AGRICULTURAL RESEARCH COUNCIL

Presentation to Portfolio Committee of DAFF

Annual Report for 2014/15

15 October 2015

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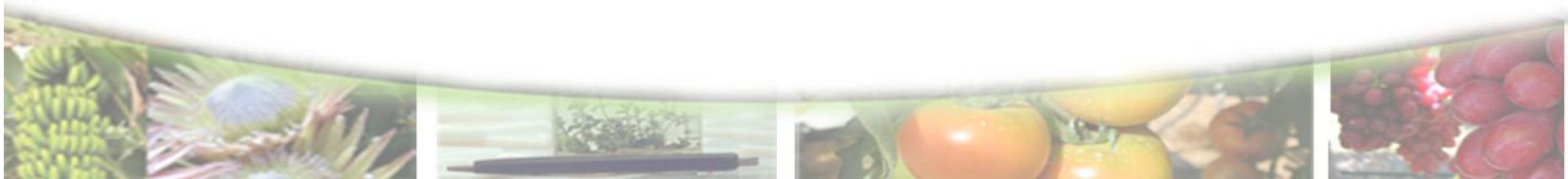
ARC COUNCIL MEMBERS

1. **Prof. Sibusiso Vil-Nkomo**: **Chairperson**
2. Prof. Michael Kahn: Deputy Chairperson
3. **Dr. Shadrack Moephuli**: **Chief Executive Officer**
4. Ms. Joyce Mashiteng: Chair: Finance and Investment Committee
5. Mr. Gerard Martin: Chair: Human Resources Committee
6. Prof. Frans Swanepoel: Chair: Research & Development Evaluation Committee
7. Mr. Allan Bishop
8. Mr. Mzolisi Dyasi
9. Ms. Dora Ndaba
10. Mr. Clive Kneale
11. Dr. Wilna Van Rijssen
12. Prof. Louw Hoffman
13. Dr. Joyce Chitja
14. Mr. Ismail Motala
15. Mr. Rowan Nicholls



ARC EXECUTIVE MANAGEMENT

1. **Dr. Shadrack Moephuli**: **Chief Executive Officer**

GROUP EXECUTIVES

2. Ms. Makgomo Umlaw: Human Resources & Legal Services
3. Mr. Gabriel Maluleke: Chief Financial Officer
4. Dr. Jasper Rees: Research and Innovation Systems
5. Dr. Andrew Magadlela: Animal Sciences
6. Dr. Litha Magingxa: Agricultural Economics and Capacity Development
7. Vacant: Crop Sciences

ARC MANDATE, VISION & MISSION

MANDATE

The Agricultural Research Council (ARC) is mandated to promote the agricultural and related sectors through:

- ***Research***: *the furtherance, accumulation and improvement of knowledge in the agricultural and related sciences through original and other investigations and methods of a scientific nature with the advancement of agriculture as its object;*
- ***Development***: as activities by which knowledge acquired through research is utilized; and
- ***Technology Transfer***: *transfer of knowledge, techniques & processes for application thereof.*

VISION

Excellence in agricultural research and development

MISSION

The Agricultural Research Council is a premier science institution that conducts research with partners, develops human capital and fosters innovation to support and develop the agriculture sector.

ARC ALIGNMENT TO NATIONAL PRIORITIES AND POLICIES

New Growth Path (NGP)

MTSF (2014-2019) of Outcomes

National Development Plan (NDP)

Outcome 4 - Decent Employment through inclusive growth

6 Job Drivers

Outcome 7 - Comprehensive rural development and food security

Outcome 10 - Environmental assets and natural resources protected and continually enhanced

Agriculture Productive Sector Forum

Infrastr. Pres. Infra. Co. Comm. (PICC)

Mining (Mining Policy Action Plan)

Manufacturing Industrial Policy Action Plan (IPAP)

Tourism

Green Economy

IGDP (Policy Framework)

Agric Policy Action Plan (APAP 5 yr iterative plan)

SIP 11

10 year Innovation Plan

Bio-Economy Strategy

CRDP

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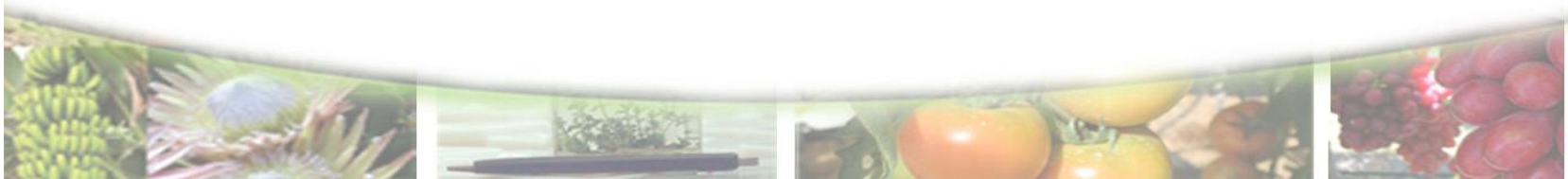
ARC CONTRIBUTION TO GOVERNMENT PRIORITIES & OUTCOMES

1. Supporting objectives of the National Development Plan, Vision 2030 through an ARC business strategy and organization structure aligned to national priorities;
2. Employment and Job creation, particularly among the poor;
3. Food and Nutrition Security for all, particularly within households;
4. Improved productivity, production, competitiveness and sustainability of animal and crop based agriculture;
5. Contributing to bio – security;
6. Optimal technology platforms for agricultural production;
7. Strengthening the role of the bio – economy (the "Farmer to Pharma Value Chain") to enable South Africa to become a leader in Biotechnology and related pharmaceuticals through our knowledge base;
8. Enabling the country to adapt and respond to climate change impacts (water, land, energy, sustainable natural resource utilization etc)
9. Contributing to South Africa's Global and Regional positioning and integration;and,
10. Ensuring an optimal and sustainable organization.



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ARC STRATEGIC GOALS (Outcomes – Oriented)

1. To improve productivity, production, competitiveness and sustainability of crop based agriculture;
2. To improve productivity, production, competitiveness and sustainability of animal based agriculture;
3. To enhance the productive use and conservation of natural resources;
4. To translate research results to support agrarian transformation and the efficiency and competitiveness of the sector;
5. To achieve good governance, financial sustainability and a high performing and visible organization.

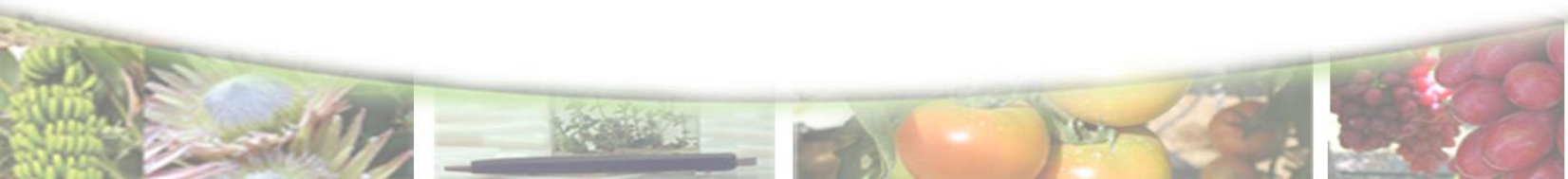
SCIENCE IN ARC FOR THE AGRICULTURE ECONOMY

SCIENCE COUNCIL

- Innovation in science
- Basic/fundamental research
- Applied research (technologies)
- Intellectual assets
- Skilled scientists & engineers
- Volume & quality publications
- Scientist ratings
- Number of PhDs
- Number of doctoral fellows
- Number of postdoc fellows
- Scientific awards

AGRICULTURE DEVELOPMENT

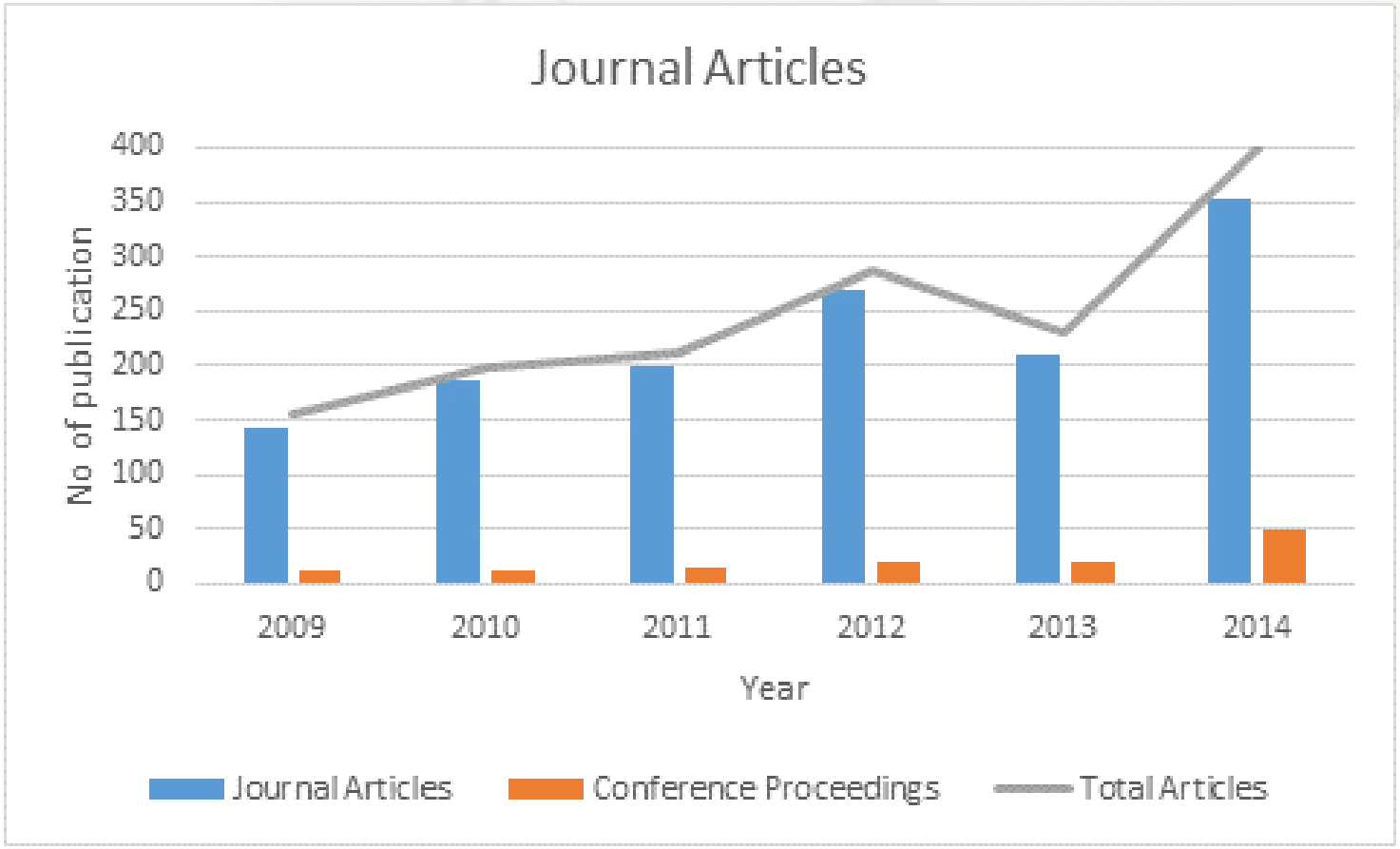
- Economic link to Innovation
- Applied research
- Technology Transfer/dissemination
- Intellectual Asset Use
- Agricultural Production & productivity
- Food Security – hunger
- Environmental Sustainability
- Import Substitution
- Export Promotion
- Agrarian Transformation
- New products (vaccines, cultivars etc)



ARC PROGRAMMES

1. Crop Production, Improvement and Protection
2. Animal Health, Production and Improvement
3. Natural Resources Management
4. Mechanisation and Engineering
5. Agro-processing, Food Technology and Safety
6. Smallholder Agricultural Development
7. Agricultural Economics and Commercialization
8. Training and Extension
9. Administration and Corporate Affairs

SUMMARY OF ARC SCIENTIFIC OUTPUT IN PEER REVIEWED PUBLICATIONS



FY YEAR	TOTAL ARTICLES
2008/09	155
2009/10	197
2010/11	212
2011/12	288
2012/13	231
2013/14	302
2014/15	401

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REVIEW OF KEY ORGANISATIONAL PERFORMANCE

SCIENTIFIC SOLUTIONS THROUGH RESEARCH AND DEVELOPMENT

a) Cultivars with Plant Breeders Rights over period 2007 – 2015: 114 to 12 Commodities

	2007		2008		2009		2010		2011		2012		2013		2014	
	Registered	Released	Registered	Released	Registered	Released	Registered	Released	Registered	Released	Registered	Released	Registered	Released	Registered	Released
Oats												2	2			
Wheat		2			2	1	1	7			7	4	2	1	2	3
Groundnuts			1	1							3	3				
Dry bean			1	1			1	1	2	2	1	1	1	1		
Maize															2	2
Cowpea																
Cotton									2	2					1	1
Apples	1	1													5	5
Nectarines	4	4	1	1	1	1	1	1			6	6				
Peaches	2	2	1	1	5	5	4	4			4	4				
Plums			1	1	4	4					5	5				
Pears					1	1										
Apricot							1	1			3	3				
Grape									1	1	4	4	1	1		
Litchi											1	1				
Banana			1													
Citrus					3	2					1	1	1			
Mango													1			
Sweet potato	3	3			3	3			1	1			3	3		
Flower bulbs									7	7						
Potato													2			2
TOTAL	**10**	**12**	**6**	**5**	**19**	**17**	**8**	**14**	**13**	**13**	**35**	**34**	**13**	**6**	**10**	**13**

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STRATEGIC GOAL 1
To improve productivity, production, competitiveness and sustainability of crop based agriculture

FOCUS OF GOAL

a) Broaden the food base for food and nutrition security and welfare.

b) Optimised crop production systems to mitigate agricultural risks.

c) Improved cultivars (food and non-food) through breeding, physiology and genetics.

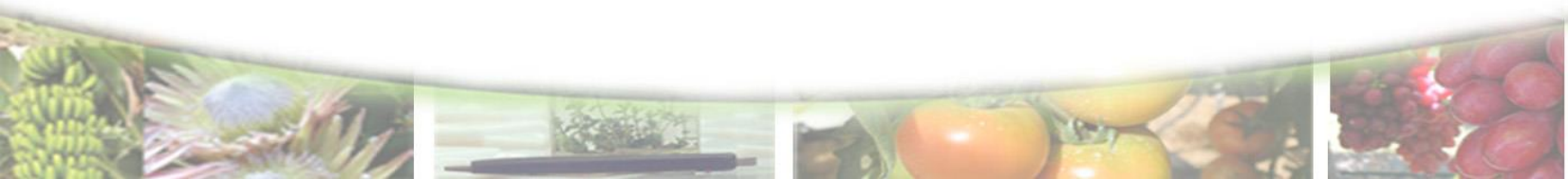
d) Enhanced crop protection systems.

e) Crops and mixed production systems developed for smallholder farmers.

OUTCOMES WITH ASSOCIATED IMPACT

1. New cultivars that would ensure higher profitability
2. Mitigation strategies against biotic and abiotic stresses that would improve productivity
3. Sustainable production systems
4. Reduction in post harvest losses
5. New products and processes developed from primary agriculture

6 OUT OF 8 PERFORMANCE TARGETS WERE ACHIEVED OF WHICH 5 EXCEEDED THE SET TARGETS

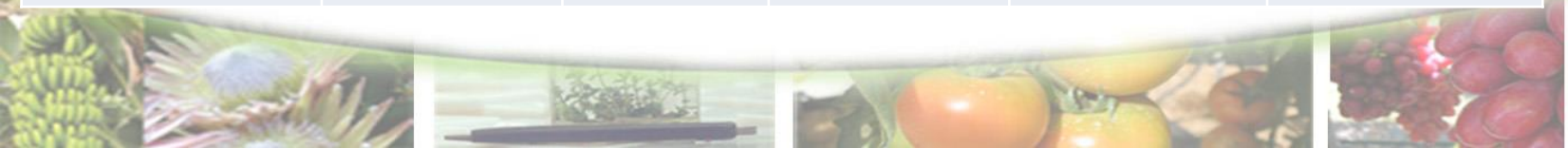


DEVELOPMENT OF DROUGHT TOLERANT AND INSECT PROTECTED MAIZE HYBRIDS FOR SMALLHOLDER FARMERS

- WEMA is a public-private partnership to develop drought-tolerant and insect protected maize hybrids and deploy them royalty-free to smallholder farmers
- In 2014 ARC registered two conventional drought tolerant maize hybrids (WE3127 and WE3128)
- The Honourable Deputy Minister of Agriculture Forestry and Fisheries launched the hybrids in December 2014
- 10 000 x 500 g seed packets were distributed to smallholder farmers in *Eastern Cape, *Free State, KwaZulu-Natal, Limpopo, Mpumalanga and North West provinces (* *Eastern Cape will be planting in the 2015/16 season)*
- Feedback from farmers who grew the promotional packs was very positive *(see Table below)*

Feedback on Drought*TEGO*™ hybrids

PROVINCE	Number of 500 g packs distributed	Number of farmers given seed packs	Number of seed packs planted (Hectares planted)	Average yield reported (t/ha)	Estimated Average Income realized (at * R3103/t) * Price as per SAFEX Maize price for Sept 2015
KwaZulu-Natal	2 000	610	200 (5)	Not reported	Not reported
Limpopo	2 400	600	2 160 (54)	1.2	R3723
Mpumalanga	2 000	500	1 000 (25)	1.5	R4654
North West	1200	800	720	2.0	R6206



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WEMA DroughtTEGO IMPACT

Free State (Qwa-Qwa) smallholder farmer

Limpopo (Mokopane) smallholder farmer

Limpopo (Mokopane) smallholder farmer

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PROMOTION OF SUGAR BEAN PRODUCTION IN THE DIPALESENG MUNICIPALITY (BALFOUR, MPUMALANGA)

- 68 ha planted at three emerging commercial farmers
- Yields of 0.86 to 1,55 t/ha obtained
- Farmers made total profit of R362 100
- Enabled them to invest in harvesters
- 65 jobs created

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STRATEGIC GOAL 2

To improve the productivity, production, competitiveness and sustainability of livestock based agriculture

FOCUS OF GOAL

a) Development of Animal Vaccines
b) Development of Diagnostic and Analytical Technologies
c) Improvement to Veterinary Public Health
d) Development of Disease Control Strategies
e) Development and Introduction of new traits and genetic diversity in animals
f) Enhance animal production and nutrition technologies
g) Animal, crop and mixed production systems developed and transferred to smallholder farmers
h) Animals and mixed production systems developed for smallholder farmers

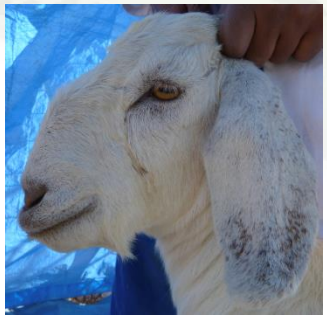
OUTCOMES WITH ASSOCIATED IMPACT

1. High quality improved meat and dairy products that are safe, highly nutritional with visual appeal;
2. Affordable meat and dairy products;
3. Disease free herds (livestock & wildlife);
4. Reduced degradation of rangelands;
5. Improved livestock production through adoption of improved rangeland management
6. Effective animal breeding methods/techniques
7. Increased efficiency of livestock production from breeding
8. Improved livelihoods among smallholder farmers
9. Reduced number of stock theft incidents
10. Disease and residue free animal products for increased market access

3 OUT OF 4 PERFORMANCE TARGETS WERE ACHIEVED OF WHICH 2 EXCEEDED THE SET TARGETS

GENOTYPING OF SA INDIGENOUS GOAT POPULATIONS

192 goats using the Goat SNP52k

A 

B

C

Commercial meat type breeds

A: Savanna

B: Kalahari Red

C: Boer

Developed Breeds

D

E

F

G

G: Feral goat population at Tankwa

D-F: Village ecotypes phenotypic representations

Kwazulu-Natal (Zulu), North West (Tswana),Limpopo (Venda),
Eastern Cape (Xhosa) -> Local language not representing breeds

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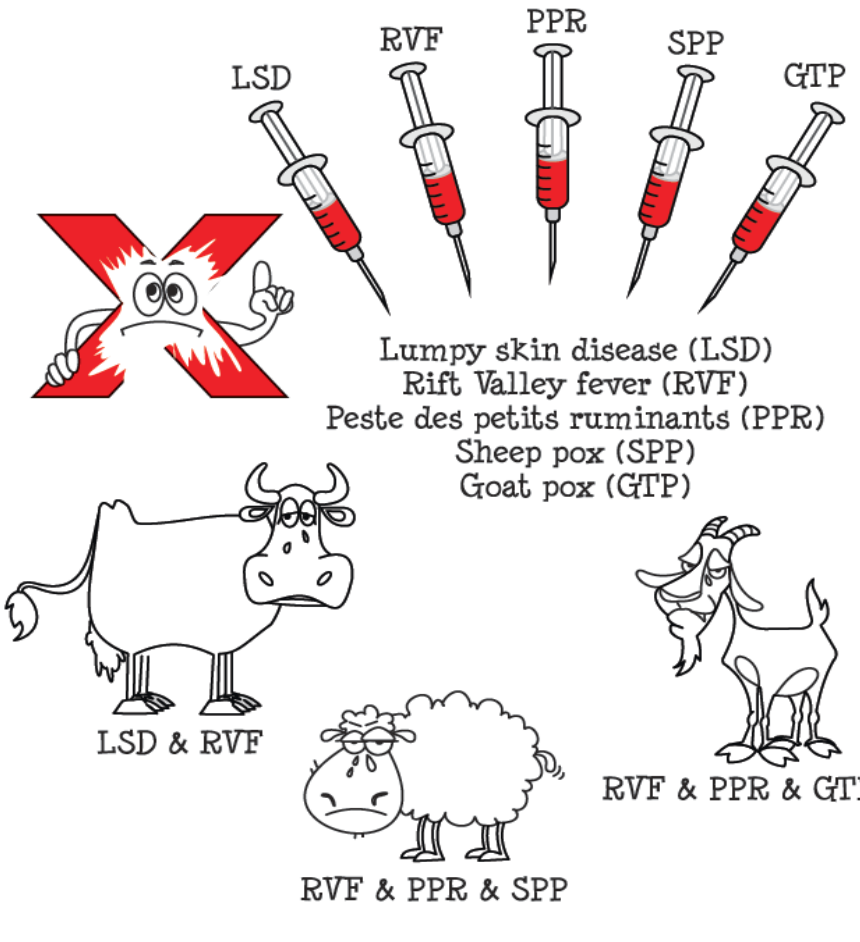
Single vaccine to control 5 animal diseases



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REVIEW OF KEY ORGANISATIONAL PERFORMANCE

Agriculture Research For Developing Farmers

Kaonafatso ya Dikgomo (KyD) Scheme: aims to accelerate participation of small scale livestock farmers into mainstream industries. Integrating scientific analysis into breeding and production of livestock.

Growth trends of participants in KyD Scheme

PROVINCE	2010	2011	2012	2013	2014
Eastern Cape	144	81	325	365	489
Free State	114	118	459	576	576
Gauteng	65	122	289	388	388
Kwazulu-Natal	-	62	592	1859	3900
Limpopo	386	307	744	727	727
Mpumalanga	159	233	642	890	890
Northern Cape	47	180	379	457	457
North West	65	158	348	569	569
Western Cape	-	18	297	403	403
TOTAL	**980**	**1 288**	**4 075**	**6 234**	**8 399**

Marked improvements in: Calving rates for participants were usually below 35%, after joining scheme, calving rates are averaging 55%, with some farmers recording as high as 90%.

Reduced mortality of animals from more than 15% to under 8%

Prices of live animals increased from 40% to 90% of commercial market rate

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STRATEGIC GOAL 3

To ensure the productive use and conservation of natural resources

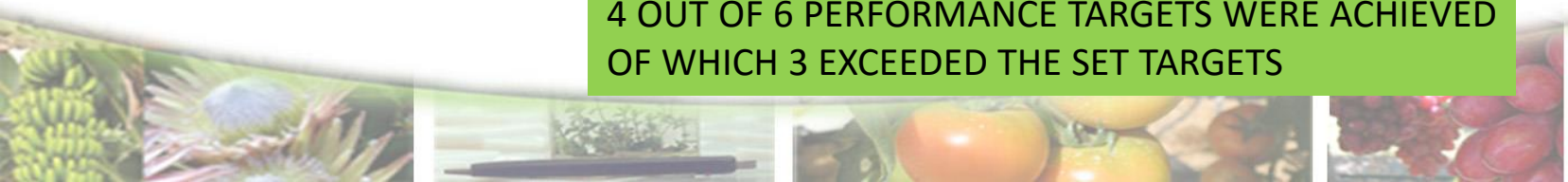
FOCUS OF GOAL

a) Alternative energy technologies
b) New and improved conservation agriculture systems
c) Climate Smart agriculture to enable mitigation and adaptation to climate change
d) Improved water management and irrigation practices
e) Natural resources monitored and characterised
f) Genetic resources, databases updated and maintained
g) Green technologies and processes to mitigate impact of agriculture on the environment
h) Enhanced mechanization in agriculture
i) Agriculture engineering

OUTCOMES WITH ASSOCIATED IMPACT

1. Climate smart agriculture technologies adopted & utilized that sustainably increase agricultural productivity and incomes;
2. Increased resilience of Agriculture to climate change;
3. Reduced greenhouse gas emissions;
4. Optimal agricultural production from increased biodiversity
5. Water efficient agriculture
6. Energy efficient agriculture
7. Optimal utilization of land for sustainable agriculture
8. Appropriate infrastructure for increased, efficient and sustainable agriculture

4 OUT OF 6 PERFORMANCE TARGETS WERE ACHIEVED OF WHICH 3 EXCEEDED THE SET TARGETS



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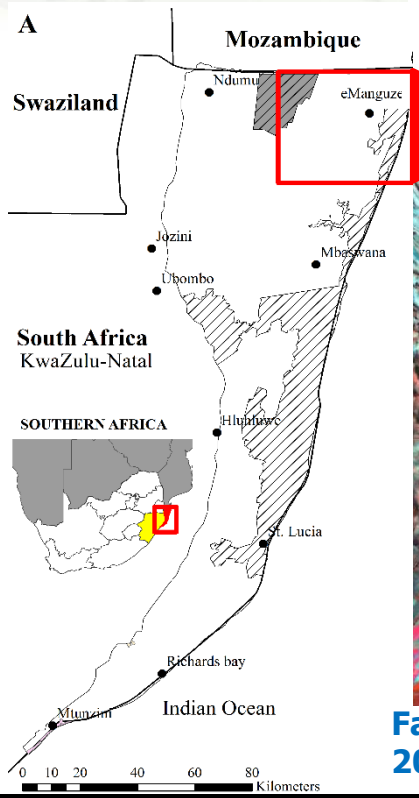
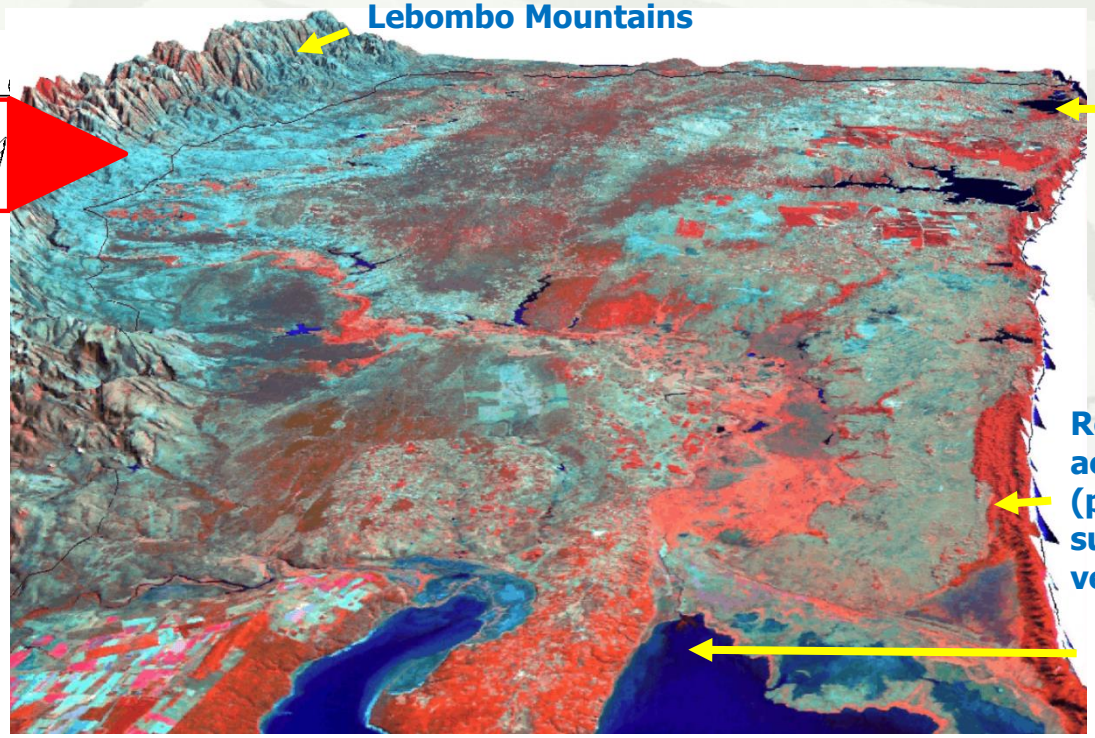
WETLAND RESEARCH PROJECTS

Location: Umkhanyakude District, North-Eastern KwaZulu-Natal





False colour Landsat image (2005) draped over a 20 m DEM (Grundling and Beukes, 2011).

A typical valley bottom wetland found in the coastland area (in the landsat image above). Such wetlands are important for water, small-scale subsistence farming and harvesting of wetland plants for the manufacturing of mats and baskets

RENEWABLE ENERGY SYSTEMS FOR CATTLE FARMERS

Mitigation and adaptation to climate variability and change in the Thabo Mofutsanyane district, Free State (funded by DAFF)

- The ARC furnished 14 smallholder cattle farmers with a Biodigester System.
- The Biodigester System is fed with cow dung and other organic waste, and produces biogas for energy.
- The Biodigester System will:
  - reduce farmers' dependence on wood and gas for heating, and reduce overall methane (a greenhouse gas) emissions from cattle farming; and
  - ultimately improve the economic success and sustainability of rural small-scale cattle farming.

Installing bio-digester

Biodigester installed under ground

A biogas stove at Maloka farm

STRATEGIC GOAL 4

To translate research results to support agrarian transformation and the efficiency and competitiveness of the sector

FOCUS OF GOAL

a) ARC technologies packaged and exploited

b) Established and functional agri – incubators

c) Animal, crop and mixed production systems transferred to smallholder farmers

d) Agriculture Development Centres that are delivering services. ARC footprint and visibility enhanced

e) Smallholder farmer enterprises support

f) Agricultural skills and capacity developed

g) Agriculture research for development outcomes communicated and disseminated

h) Marketing and stakeholder management

ALL 5 PERFORMANCE TARGETS WERE ACHIEVED AND EXCEEDED

OUTCOMES WITH ASSOCIATED IMPACT

1. Increased adoption and use of ARC technologies among smallholder farmers
2. Increased number of functioning and sustainable agriculture enterprises from agri – incubators
3. Increased number of animal, crop and mixed production systems transferred to smallholder farmers
4. Agriculture Development Centres established in all provinces
5. Competitive and sustainable Smallholder enterprises
6. Increased skills base and capacity in agriculture sector
7. Increased use of and application of agriculture science and technology in decision making
8. Improved image and relations of ARC with stakeholders

EFFICIENT WATER USE IN GAUTENG

Small scale farmers were trained in the principles of irrigation performance and they were then required to build their own dripper and micro sprayer systems. It gave substantial guidance to farmers with respect to water use efficiency to assist with food security.

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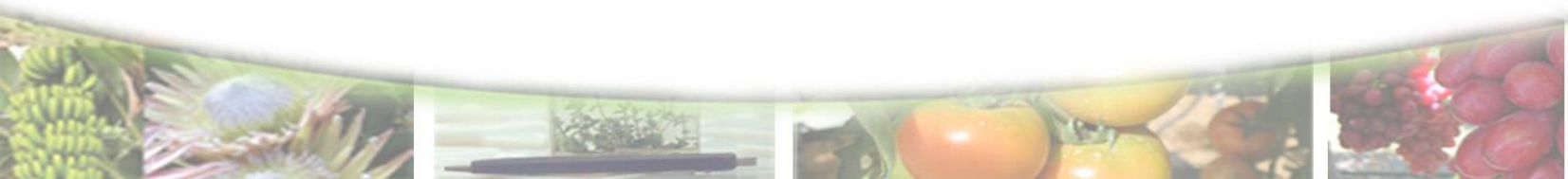
ROLE OF THE ARC IN THE AFRICAN DISPORA

In partnership with the National Agriculture Research Systems (NARS) in 10 countries, the Consultative Group for International Agricultural Research (CGIAR) and Non Governmental Organisations (NGO's) operating in these countries, the ARC:

- conducted **capacity building for fellow Scientists and Extension** on Conservation Agriculture; Pest & Disease Management and Science Communication for sustainable maize and legume production in Ethiopia, Uganda, Rwanda, Kenya, Malawi.
- negotiated a **materials transfer agreement** with AATF for the evaluation of ARC wheat, groundnuts, soybean and cowpea cultivars in Zimbabwe and Malawi.
- **Joint breeding** programme for drought resistant maize cultivar (DroughTEGO) with NARS in Kenya, Mozambique, Malawi, Tanzania and Uganda.
- participated in the 1st General Assembly of Centre for Coordination of Agriculture Research and Development for Southern Africa (CCARDESA) in Gaborone, Botswana.
- Animal Health Scientists participated in the 2nd **One Health Conference** in Africa, jointly organized by Southern African Centre for Infectious Disease Surveillance and the Tanzania Institute for Medical Research.



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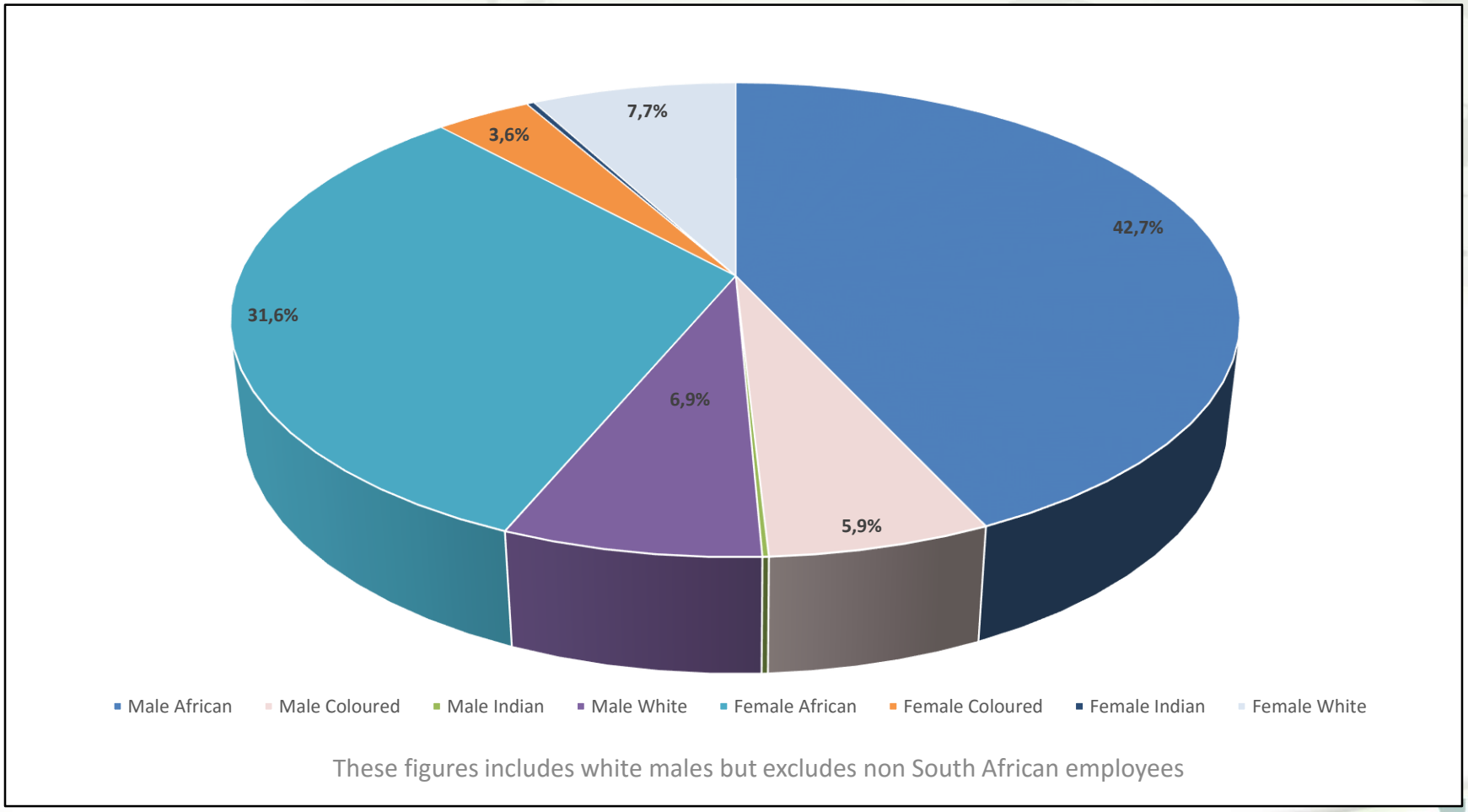
STRATEGIC GOAL 5

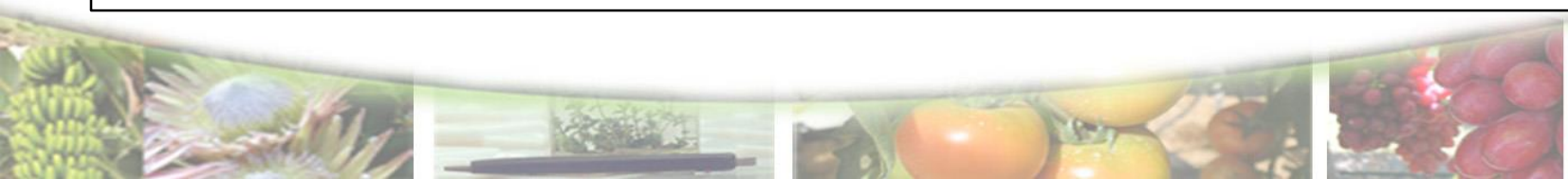
To achieve good governance, financial sustainability and a high performing and visible organization

a) Human Resources

% ARC EMPLOYEE DEMOGRAPHICS AS AT 31/03/2015



These figures includes white males but excludes non South African employees



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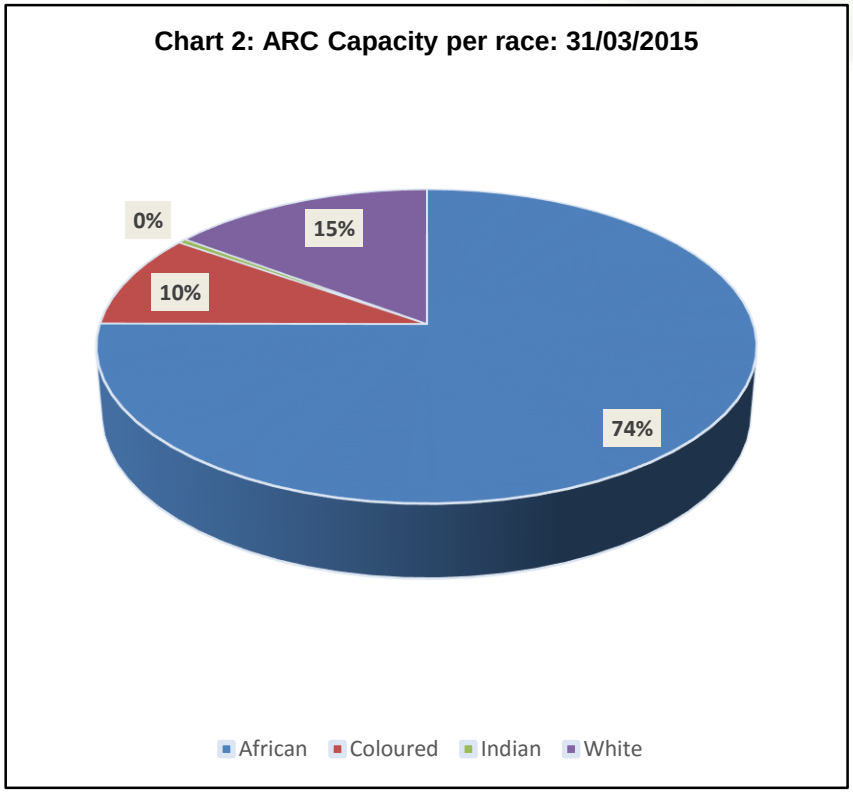
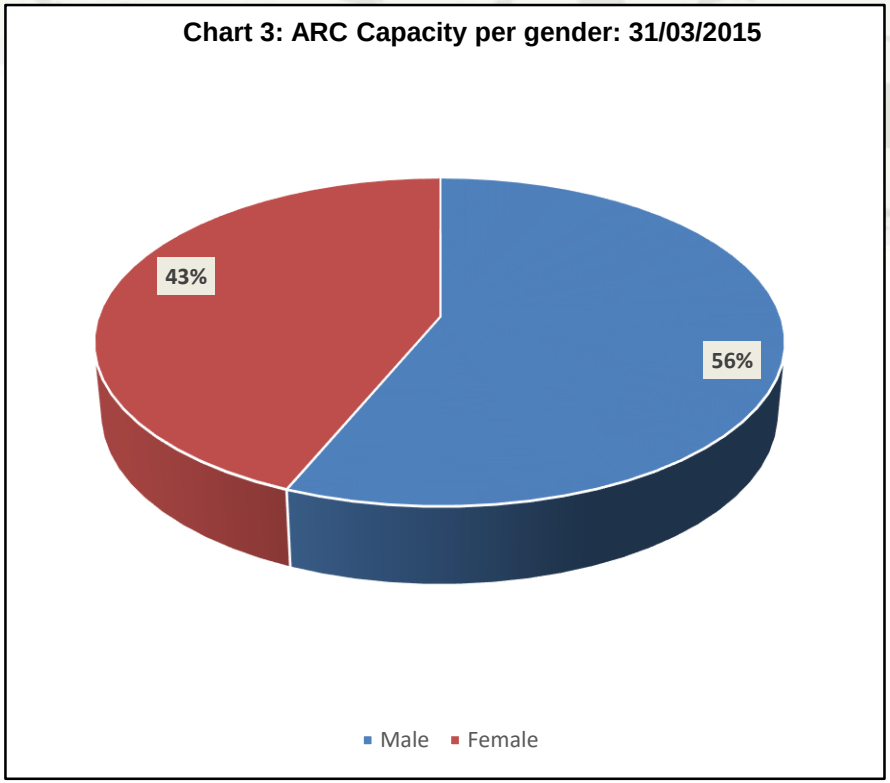
SCIENTIFIC CAPACITY PER RACE AND GENDER

ARC EE Scientific Capacity per race



ARC EE Scientific Capacity per gender



These figures include white males but exclude non South African employees

ARC HUMAN RESOURCE CHALLENGES

a) A high proportion of experienced researchers are approaching retirement.

b) Higher–end specialist skills to ensure future growth of ARC therefore cannot be provided by conventional educational streams.

c) The need for a higher ratio of scientists to total staff, particularly at post graduate level.

d) The urgent need to improve ratios of women, black and young researchers especially researchers vs technicians.

e) The need to improve the qualifications profile of ARC and to expand its SET base (Masters and PhD)

f) The need to develop research capacity in emerging national priority science areas i.e nanotechnology

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b) Information Communication Technology and Infrastructure Management

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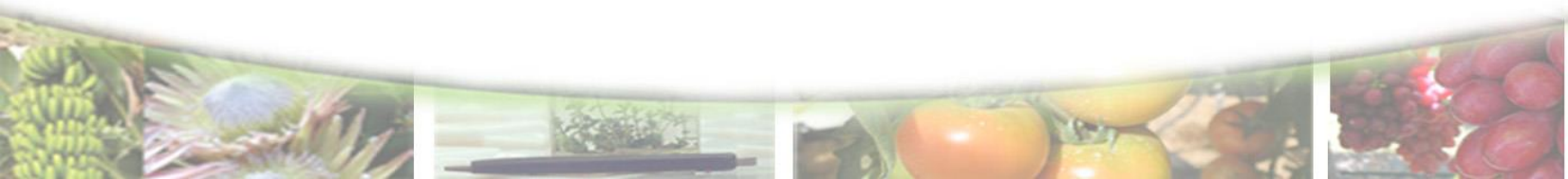
INFORMATION COMMUNICATION TECHNOLOGY

Creating an enabling environment for optimal use of information communication resources to support of ARC business initiatives:

a) innovations to support information dissemination initiatives
b) increased mobility and use of mobile applications
c) improved access to information resources for all employees
d) improved connectivity to enable virtual presence and collaboration
e) improved ICT resources to enable research and development through informatics tools
f) providing a Knowledge Management Platform to enhance ARC research and development initiatives and service delivery



ARC INFRASTRUCTURE MANAGEMENT

Creating an enabling environment for optimal use of infrastructure to support ARC business initiatives:

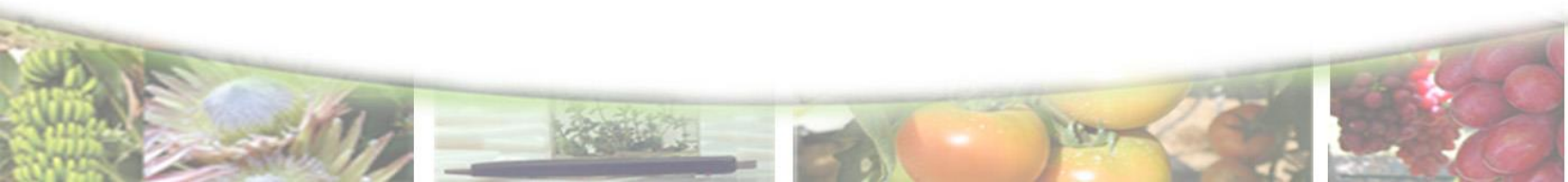
a) optimal use of ARC land, buildings and equipment for research and development

b) optimising use of ARC assets, particularly land (this indirectly contributes to the security of our land and buildings, preventing vandalism, illegal land invasions, etc)

c) improved generation of rental income

d) disposal of non-strategic assets (assets not now and not in future required or usable for agricultural research and development purposes)

e) seeking and building productive partnerships and collaborations with interested 3rd parties (e.g. commercial production of crops where land is not immediately required for research)



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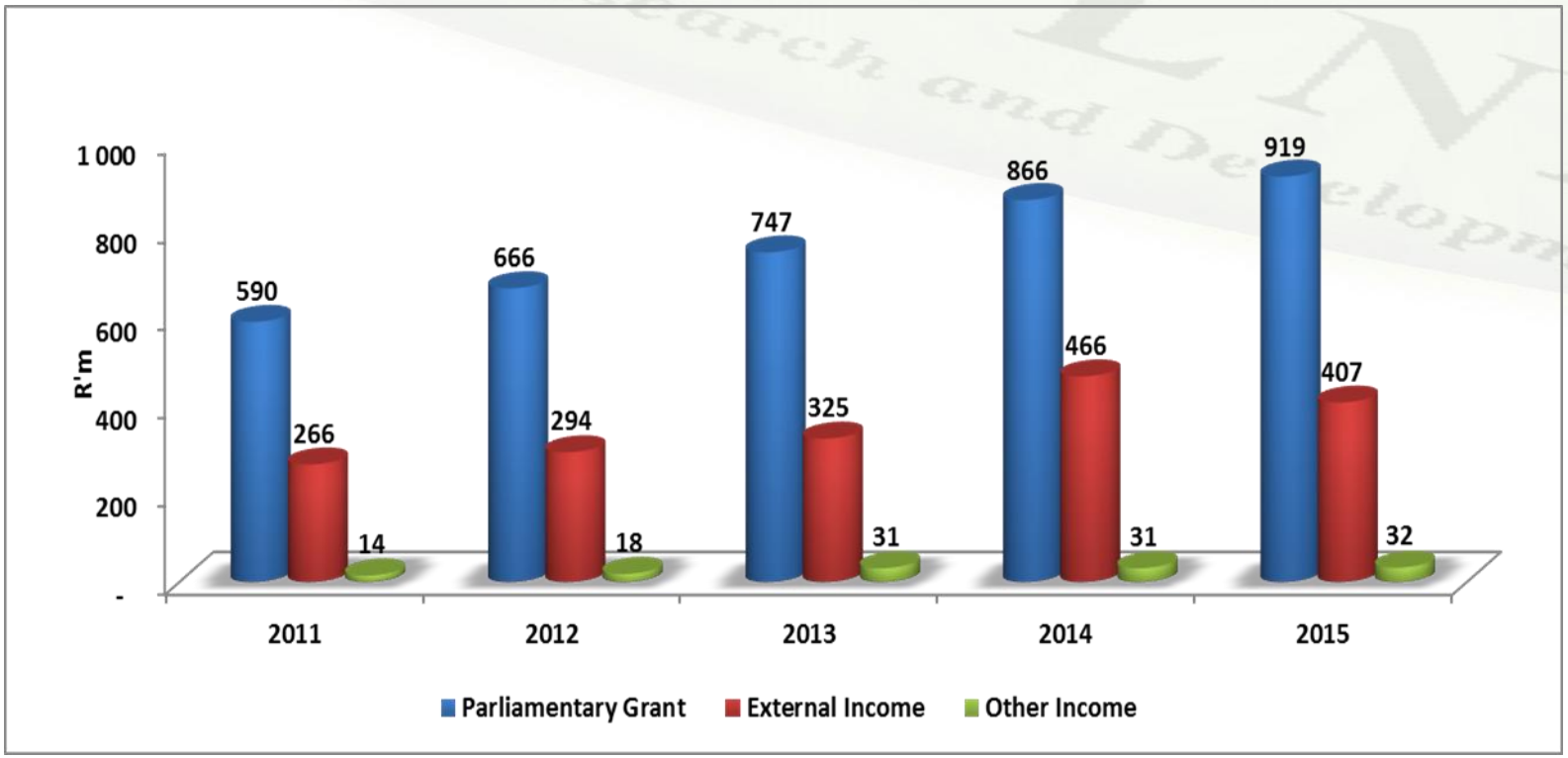
ARC FINANCIAL PERFORMANCE

ARC FINANCIAL MANAGEMENT

Financial Performance	2014 Actual R'm	Var. %	2015 Actual R'm	Var. %	2015 Budget R'm
Parliamentary Grant	**866**	**6%**	**919**	**(4%)**	**957**
PG - Operational	699	**1%**	705	**(0%)**	707
PG - ECSP	92	**46%**	135	**(21%)**	171
PG - Capex	75	**5%**	79	**(0%)**	79
External Income	466	**(13%)**	407	**11%**	365
Other Income	31	**4%**	32	**24%**	26
Total Revenue	**1 363**	**(0%)**	**1 358**	**1%**	**1 348**
Operating Expenditure	**1 227**	**(8%)**	**1 325**	**(4%)**	**1 269**
Personnel Costs	685	**(11%)**	760	**(3%)**	739
Other Operating Costs	491	**(5%)**	517	**(4%)**	497
Depreciation & Impairment	51	**7%**	48	**(40%)**	34
Surplus/(Deficit) for the year	**137**	**(75%)**	**34**	**(57%)**	**79**

ARC LNR
Excellence in Research and Development

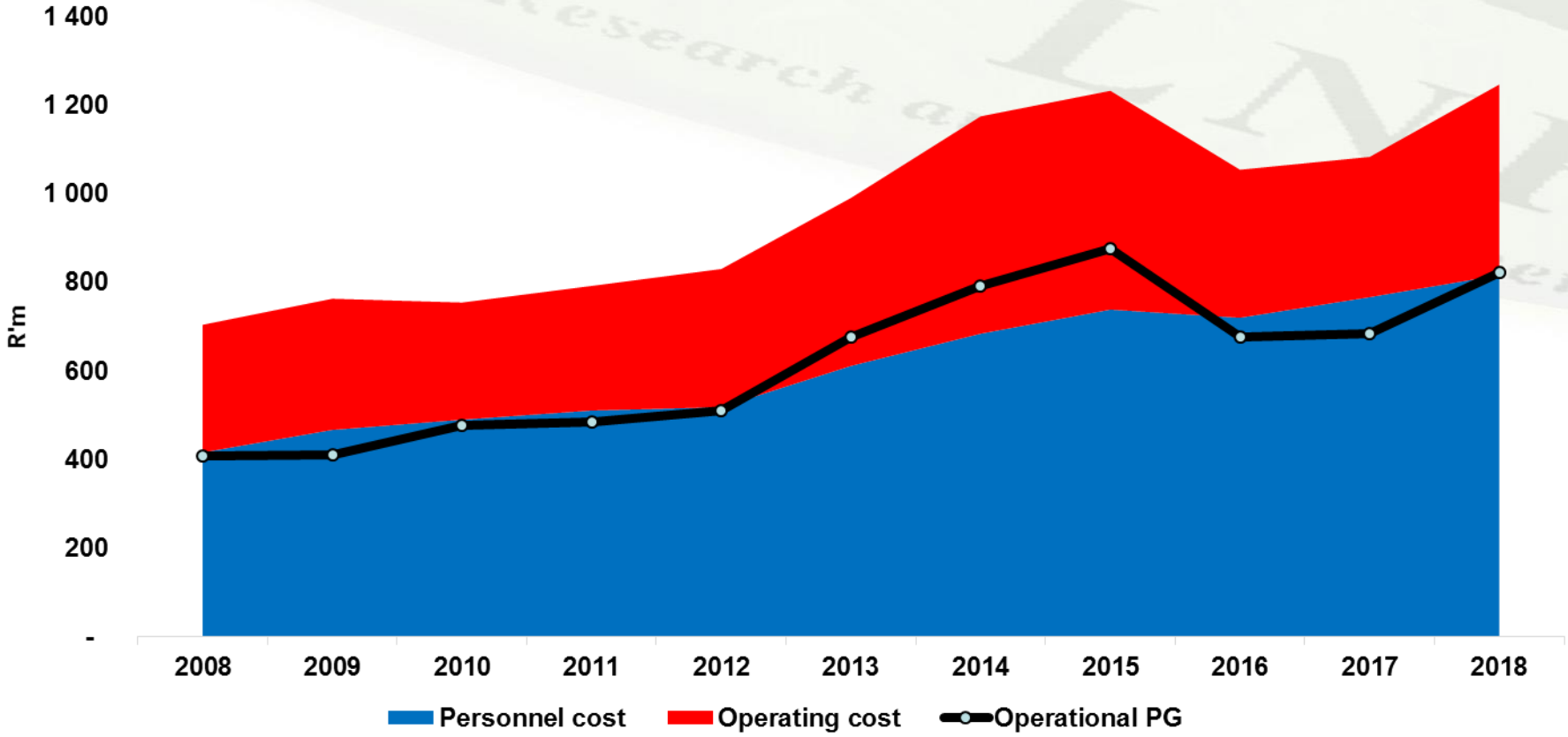
ARC REVENUE FOR 2011/12 – 2014/15



ARC CASH COMMITMENTS 2014/15

	Amount (R'm)
• Cash received in advance from customers	24
• Unspent Economic Competitive and Support Packages (ECSP)	80
• Amount owing to creditors for services/goods received and employees (Leave and Bonus)	250
• Ring-fenced for the completion of the Food – and – Mouth Disease (FMD) Factory	130
• Parliamentary Grant Capex rolled over into the new financial year	38
• Employee benefit obligation	20
• Vat Liability for the year	13
Total	**555**

OPERATIONAL EXPENDITURE VS OPERATIONAL PG (2015/16 – 2017/18)



IMPLICATIONS OF BUDGET CUTS

a) Return to negative cash position over MTEF

b) Inability to fill critical vacancies

c) Student intake will be limited- capacity building

d) Vaccine development projects negatively affected

e) No funds available for any marketing activities

f) Multiyear projects negatively affected

Comments or Questions?

Re a Leboha!

Siyabonga!

Ria Livhuwa!

Ha Khensa!

Siyathokoza!

Re a leboga

Siyabulela!

Baie Dankie!

Thank You