the Matsapha Town Council (mean E47.71) followed by the private contractor (mean E43.71) and finally, the Kwaluseni Inkhundla (mean E36.49). Additional analysis showed that the mean WTP did not statistically differ when the SWM service was provided by the Matsapha Town Council or the private contractor ($t = 1.52, p = 0.1331$), which was unexpected, given that the latter is generally viewed as more efficient and cost effective. Mean WTP was, however, significantly higher when the service provider was the Matsapha Town Council, in comparison with the Kwaluseni Inkhundla ($t = 4.28, p = 0.0001$). Finally, the mean WTP was significantly higher when the service provider was the private contractor, in comparison with the

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Kwaluseni Inkhundla ($t = 2.90$, $p = 0.0053$). This allows us to conclude that the institution providing improved SWM services significantly influences households WTP, and that households rank the Matsapha Town Council as the most-preferred service provider.

Influence of governance institutions on households' willingness-to-pay for wetland resources conservation in khalong-la-lithunya wetland area, Lesotho

Jacob, G.

This study uses the double-bounded bid elicitation format to estimate how much households in the Khalong-la-Lithunya wetland area (KWA) would be WTP (on top of monthly water bills) for wetland resource conservation, and test whether WTP significantly varies with the institution responsible for its conservation management. KWA was purposely selected on account of the critically important role it plays in securing water provisioning ecosystem services; a role that is currently threatened by proximate and ultimate factors hypothesised to be driven by its unrecognised economic value. Purposive and simple random sampling methods were used to collect survey data from 204 households. WTP was thus elicited and compared when the governance institution was (i) the Ministry of Natural Resources, and (ii) a private environmental conservation agency that is currently active in Lesotho i.e. the Transformation Resource Centre (TRC). Mean WTP was M78.80 per household per month (UB M92.89 and LB M38.21) when the Ministry of Natural Resources was responsible for conservation management in KWA (equivalent to M 0.011 per litre or M0.21 per 20 litre jerry can), and M83.09 per household per month (UB M98.00 and LB M32.94) when TRC was responsible for conservation management in KWA (equivalent to M0.011 per litre or M0.22 per 20 litre jerry can). The null hypothesis of equality of the two mean WTP values was rejected at the 1% level ($t = 4.34$ and $p = 0.000$), suggesting that institution responsible for conservation management in KWA significantly influences households' WTP.

Assessing Economic Milk Production Losses in a changing climate: Case Study in three selected Semi-arid regions of Free State, South Africa

Wondwossen, H., Ogundeji, A., Tesfahun, W.

Dairy cows are sensitive to increasing temperature and humidity which affects their feed intake and automatically impact milk production. Using a climate data from the year 1950 to 1999 and a downscaled climate data (2040-2070), milk production loss were estimated for dairy cows in the Free State, South Africa. Bloemfontein, Bothaville and Bethlehem were used as sample regions from Free State. The study looks at two Temperature Humidity Index thresholds of 70 and 65. Taking present time prices it was found that with a THIthreshold of 70, Bloemfontein, Bothaville

and Bethlehem respectively incur a loss of 17 cents, 16 and 2 cents per cow/day on average. While for a THIthreshold of 65, milk production loss showed an increase amounting to 60, 50 and 17 cents per cow/day on average. For the mid-century data with a THIthreshold of 70 Bloemfontein incurs a loss of 42 cents per cow a day. While for a 65 THIthreshold we found a loss of R2.18 per day/cow. In case of Bothaville with a THIthreshold of 70 it was estimated that a milk production loss per cow to be 11 cents per cow/day, while for a threshold of 65 it would incur a loss of R3.47 per cow/day. This is an indication that dairy cows are sensitive to heat stress but the effect on future production can be greatly reduced through appropriate adaptation strategies.

Crop yield sensitivity to climate variability in South Africa

Shoko, R.R., Chaminuka, P., Belete, A., Senyolo, M.P.

Climate affects crop production decisions and outcomes in agriculture. From very short-term decisions about which crops to grow, when to plant or harvest a field, to longer term decisions about farm investment, climate can positively or negatively affect agricultural systems. Although the general effects of climate change on agriculture are broadly understood, there are limited studies that model the relationship between specific crops and climate variables. The main objective of the paper is to analyse the sensitivity of maize yield to rainfall changes and fertiliser usage. The paper uses time-series data of 33 observations spanning from 1980 to 2013. The analysis reveals that there is a positive relationship between maize yields and rainfall and between fertiliser usage and maize yield in the long run. In the long run, a 1% increase in rainfall will lead to an increase in maize yields of up to 63%, whereas an increase in fertiliser usage of 1% will lead to an increase in maize yields of 35%. Short run elasticities are much lower at 45.2% for rainfall and 26.2% for fertiliser usage. These findings are important in exploring solutions for mitigating the effects of climate change on maize production, and in cushioning agricultural production against high input costs caused by the depreciation of the rand.

Session 2c: Total factor productivity

Total factor productivity on commercial dairy farms, and how it relates to sustainability

Galloway, C., Conradie, B.

Data Envelopment Analysis was used to estimate technical efficiency on commercial pasture-based dairy farms in the Eastern Cape, South Africa. A large amount, 35% of the 63 firms, was found to be fully efficient. The mean variable-returns-to-scale technical efficiency across the 63 firms was 0.885. The partial measures of efficiency identified which have the greatest



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influence on technical efficiency are stocking rate (cows in milk per hectare) and milk production per area (litres per hectare). The amount of concentrate feed fed relative to milk production (megajoules of concentrate per litre of milk) also influenced efficiency. No environmental or demographic factors seemed to greatly influence technical efficiency on the farms included in the study. Sustainable agriculture includes the aim to produce sufficient food on the available agricultural land without negatively impacting the environment. The implementation of the most efficient pasture-based system, as identified through this study, will contribute to this goal.

Productivity Differentials of Tobacco and Non-Tobacco Farms in Uganda

Namome, C., Conradie, B., van Walbeek, C., Leiman, T.

Data envelopment analysis (DEA) is used to determine productivity differentials in tobacco and other crops farming systems in the West Region of Uganda, with data from the 2014 farming season. An input oriented variable returns to scale frontier is used to estimate productivity, technical and scale efficiencies and further identifies their determinants. The mean pure technical and scale efficiencies were found to be different between tobacco and other farming systems, however, overall efficiency was the same. Tobacco farms are scale efficient whereas non-tobacco farms are more technically efficient. The Tobit regression revealed that education, membership to farmer groups and extension services were the significant determinants of technical and scale efficiencies. Non-tobacco farms were strongly correlated with productivity.

Examining technical efficiency of commercial and smallholder tomato production: A Meta-frontier approach

Gwebu, J., Matthews, N.

Despite the efforts of the South African smallholder development policy to motivate and enable smallholder farmers to progress from subsistence farming to commercial producers, the smallholder producers' still experience problems in progressing into the commercial market. This paper aims to address the lack of movement to the commercial market by first determining the level of technical efficiency for the smallholder and commercial tomato producers in the Nkomazi area in South Africa. Group frontiers and a meta-frontier are estimated using an output-orientated DEA before the estimated efficiency scores are used to determine the technology gap ratios for the producers. Using the estimated technology gap ratios a tobit model is used to identify factors that could affect the producers ability to produce on the meta-technology. Results indicate that the smallholder farmers and commercial farmers are fairly efficient, however, the commercial farmers are closer to the meta-frontier with a average technology gap ratio of 99% while the average technology gap ratio for the smallholder farmers is 63%.

The results from the tobit regression indicate that farmers who specialise and use inorganic fertilisers, timely weeding and pesticides and fungicides are more likely to be on the meta-frontier.

Long Term Relationships in Agricultural Tractor Prices in South Africa amidst Technological Change

Gandidzanwa, C., Liebenberg, F., Kirsten, J.

Prices play an important role in giving market information. As such prices are instrumental in establishing market relationships within the same market and in other markets. The tractor market in South Africa is characterised by a wide range of manufacturers as well as differentiated tractors in terms of quality and power size. In farm decision making a tractor power size that is appropriate to the farm requirements has to be made. These decisions involve making a choice of one power category as opposed to the other, with a price consideration made. Invoking the cointegration test indicates that there exist a long-run relationship among the disaggregated price series between and among the different power categories of tractors below 150kw. An error correction model reveals that the speed of adjustment to the equilibrium is faster among the 4-wheel drive tractor compared to the 2-wheel drive categories.

Session 2d: Water, irrigation and production

The Role of Potato Seed Cooperative in Improving the Livelihood of Rural Households: The Case of East Hareghe, Ethiopia

Fitawek, W.B., Legesse, B.

Cooperatives are the best institutional intervention for improving income and attaining food security in any country. Agricultural Cooperatives help their members to increase their yield and incomes by pooling their resource to support collective service provisions and economic empowerment. This study provides empirical evidences of the impact of potato seed production cooperatives in the study area. The study has used cross-sectional data (both primary and secondary data). Primary data were collected from the sample of 172 households (82 from Haramaya and 90 from Kersa) from both members of the potato seed cooperative and non-member. Both descriptive statistics and econometric model were applied for data analysis. A propensity score matching method was used to evaluate the impact of potato seed production cooperative on household income, expenditure and asset. The evaluation result revealed that member of potato seed production cooperative have got higher income from crop production, total annual income and asset holdings amounting to Birr 29,006, 33,901 and 47,768 respectively and also spent Birr 11,728 more than non-member households. Finally, results showed that membership to potato seed cooperative are

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found to have a positive and significant on livelihood indicators. The impact estimates were found to be insensitive to unobserved selection bias for significant outcome variables.

The Role of Cooperatives in Empowering Smallholder Farmers to Access Markets. A Case Study of Eastern Cape and KwaZulu Natal Cooperatives in South Africa

Mpuzu, S.M., Abyssinia, M.

Smallholder farmers can benefit from market-oriented agriculture when they get support from various institutions and operate in organized groups such as cooperatives. Cooperatives have the potential to penetrate high value markets or better paying markets to improve their living standards. However, agricultural cooperatives often face a number of challenges in accessing better paying markets arising in part from the institutional factors and the emergence of complex supply chains in agriculture. Collective action has the potential to reduce transaction costs and improve bargaining power of farmers vis-a-vis the market. The objective of this paper was to evaluate the probability for South African agricultural cooperative to engage in collective marketing activities over time, given market and institutional characteristics. Using a sample of 89 agricultural cooperatives from the Eastern Cape and KwaZulu Natal Provinces in South Africa, the analysis suggests that collective marketing faces challenges related to increasing competition. Empirical results also suggest that among South African cooperatives, those established in KwaZulu Natal and partly in the Eastern Cape Provinces and upon the voluntary initiative of farmers are more sustainable and have access to better paying markets. The results also show that Non-Governmental Organizations supported cooperatives have a longer life span than Government controlled cooperatives.

Determinants of efficiency of emerging farms: The case of wool in the Transkei/Ciskei and interventions by the National Wool Growers Association

Gerwel, H., Conradie, B.

This paper fitted a non-parametric production function to the pooled data from livestock producers in the former homelands of Transkei and Ciskei in the Eastern Cape Province of South Africa, using Data Envelopment Analysis. Four benchmark producers were identified and the group was divided into top, middle and bottom thirds according to efficiency performances. The top most efficient producers were significantly more overall efficient, with a mean efficiency score of 0.898; the middle group had an overall efficiency mean of 0.411 and the bottom third a very low mean of 0.175. These results are important, as they highlight the how industry level interventions can assist in achieving the country's land reform targets and address the many years of neglect the former homelands have suffered in terms of

fostering competitive and potentially lucrative farming operations in these areas. Further work should interrogate whether convergence occurs with commercial farming regions adjacent to the producers in the sample and how technological and institutional innovation can be promoted through similar cooperation between emerging farmers and other industry associations.

Session 2e: Innovation

Analysing the cost-effectiveness of using Latrine Dehydrated and Pasteurization ("LaDePa") agricultural pellets and struvite as new fertilizers: Experimental evidence for maize, wheat and sugarcane in KwaZulu-Natal, South Africa

Chapeyama, B., Wale, E., Odindo, A.

Faecal sludge and urine can be processed into useable waste products such as the Latrine Dehydrated and Pasteurization ("LaDePa") and struvite, respectively, which can be used as fertilisers. The financial costs and benefits of using LaDePa and struvite as fertilisers in South Africa and the wider sub-Saharan African region have not been quantified. An empirical study was conducted using experimental data to quantitatively determine the cost effectiveness of using LaDePa and struvite for maize, wheat and sugarcane production. The costs per hectare of using these waste products to meet crop nutrient requirements for the selected crops to achieve specified target yields were determined and compared with the costs per hectare of using recommended chemical commercial fertilisers. The financial feasibility was determined using partial budgets which tested the relative change in farm profitability as a result of a change in the input use. The results showed that LaDePa agricultural pellets were not financially viable as a nitrogen source, but could probably be cost effective if used as a soil amendment to improve soil physical properties by adding organic matter and carbon. However, there is a need to account for environmental benefits before firm conclusions are made. The use of struvite as a phosphorus source was shown to be financially viable. In conclusion, there are potential financial benefits with regard to the use of struvite as a phosphorus source. Future studies should examine not only the financial benefits of using these products but also account for social and environmental benefits.

Would you purchase milk from a milk ATM? Consumers' attitude as a key determinant of preference and purchase intentions

Kataike, J., Butali, E., De Stuer, H., Mugenyi, A.R., Gellynck, X.

In marketing research, studies on consumer attitude have received significant attention over the past decade, however, little is known in the context of innovative agro-food technologies, particularly in regard to



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empirical hypothesis testing. Therefore, this paper seeks to find out whether consumers would purchase milk from an ATM milk vending machine, in the framework of consumers' attitude as a key determinant of preference and purchase intentions. Data were drawn from a simple random sample of 296 dairy consumers. Structural equation modeling was used to test the hypothesized relationships using SMARTPLS data analysis software version 3.2.3. Besides, a multigroup analysis was conducted to test for group differences of specific path estimates between male and female consumers. The findings revealed that consumer utilitarian and hedonic attitudes are significantly related to preference and purchase intentions. However, utilitarian attitude is more strongly related to preference and purchase intentions to purchase milk from ATM vending machine than hedonic attitude. The paper concludes with a discussion of the findings, theoretical and managerial implications and suggestions for further research.

Assessing the Impact of Biological Control of Maize Stem Borers on Productivity and Poverty in Kenya using Continuous Treatment Regression Approach

Midingoyi, S., Kassie, M., Affognon, H., Macharia, I., Ong'amo, G., LeRu, B.

This study investigates impact heterogeneity resulting from the biological control of maize stem borer pests using data from biology and household survey in Kenya. We adopted the continuous treatment regression to generate dose response functions of productivity and poverty measures after controlling confounders. Findings indicate that biological control increased productivity and reduced poverty and that the impact on the two types of outcomes varies with the level of biological control. On average with the release and spread the BC agents, maize yield increase by 31%, households have improved their purchasing power by a yearly intrinsic supplementary amount of Ksh 14 thousands and 22% of maize farming households were moved out of poverty, these impacts varying with the level of BC activity. Biological control is revealed as a strategic tool of policies of increasing food

availability and poverty reduction and there is still scope of optimizing its advantages through conservative and augmentative biological control in Kenya and the other East and Southern African countries.

Rent Seeking Behaviour: Promoting Agricultural Consumption at the Expense of Productivity in South Africa

Ngarava, S., Mushunje, A.

Social grants have impacted household welfare on two fronts, maintenance of minimum living standards and sustainable long term improvement in these living standards. However, the intended benefactors have become inert and overly reliant upon them for their livelihoods. Fundamentally, they exhibit rent seeking behaviour. Furthermore, sustainability concerns are raised especially in the value of scarce resources, shifting prioritisation of national government strategic issues and overall value of agricultural production. This is compounded by the fact that much of this social grant expenditure has been utilised in private household food consumption at the expense of agricultural production. This assertion is tested within the South African economy by deciphering how social grants have impacted private food consumption and value of agricultural output through a multiple regression and Engle-Granger co-integration analysis. The multiple regression analysis revealed that value of agricultural output and social grant expenditure has a major significant positive influence on private consumption of food. From the Engle Granger co-integration analysis, the OLS model's ADF statistic was more than the Engle Granger critical value for the residuals, showing co-integration and long run equilibrium relationship. However, there was no Granger causality of social grant expenditure on private consumption of food, but there was causality with value of agricultural output. The study recommends recalibrating social grants expenditure through offering conditional social grants, so as to have tier effect of initiating and promoting agricultural productivity as well as private consumption of food.

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The Relationship between Smallholder Irrigation and Household Food Availability and Dietary Diversity in Greater Tzaneen Municipality of Limpopo Province

Moyo, T., Machethe, C.L.

Irrigation farming is the potential answer to household food security challenges. This paper examines household food availability, consumption and dietary diversity for irrigating and non-irrigating households in Greater Tzaneen municipality of Limpopo Province of South Africa. The paper uses primary data collected from 180 households comprising of irrigation scheme irrigators, independent (non-scheme) irrigators, and non-irrigating households. Data analysis employed descriptive analysis and analysis of variance to compare food security components of the different types of households. Results provide sufficient evidence that smallholder irrigation farming contributes significantly to household food security through improved food availability and dietary diversity. However, since most households are net food buyers, it is essential to have policies that are formulated with an understanding that household food security is not only a function of the food that farming households produce for their own consumption but more so a function of total household income. Such knowledge is crucial to inform agrarian reform debates on whether South Africa should continue investing in smallholder irrigation farming for improved household welfare. An integration of smallholder irrigation farming in strategies for growing the rural economy and contributing to improved livelihoods and poverty reduction is, therefore, recommended.

Analysis of trade and employment performance of the agro-processing sector using a Revealed Comparative Advantage (RCA) Index

Thindisa, M.V., Magomani, J.

This study assesses trade performance of the agro-food products, in South Africa, using the Revealed Comparative Advantage (RCA) Index. Descriptive statistics of trade performance and employment trends in the agro-processing industry are presented. Data indicates that South Africa is a net importer of processed food, however with the potential to expand exports of agro/food products reflecting high RCA. Also, the potential to expand and grow the agro-processing industry exists through import replacement strategy of agro/food products where the country has a comparative and competitive advantage. The results indicate that food products including oils, juices and alcoholic beverages reflect high export potential and employment ratio. This study provides an opportunity to identify specific agro/food products with high export and employment potential for targeted strategic support in the implementation of the National Development Plan (NDP) but specifically the Industrial Policy Action Plan (IPAP) and the Strategy on Support and Development of Small and Medium Agro-processing Enterprises

Agro-ecology and small farms' livelihood combinations: A revisit of post-Green Revolution agrarian and food security reforms in sub-Saharan Africa

Hosu, Y.S., Cisse, E.N., Mushunje, A.

This paper investigates the suitability of agro-ecologically integrated agriculture for agrarian and food security reforms among small farming households in the rural communities of South Africa. It explored the impact of soil and climate factors on smallholders' crop and livestock enterprise choices in the three major agro-ecological zones of the Eastern Cape province of South Africa and make case for necessary community/area tailored institutional frameworks and agricultural research and development re-adjustment for adequate support system provision. Data on households' production activities were processed in monetary term and analysed by cost/returns (gross margin analysis) and GIS mapping of smallholders' maize revenue sensitivity to agro-climatic variations. Crop based activities performed better in grassland zone while livestock enterprises performed better in the savannah zone. However, small farms in the Karoo can only productively engage in livestock production. GIS mapping further showed that smallholders' enterprise activity was not only affected by the soil-climatic factors but by the management skills of the farmers. We recommend agro-ecologically adapted policies and incentives for agriculture based livelihood activities, intensified mixed cropping systems and business skills empowerment for sustainable livelihood systems for enhanced food security among poor households in the Eastern Cape Province.

Investigation transformation potential in the subtropical fruit sector: A profile of smallholder fruit farmers in Vhembe

Verschoor, A., Naledzani, Z., Chaminuka, P., van Leynseele, Y.

Despite challenges, the agricultural sector is highly valuable to the South African economy, and in terms of high value crops, has clear economic development potential. Transformation efforts though, have had limited success thus far. The subtropical fruit sector has specific transformation targets based on the growing value of its commodities and its efforts to support smallholders. Policy directives focus on sustainable growth and job creation for which tropical fruit has excellent potential. This study investigated transformation potential by analysing a simple farmer typology; the commercial subtropical fruit farmer, the typical smallholder and a small group of lead farmers were profiled. It was found that the subsistence level farmer did not exist. Lead farmers achieve a higher production level than that the average smallholder in Vhembe, apparently due to a higher access to capital and a greater specialisation. They are however still distinct from their white commercial counterpart. Whilst major challenges relating to capital, water, theft, transport logistics, pest control are universal to all



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farmer types, commercial farmers are better positioned to deal with these as the communal, village environment creates a less enabling environment. There is a critical need for improved financial management and record keeping with aspiring smallholders. Instruments for capital access currently are not accessible and need to be tailor-made, perhaps through a collective effort from the private and public sector. Subtrop, the commodity organisation, target to support 2000 hectares of fruit by commercially viable smallholders by 2025 is achievable if constraints can be collectively addressed.

Smallholder farm enterprises and food security in the Eastern Cape Province of South Africa

Mujuru, N., Obi, A.

This paper presents a study of food security and profitability of crop farmers in the Eastern Cape Province of South Africa. The regression analysis uses maximum likelihood estimator that combines the seemingly unrelated regression (SUR) and one-way error component models, to determine factors that influence food security and profitability. A multi-stage sampling technique was used for the selection of study site. Simple random sampling was used to select 158 irrigators and non-irrigators from Qamata and Tyhefu irrigation schemes. The sample statistics show that farmers are aged, largely uneducated and operate on small plots of land. Maize generated higher profits than cabbage with a mean scaled value of R2 213 in contrast with R830 for cabbage. Location, farm type and income were important variables in explaining food security. There is a positive correlation between the random error that determines food security and the corresponding errors of maize and cabbage production. A negative but insignificant correlation (-0.01) exists between residuals within the maize and cabbage equations implying that the two crops compete for resources. Area under cultivation is highly significant for both crops. Hence, farmers need to adopt new technologies and become aware of the associated benefits. The low variation coefficient for food security (0.033) shows that individual household food security is close to the expected mean and there are no marked differences across households. Profits for both crops depict large variances which can be explained, inter alia, by farm type, farm size and degree of household commercialisation.

Software design of an Online Warehouse Receipt System: The Mozambican case study

Van der Vyver, A., Grosvenor, M.

Across the Southern Africa region, smallholder farmers sell their produce shortly after the harvest each year when markets are in surplus and prices are low. If only they could hold out for a month or two, they could reap

the benefit of higher prices, but as they are in need of money, they have no choice but to sell early. Warehouse receipts (WRs) enable the owner to deposit his product in a warehouse in respect of which a receipt is issued that stipulates the quantity and quality. Financial institutions are often willing to extend loans against such a WR as collateral or security. In these circumstances, the farmer would have access to funds to sustain her/himself until such time that s/he is ready to sell the commodity and repay the loan.

The market or fundamental requirements of a warehouse receipt systems have been research and dealt with in various literature studies, not least Van der Vyver (2012) documenting the requirements for a successful Malawian Agricultural Commodity Exchange (ACE) of Africa. One of these requirements is a centralised online software system that has to process all transactions in a secure environment. This article deals with the research and design process required for such a software system.

The Whole farm financial implications of different tillage systems on different crop rotations in the Swartland area of the Western Cape, South Africa

Knott, S.C., Hoffmann, W.H., Labuschagne, J., Strauss, J., Vink, N.

Conservation agriculture (CA) is one of the most holistic sustainable agricultural practices yet. It reduces environmental degradation, and concurrently it could enhance farm profitability. A large proportion of the commercial grain producers in the Western Cape have adopted CA to varying degrees. Adoption has taken place in the absence of any policy support framework directed to CA, and thus, has been market driven.

The physical/biological benefits of CA are well known. The financial implications of the various systems within CA, at farm-level are still unknown. This study implements trial data from Langgewens experimental farm to evaluate the financial implications of various farming systems over an extended period.

Farm systems are complex, consisting of numerous interrelated components. A whole-farm budget model is developed within a systems approach to compare various farming systems designed within CA principles. Multi-disciplinary group discussions are used to bridge the gap between scientific knowledge. To serve as a basis for comparison, the whole-farm model was based on a typical farm within the Middle Swartland relative homogeneous farming area. A key role of the inter-disciplinary expert group was to ensure that data and the model design accurately reflect the underlying physical/biological processes of CA.

The financial evaluation of the various farming systems showed that conventional agricultural practices of monoculture and deep tillage are financially unsustainable. The financial benefits of CA are directly related to

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improved soil health, lower weed and pest stress and improved yields. The CA farming systems were less susceptible to variations in external factors, highlighting the resilience of the system that incorporates crop rotation and no-till.

The performance and economic sustainability of savings and credit cooperatives in Swaziland

Zikalala, M.J., Macheche, C.L.

The cooperative model has attracted much attention as a vehicle for increasing access to financial services, particularly for the poor. In this paper, we examine the performance and economic sustainability of savings and credit cooperatives (SACCOs) in Swaziland. Primary data was obtained through a survey of 38 savings and credit cooperatives whilst secondary data was obtained from the Commissioner of Cooperatives for the period 2011 to 2014. The PEARLS method was employed to assess the performance and sustainability of the cooperatives. The results show that savings and credit cooperatives have a high level of outreach, with an average membership of 631 members of whom 46 percent are women. However, the cooperatives have a low level of penetration of only three percent of the economically active population. Overall, savings and credit cooperatives in Swaziland have failed to meet international standards of economic sustainability set for cooperatives.

Economics of Plum Breeding Research in South Africa: The role of research in agricultural productivity

Tshabalala, P.M., Liebenberg, F., Kirsten, J.F.

Numerous studies have been conducted, and the evidence has been unambiguous showing that investing in agricultural research and development increases productivity. Continued investments in agricultural research have led to the development of over 26 successful plum cultivars since 1980 at the Agricultural Research Council's (ARC) Infruitec/Nietvoorbij in South Africa, and other scientific interventions. Whilst it is now widely recognized that in order to increase agricultural productivity more investments have to be channeled towards agricultural research, the government has continued to decrease investments towards agricultural research. This is seen by the decline of the parliamentary grant apportioned to the ARC for research. The objective of the study is to show the impact of research investments at the ARC on the plum industry. Secondary data collected from the industry representatives and Infruitec were used in estimating how plum research has contributed to changes in output. The production function approach was used as an analysis tool and the rate of return (ROR) to investments since 1980 was found to be 14.23 percent. Being this high is indicative of an underinvestment in plum research.

South Africa's Recapitalisation and Development Programme: Its impact on food security and determinants thereof

Mabuza, N., Macheche, C.L.

One of the objectives of the Recapitalisation and Development Programme (RECAP) is to guarantee food security for its beneficiaries. This paper examines the impact of the programme on household food security of land reform beneficiaries in six provinces of South Africa. Cross-section data was collected in 2013 from a purposive and stratified sample of 98 projects. The impact of RECAP as perceived by the respondents was assessed and logistic regression analysis was performed to assess how the different components of RECAP (strategic intervention, skills transfer and funding) affected the household food security of beneficiaries. About 58% of the respondents indicated that RECAP contributed to their household food security. The impact of RECAP on beneficiaries' food security is significantly influenced by age of household head, number of beneficiaries, farm size, funding, and, most importantly, skills development. One of the core principles of RECAP, strategic intervention (having a strategic partner/mentor) was found not to be significant, suggesting that the intervention is ineffective. To ensure effective skills transfer, the criteria for strategic partner and mentor selection need to be reviewed to ensure that only those that are competent, with appropriate qualifications and skills, and are devoted to RECAP objectives are selected.

The role agricultural trade and policy complementarities in poverty reduction in South Africa

Lubinga, M.H.

Although South Africa exhibits an increasing positive trend in agricultural exports, her level of poverty is also still a big challenge. This study seeks to empirically answer the question of whether South Africa's increasing trend in agricultural export performance translated into lower poverty levels between 1996 and 2014. Specifically, the study evaluates the effects of export intensity of agricultural goods disaggregated by end-use category on poverty outcomes with the help of the concept of 'policy complementarities'. Rather than the commonly used poverty measures (poverty head count ratio and poverty gap), relative poverty is used in this study. Export intensity is individually interacted with proxies of access to credit, educational and governance systems to capture the role of policy complementarities. To address the reverse causality problem associated with exports and poverty, a Two Stage Squares (2SLS) estimator was used. The study concludes that South Africa's agricultural trade performance may be associated with poverty reduction effects in the country but this can be realised in presence of supportive complementary domestic policies. Policy wise, there is need to further enhance the education levels of the populace, increase people's confidence in public institutions of governance, as well as



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boost the depth of the financial sector. It may also be necessary to promote importation of household consumables that are not necessarily produced in the country.

What Does AGOA mean for South African Agriculture?

Partridge, A., Pienaar, L.

At the end of 2015 South Africa was faced with the threat of losing its AGOA beneficiary status unless it eased barriers such as anti-dumping duties and health and safety requirements restricting USA imports into South Africa. This study utilises historic trade data in conjunction with Relative Preference Tariff (RPT) calculations and a Computable General Equilibrium (CGE) model in order to assess what AGOA means for South African agriculture. The findings show that South Africa has utilised AGOA for only a small selection of agricultural products but these products are exported in significant quantities making up 56% of the value of all agricultural exports to USA. The total additional annual tax that would need to be paid on these products was calculated to be R52 million at a weighted average tax rate of 2.77%. This tax rate varied over different products but for key exports where the tariff rate was high South Africa would still remain competitive on a tariff basis. When taking the view of the entire economy, the cost of losing AGOA benefits on agricultural products was not substantial, estimated at a total cost to the economy R40 million in Gross Domestic Product (GDP). This loss on AGOA was revealed to put overall more pressure on processed goods further down agricultural value chains. The recommendations based on the study are for increased efforts in searching out new export markets, whilst at the same time supporting developments of local agricultural value chains.

The factors influence South Africa's agricultural export growth to world markets

Potelwa, X.Y., Lubinga, M.H.

The paper assesses the factors influencing South Africa's agricultural export growth to its important destination between 2001 and 2014. A gravity model was used to present analysis of trade flows and has been validated is a useful tool in determining export growth. The findings present that an increase of South Africa's and importer's GDP causes an increase in agricultural exports. The distance and the political stability has been presented have no influence on the growth of agricultural exports to its trading partners. The importer's population the export capacity has shown positive relationship on the growth of South Africa's agricultural export into its trading partners. The trading agreements that include AGOA and EU (TDCA) shows a positive impact on increase in export performance. Therefore, the results suggest that South Africa should focus on countries

with growing population and GDP to improve agricultural export growth and market diversification.

Action Plan for Gender Transformation in the South African Sugar Industry

King, M.

South Africa's rural poor comprise of a predominantly female population and thus the South African National Development Plan (NDP) has identified a specific objective to eliminate the country's gender inequities and take active measures in advancing women's rights (National Planning Commission [NPC], 2014). Despite their critical role in agriculture and food security, women continue to have little part in the decision-making processes pertaining to the development of the sector. This paper addresses the need for gender equality in South African agriculture through specifically focusing on interventions for gender transformation in the South African sugar industry. Broad objectives to promote a transformed and gender-conscious industry include (i) gender equitable agricultural research and study, (ii) gender equitable industry and grower structures, (iii) profiling and highlighting female growers and (iv) gender-based training and support. This research expands upon the research conducted by King and Nicholson (2016) in this regard and unpacks these broad objectives and utilises an understanding of the social, cultural and economic realities within which female growers operate to provide an analysis of strategic interventions for gender transformation and link these to South Africa's NDP.

Agricultural Productivity Growth and Policy Reforms in Botswana

Temoso, O., Temoso, D., Villano, R.

Over recent years agricultural productivity in Botswana has declined, leading to a progressive increase in food imports. The main objective of this paper is to examine the sources of efficiency, productivity and output growth in Botswana agriculture and explore the possible reasons for this decline. A stochastic distance frontier approach is employed using panel data from six regions in Botswana for the period, 1979 to 2012. Technical and scale efficiency change are found to be the main sources of productivity growth in Botswana agriculture whilst technical change has been low. Slow growth of technical change reflects the semi-arid production environment in Botswana; i.e. an environment categorised by poor soils, low and unreliable rainfall and high temperatures, and frequent outbreaks of the disease such as foot and mouth (FMD) and contagious bovine pleuro pneumonia (CBPP). The region that achieved the highest total factor productivity (TFP) growth during the study period was the Central region, whilst Maun experienced the

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least growth. The decomposition of TFP growth into various components provides some useful insights into the role of government support programs in agricultural growth.

Support measures for climate smart agriculture– GreenAgri portal

Cloete-Beets, L., Murdoch, J., Kuschke, I.

The year 2015 has seen one of the worst droughts in the past 30 years in South Africa. Worldwide there has been a shift in climate patterns and an increase in annual mean temperatures all of which are factors that have an adverse effect on agriculture. Agriculture is a vulnerable sector which is now having to change to more sustainable and precision practices, adopt new technology, consider renewable energy and simultaneously access funding. The need for supportive measures and reliable information are visibly a necessity if food security is to be ensured.

Lack of information regarding sustainable agriculture production in South Africa has been highlighted as a barrier to the adoption of more resilient practices. This paper will discuss a web based tool, GreenAgri (www.greenagri.org.za) which was developed in collaboration between the Western Cape Department of Agriculture and GreenCape. The aim of the GreenAgri portal is to provide relevant and reliable information regarding climate smart agricultural information, technology, practices and funding channels which are currently available to improve the resilience of the sector. The implementation of the portal has proven to be a powerful communication tool between industry participants and government and it is allowing information to be disseminated, feedback to be given on current, future and past research as well as providing support on climate smart agricultural matters. The website's conception, objectives and anticipated advantages will be discussed as well as a general trend analyses of its statistics to date.

The Balance of Natural Resources: Understanding the long term impact of mining on food security in South Africa

Delpont, M., Davenport, M., van der Burgh, G., Meyer, F., Davids, T.

This paper illustrates key results from a second study by BFAP on the competition for natural resources (specifically land and water) between the agricultural and mining sectors in South Africa. The current state of the contribution to the economy by both sectors was summarised as well as the state of competition for natural resources, covering land and water in more detail. A scenario planning workshop, including key stakeholders from the agricultural, mining and environmental sectors was hosted during which four futures for the "The contribution and co-existence of mining and agriculture towards ensuring national security in 2030-35" were

developed. The BFAP Sector Model was employed to determine the impact of the respective futures on the South African agricultural sector and by implication, the availability and affordability of food in South Africa.

Agri-innovation hubs: Collective agricultural innovation in stimulating development

Verschoor, A., Lubinga, M., Scar, L.

An ARC team of agricultural economists investigated the Agri-innovation Hub concept on behalf of DST. The study included policy and literature review; the development of criteria for site and commodity selection; refinement of these criteria with key informants; followed by the use of these criteria to evaluate commodity options and potential hub sites with industry experts, and finally, the development of a model for hub establishment. This study explored potential options for implementation of the bio-economy strategy that aims to facilitate an enabling environment for collaboration in bio-innovation, to stimulate development. Mainstream grains scored low and crops less dependent on scale were favoured. Beef and poultry as well as tropical fruit and nut commodities and vegetables were deemed highly relevant. Whilst a commodity mix is suggested at each site, the eventual mix should result from a consultative process. In terms of sites, criteria related to proximity of stakeholders and services were most important. Roodeplaat and UP in Pretoria and Witzenberg in Ceres scored highest. These two and Mkhuhlu in Bushbuckridge were recommended. The selected sites and commodities are informed by policy analysis, experts and their collective evaluation and potentially fit into Agriparks implementation. An implementation model based on collective innovation, professional management, local ownership, capacity development, communication and iterative M&E is proposed, but success will be highly dependent on participant buy in and collective stakeholder effort.

South African agricultural land investments in Africa as per the land matrix

Maluleke, I., Niassy, S.

Africa is the most targeted continent for Large Scale Land Acquisition. Most land transactions occur in sub-Saharan Africa, where an area of the size of Spain is believed to be sold. Both investors and sellers claim that these land acquisition are meant to reduce poverty and hunger. However globally, the Large Scale Land Acquisition raise many concerns about their local economic impact, human rights and fuelling social tensions in already fragile states. Like many rich countries in the world, South Africa ranks among the top investors in some African countries. Being a targeted country itself, there are limited quantitative studies that describe South African land investment on



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the continent. Furthermore the motive and implications of such investments are poorly studied. We analysed data of the Land Matrix database to document South African land investment on the continent. In total, 47 land deals were reported on the Land Matrix. South Africa's investments cover all regions of Africa specifically Mozambique, Zambia and Ghana both in terms of number and size of deal. Intentions of investment are mainly for multiple uses and food crops. However SA also invests in tourism. Food crops only covers 24,666 ha contradicting popular assertions that land investment contribute to food security. Surprisingly, while investing on the continent looking at commodities such as eucalyptus, wood fibre and biofuels, other countries such as US, Japan, Spain and United Arab Emirates are investing for the same commodities in South Africa. In times such as these when land reform in South Africa is one of the most sensitive topics, this raises the issue on the reasons of these land investments, their link with country demand but also national land governance.

South Africa's statutory levies in context of same levies elsewhere- are we funding the correct area

Mazibuko N.V.E., Balarane, A., Mpyana M.

South Africa has a well-developed statutory levies system, developed over decades. The 1937 Marketing Act provided the legal framework for statutory interventions in agricultural marketing. The 1968 Marketing Act (Act No. 59 of 1968), which replaced the 1937 Marketing Act, provided for a system whereby farmer-dominated control boards administered "marketing schemes". The Marketing of Agricultural Products Act, No. 47 of 1996 (MAP Act), as amended, provides for the establishment of statutory measures in South Africa. Levy systems are established by government at the request of an industry group that can show it has a majority consensus, by numbers or volume, in support of such systems. This study surveyed 11 Countries with levy systems to compare South Africa's statutory levies with similar instruments in the other Countries. These levy systems allow farmers, and other stakeholders among the surveyed countries to collect levies to finance the common generic functions, which are: Research & Development, Market Information, Consumer Education & Local Promotion, Export Promotion & Market Access and Information & Liaison. South Africa is the only country financing transformation in the surveyed countries, through the levy system. Furthermore, it was interesting to see that South Africa funds most of the activities funded by developed countries. Countries like Brazil and Namibia also fund political representation, with Brazil and Ukraine also funding infrastructure. In essence, levy systems allow participants to enjoy the benefits associated with pooling their money together to create

economies of scale in their funded activities and increase competitiveness of an industry.

PBR investments changing the landscape of the South African peach and nectarine fresh-fruit sector

Tsvakirai, C. Z., Liebenberg, F., Kirsten, J. F.

Plant varietal improvement has had a long history of local government dominance. However, through the use of Plant Breeders Rights (PBR) a space for the participation of other actors to has been created. This paper investigates how the integration of foreign bred dessert peach and nectarine cultivars has led to change in the landscape (variety development, production, exports) of the sector. This PBR analysis shows that the question of "Who should invest in plant varietal improvement" can be simply answered by providing incentives through the strengthened institutions.

Welfare shocks and their impact on poverty eradication amongst rural households the case of Durban mission location in Peddie

Madyo, S., Obi, A.

Households encounter many risks, and they often experience shocks leading to wide variability in their resource endowment and income. This results in the absence of effective coping strategies. This study analyses a cross sectional dataset on a representative sample of 50 rural households interviewed in 2014 in Durban Mission Village under the Ngqushwa Municipality of the Eastern Cape Province, to empirically assess the impact of welfare shocks on poverty eradication and estimate the determinants of households' vulnerability to poverty. The results show that 80% of the respondents were unemployed and were depending on social grants as their means of living. As a result of this, households were vulnerable to poverty, low levels of health care, lack of nutritious food, etc. The results also show that many of the households lack coping strategies in the event of a shock, this evidenced by the fact that 34% of the sampled households indicated that they sell their assets in the event of a shock. As many as 64% of the households interviewed agreed that they run out of food and have to smooth their consumption in order to survive. The results of adopting weaker strategies in those households will result in households sinking even deeper into poverty in the future

The Agribusiness Development Agency (ADA) is a KZN based public entity that serves as a vehicle to drive economic transformation in the agricultural and agribusiness sectors in the province.

Vision

A transformed, highly developed, sustainable and deracialised agribusiness sector in KwaZulu-Natal.

Mission

To create and enabling environment aimed at growing the agricultural sector and improving the market access for black commercial farmers and agribusiness entrepreneurs, through intensifying land productivity and maximising value adding opportunities, thus stimulating job creation and economic inclusion in a sustainable manner.

Services

The ADA provides integrated support to black commercial farmers involved in small and large scale agribusiness operations from farming, agro-processing, packaging and distribution of products.

The main focus is on the following services:

- On and off farm infrastructure and input support
- Leverage funding and partnerships
- Enterprise and value chain development
- Capacity building, training, mentorship and skills development
- Technical support
- Market linkages



"Promoting Agribusiness through Partnerships & Knowledge"



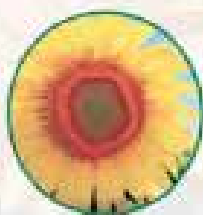
AGRICULTURAL RESEARCH COUNCIL

The Agricultural Research Council (ARC), a schedule 3A public entity, is a premier science institution that conducts research with partners, develops human capital and fosters innovation in support of the agricultural sector.

Through its research work, the Council impacts the agriculture and related sectors significantly, particularly through scientific knowledge generation that influences economic performance and a sustainable development for a transformed society.

The Council's interventions aim to increase agricultural production and productivity, including the creation of new areas of agricultural production to enhance food security and income generation. Special focus on expanding agricultural production in communal areas, rural poverty nodes and peri-urban areas where the potential for increasing the number of productive farmers may be highest.

*Agricultural Research Council is committed to Excellence in
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Tel: +27 124279700 • Fax: +27 124305814

Email: enquiry@arc.agric.za • Website: www.arc.agric.za



National Agricultural Marketing Council
Promoting market access for South African agriculture

Promoting Market Access for South African Agriculture

Background

The National Agricultural Marketing Council is pleased to interact with such important stakeholders of our sector. We collaborate with government, unions and the agriculture sector on programs aimed at improving the conditions and sustainability of agriculture.

Our mandate is to advise the Minister of Agriculture, Forestry and Fisheries on the marketing of agricultural products and other industry specific issues. In other words, the NAMC is mainly involved in marketing policy issues, and not involved in the physical marketing and selling of agricultural products.

Our mandate is captured in the following:

- Increase market access for all market participants
- Promote the efficiency of the marketing of agricultural products
- Optimise export earnings from agricultural products
- Enhance the viability of the agricultural sector

Our Services

The National Agricultural Marketing Council is divided into four divisions with focus areas on research, linking farmers to markets, trade, application of statutory measures, food prices and input costs monitoring, training and development, facilitating communication between the Minister and Ministerial Trustees to name but a few.

Registration of Directly Affected Groups

The NAMC welcomes all industry participants to register as a directly affected group. A directly affected group means any group of persons, which is party to the production, sale, purchase, processing or consumption of an agricultural product and includes labour employed in the production or processing of such a product.

VISION

Strategic positioning of agriculture in a dynamic global world

MISSION

To provide agricultural marketing advisory services to key stakeholders in support of a vibrant agricultural marketing system in South Africa

The register is used to bring agricultural issues, including applications for statutory measures, to the attention of directly affected groups and to invite such directly affected groups to lodge any objections or representations relating to a request for intervention in the agricultural sector within a specified time.

Contact Us

Private Bag X935.Pretoria.0001
Block A 4th Floor, Meintjiesplein Building, 536
Francis Baard Str, Arcadia, Pretoria, 0002
Tel: 012 341 1115. Fax: 012 341 1811
Email: info@namc.co.za / Web:
www.namc.co.za

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