AGRICULTURAL RESEARCH COUNCIL

Strategic Plan: 2015/16 – 2019/20
And
Annual Business Plan for 2016/17
OUTLINE OF PRESENTATION

1. ARC Council Members
2. Executive Management Team
3. ARC Mandate, Vision & Mission
4. ARC Alignment to National Priorities and Policies
5. Science and Agriculture Indicators of Economic Performance
6. ARC Review of Organizational Performance
7. Outcome Oriented Strategic Goals (1 to 6):
   - Goal 1
   - Goal 2
   - Goal 3
   - Goal 4
   - Goal 5
   - Goal 6
8. Critical Success Factors
ARC COUNCIL MEMBERS

1. Prof. Sibusiso Vil-Nkomo, Chair
2. Prof. Michael Kahn, Deputy Chair
3. Ms. Joyce Mashiteng, Chair: Finance, Investment and ICT Committee
4. Mr. Gerard Martin, Chair: Human Resources & Remuneration Committee
5. Prof. Frans Swanepoel, Chair: Research and Development & Evaluation Committee
6. Dr. Shadrack Moephuli, CEO
7. Dr. Joyce Chitja
8. Mr. Mzolisi Dyasi
9. Mr. Ismail Motala
10. Mr. Nick Nicholls
11. Dr. Wilna van Rijssen
12. Mr. Alan Bishop
13. Mr. Clive Kneale
14. Prof. Louw Hoffman
ARC EXECUTIVE MANAGEMENT TEAM

1. Dr. Shadrack Moephuli, CEO
2. Mr. Gabriel Maluleke, Chief Financial Officer
3. Dr. Nthabisent Motete, Group Executive: Crop Sciences
4. Ms. Makgomo Umlaw, Group Executive: Human Resources & Legal Services
5. Mr. Frans Monkwe, Group Executive: ICT and Infrastructure
6. Dr. Jasper Rees, Group Executive: Research & Innovation Systems
7. Dr. Andrew Magadlela, Group Executive: Animal Sciences
8. Dr. Litha Magingxa, Group Executive: Agriculture Economics and Capacity Development
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.
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.
1. To generate knowledge and technologies that will enhance the efficiencies in crop based agriculture;
2. To generate knowledge and technologies that will enhance the efficiencies in animal based agriculture;
3. To generate knowledge and technologies for the conservation and utilization of natural resources;
4. To generate knowledge, solutions and technologies for food safety, quality and improved efficiencies in the agriculture value chain;
5. Translate research outputs in order to generate knowledge, facilitate decision making and contribute to the transformation in the agriculture sector; and,
6. Apply resource management practices towards a high performing and visible organization.
ARC SCIENCE & ROLE IN 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

AGRIC. 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.)
Strategic Goal 1
To generate knowledge and technologies that will enhance the efficiencies in crop based agriculture

• Crop production for broadening of the food base, ensuring food and nutritional security and welfare
• Optimised crop production systems to mitigate agricultural risks in the changing environment
• Crop science research and development for improved cultivars of food and non-food crops (breeding, genetics and physiology)
• Enhanced crop protection systems
• Development and transfer of appropriate technologies to smallholder farmers for sustainable production systems
• Characterising and evaluating crops in terms of quality, nutritional composition, shelf life and suitability for processing
• Improvement of agricultural production and profitability through adaptive and innovative crop management and production systems such as conservation agriculture
• Lowering input costs
• Crop cultivar development through genetic improvement and modification
• Disease and pest control by means of enhanced genetic diversity, Bio-control and strategies for management of alien invaders
• Training of crop growers and extension staff to ensure sustainable production
• Provision of scientific services to farmers and other clients of ARC
ARC is working with Jermart Seeds and Capstone Seeds to market WE3127 and WE3128 hybrids in RSA, and to this end, Capstone committed to produce 50 tonnes of Certified seed and Jermart committed to produce 80 t of Certified seed to meet demands of small holder farmers for the 2016/17 summer planting season.

Continued engagements with farmers in rural communities to promote WEMA varieties and to document impact analysis of WEMA products. Drought tolerant WEMA varieties are on very high demand among due to good yields and farmer’s days events of 2015 were well attended. More farmer’s days are planned for 2016 to include all provinces affected by drought.

Recorded yields for from WEMA varieties in Mokopane (Limpopo) among 9 Small Holder Farmers were 1.14 t/ha compared to 0.6 t/ha from other varieties. In Mooifontein (North West) where rainfall was as low as 250 mm rainfall, farmers achieved record yields of 2 t/ha with WEMA compared to 1.5 t/ha with other varieties.

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of Female participants</th>
<th>Number of Male participants</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madikwe (NW) – 19 March</td>
<td>55</td>
<td>27</td>
<td>82</td>
</tr>
<tr>
<td>Mooifontein (NW) – 19 May</td>
<td>23</td>
<td>55</td>
<td>78</td>
</tr>
<tr>
<td>Polokwane (L) – 27 May</td>
<td>150</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>Hamakuya (L) – 29 May</td>
<td>57</td>
<td>40</td>
<td>97</td>
</tr>
<tr>
<td>Mooifontein (NW) – 26 June</td>
<td>23</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>Mokopane (L) – 22 July</td>
<td>35</td>
<td>30</td>
<td>65</td>
</tr>
<tr>
<td>QwaQwa (FS) – 24 July</td>
<td>90</td>
<td>58</td>
<td>148</td>
</tr>
<tr>
<td>TOTALS</td>
<td>433</td>
<td>372</td>
<td>805</td>
</tr>
</tbody>
</table>
ARC (Agricultural Research Council) distributed 10 000 seed packs, 500 grams each, free to smallholders in Limpopo, Mpumalanga, North West, State and KwaZulu-Natal for them to try out the variety. According to Isaiah Setseta, chairman of the Mokaba Farmers’ Association, their yield was 1.14t/ha compared to 0.6t/ha the previous season, with good rains – 100% increase in a season that has been termed the worst in two decades. They only had rain immediately after planting and again during flowering. At Mooifontein, near Lichtenburg, North West, according to Prince Molema, one of four smallholders who planted the drought tolerant maize, their average yield was 2t/ha compared to 1.5t/ha for other commercial hybrids. Average rainfall during the season was 250 mm compared to an average 500 mm in a normal year.

**Mokopane (Limpopo):** 9 Small Holder Farmers
Yield was 1.14 t/ha from 0.6 t/ha

**Mooifontein (NW):**
- 250 mm rainfall
- 2 t/ha vs 1.5 t/ha
Plant Growth Facility
Controlled and Contained Environment

- LED lights; temperature, humidity, CO2 all controlled independently in 3 growth compartments
- GMO and pathogen containment to BSL3 level facility
- Completely designed and built locally by ARC and local engineering firm (LIS)
Plant Phenomics Platform

- National Research Foundation and ARC – PG Funded
- For high through put plant imaging for breeding, disease and stress studies
- For implementation in 2016-18
Strategic Goal 2
To generate knowledge and technologies that will enhance the efficiencies in animal 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:

a) High quality improved meat and dairy products that are safe, highly nutritional with visual appeal;
b) Disease free herds (livestock & wildlife);
c) Reduced degradation of rangelands;
d) Improved livestock production through adoption of improved rangeland management
e) Effective animal breeding methods/techniques
f) Increased efficiency of livestock production from breeding
g) Improved livelihoods among smallholder farmers
h) Reduced number of stock theft incidents
i) Disease and residue free animal products for increased market access
Strategic Goal 2
To generate knowledge and technologies that will enhance the efficiencies in animal based agriculture

To counter this problem the ARC has developed a new attenuated heartwater vaccine!!
1. Heartwater is a tick–borne disease of ruminant animals caused intracellular bacteria, Ehrlichia ruminantium

2. Economic losses in Sub–Saharan Africa are estimated R975 million per annum, costs to South African farmers (commercial and emerging sector) estimated at R220 million annually, which will be saved when the vaccine is available commercially.

3. The production of mohair (the hair of the Angora goat; the most susceptible animal to the disease) in 2013 was approximately 2.3-million kilograms of the fibre, which is highly sought after in the world’s fashion capitals in Europe and increasingly in China. The availability of a HW vaccine will boost mohair production as Angora goats are the most susceptible.

4. Farming with Angora goats is considered the most profitable livestock farming operation in South Africa.

5. FACT: Last year’s production of mohair in South Africa earned local farmers about R250m and the exported product earned almost R800m.

6. The mohair industry, is mostly based in the Eastern Cape, and provides about 6,000 jobs, about 30,000 dependants, 1,000 commercial farmers and a fast-growing sector of smallholder farmers.

7. Losses in cattle, sheep and others goat breeds combined also run into the millions. Development of new vaccine will play vital role in expanding the number of successful livestock farmers resulting in reduced losses and increase in revenue for the farmers.
ARC DEVELOPED AN ATTENUATED HEARTWATER VACCINE

ADVANTAGES:
1. Broad spectrum: attenuated vaccines activate all phases of the host immune systems
2. Produce durable immunity (6 months-lifelong).
3. No live animals are used for production
4. They are cheaper to produce
5. Treatment with antibiotics is not necessary after vaccination
6. Do not revert back to virulence
7. Production in a closed in vitro culture system minimizes the risk of introducing extraneous biological contaminants.
ARC ENABLING ACCESS OF THE HEARTWATER VACCINE FOR ALL FARMERS

NEXT STEPS FOR MASS PRODUCTION & MARKETING:

1. Collaborate with OBP to develop product safety, production and packaging information for successful registration of vaccine with government
2. Vaccine Registration
3. ARC product licensing to OBP or other manufacturer/s
4. Scientific and Technical information exchange with OBP (Technology Transfer)
5. Commercial Production of approved doses by OBP & product marketing
   • Vaccine estimated to be on the market 12 to 24 months
Kaonafatso ya Dikgomo (Animal Improvement Scheme)

- Major achievement in the 2015/2016 FY – Exceeded a milestone of 8000 smallholder livestock farmers receiving ARC scientific services

- Expected Impact:
  - A viable and sustainable commercial smallholder livestock sector
  - Better rural livelihoods from livestock-based agriculture
  - More productive smallholder livestock sector
Key Deliverables for Kaonafatso ya Dikgomo (Animal Improvement Scheme)

- Provide access to scientific analysis with services in the form of advisory services on:
  - Animal husbandry principles
  - Breeding and reproduction
  - Nutrition
  - Animal health
  - Rangeland management

- Facilitate market access for smallholder farmers

- Registration of farmers on the national animal database Integrated Registration and Genetic Information System (INTERGIS)

- Process (quantitative and qualitative genetic information) performance data and generate reports to assist farmers with selection and breeding decisions
Improving the gene pool in the smallholder beef sector

1. ARC has partnered with the IDC in the project to improve the quality of breeding stock in the smallholder holder beef sector

2. The role of the ARC in this project is to breed high quality bulls and make them available to The IDC for distribution to smallholder farmers
   - The ARC currently owns genetically superior Nguni and Bonsmara stud herds in Loskop and Roodeplaat respectively
   - The herds have a good history of producing breeding stock that is sought after by the industry

3. The potential benefits and impacts of the project are:
   - Improved access to good bulls by smallholder farmers particularly communal farmers
   - High quality breeding stock that would lead to improved production efficiency
   - Restoration of genetic diversity among the cattle owned by smallholder farmers through prevention of indiscriminate crossbreeding
Facilitating Market Access for smallholder livestock farmers

1. A 3-year project funded by ARC and the Australian Center for International Agricultural Research (ACIAR)
2. The project officially commenced in 2015
3. The aim of the project is to establish high quality markets and value chains for smallholder beef farmers in South Africa

➢ Project partners include:

A value chain for the Woolworths free range beef is being established in Cradock, EC
ARC and DRDLR – Dairy Value Chain Project

1. The project aims to develop dairy value chain in rural communities of the Eastern Cape and Limpopo Provinces in order to stimulate rural economy.

2. Project is implemented in the following areas:
   - EC:
     - Alfred Nzo: Mbhizana: Mngungu Village
     - OR Tambo: Butterworth: Bethel College: Butterworth
   - LP:
     - Sekhukhune: Makuduthamaga: Mokwete, Vergelegen, GaMolepane - Ward 11 & 9
     - Vhembe: Makhado: Njhakanjaka – Ward 8

3. Expected Outcome/s include:
   - Employment creation for graduate students and dairy entrepreneurs in the DVC
   - Income generation from milk sales, improved food and protein nutrition for community,
   - Diversification of cropping system to fodder production, soil fertility improvement through dairy manure nutrient re-cycling
   - Opportunity for other business, human capacity development through training, contribution to national milk production from smallholder sector
Strategic Goal 3
To generate knowledge and technologies for the conservation and utilization of natural resources

<table>
<thead>
<tr>
<th>FOCUS OF GOAL:</th>
<th>OUTCOMES WITH ASSOCIATED IMPACT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Alternative energy technologies</td>
<td>a) Climate smart agriculture technologies adopted &amp; utilized that sustainably increase agricultural productivity and incomes;</td>
</tr>
<tr>
<td>b) New and improved conservation agriculture systems</td>
<td>b) Increased resiliency of Agriculture to climate change;</td>
</tr>
<tr>
<td>c) Climate Smart agriculture to enable mitigation and adaptation to climate change</td>
<td>c) Reduced greenhouse gas emissions;</td>
</tr>
<tr>
<td>d) Improved water management and irrigation practices</td>
<td>d) Optimal agricultural production from increased biodiversity</td>
</tr>
<tr>
<td>e) Natural resources monitored and characterised</td>
<td>e) Water efficient agriculture</td>
</tr>
<tr>
<td>f) Genetic resources, databases updated and maintained</td>
<td>f) Energy efficient agriculture</td>
</tr>
<tr>
<td>g) Green technologies and processes to mitigate impact of agriculture on the environment</td>
<td>g) Optimal utilization of land for sustainable agriculture</td>
</tr>
<tr>
<td>h) Enhanced mechanization in agriculture</td>
<td>h) Appropriate infrastructure for increased, efficient and sustainable agriculture</td>
</tr>
<tr>
<td>i) Agriculture engineering</td>
<td></td>
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</tbody>
</table>
# Remote Sensing Systems

<table>
<thead>
<tr>
<th>Platform</th>
<th>Distance</th>
<th>Scale</th>
<th>Resolution</th>
<th>EMS spectrum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36 000 km</td>
<td>Global Continental National</td>
<td>1 - 5 Km</td>
<td>VIS / IR / Thermal</td>
</tr>
<tr>
<td>600 km</td>
<td>Provincial District Farm Big Field</td>
<td>1 - 250 m</td>
<td>VIS / IR / Thermal / RADAR Hyperspectral</td>
<td></td>
</tr>
<tr>
<td>1 – 10 km</td>
<td>District Farm Field</td>
<td>20 cm – 5 m</td>
<td>VIS / IR / Thermal / Hyperspectral LIDAR / Gas</td>
<td></td>
</tr>
<tr>
<td>50-1000 m</td>
<td>Farm Field</td>
<td>10 cm – 2.5 m</td>
<td>VIS / IR / Thermal / Hyperspectral LIDAR / Gas</td>
<td></td>
</tr>
<tr>
<td>10 -500 m</td>
<td>Field Plot</td>
<td>5 cm – 2 m</td>
<td>VIS / IR / Thermal / Hyperspectral LIDAR / Gas</td>
<td></td>
</tr>
<tr>
<td>1cm -10 m</td>
<td>Plot Plant</td>
<td>5 mm – 5 m</td>
<td>VIS / IR / Thermal / Hyperspectral LIDAR / Gas</td>
<td></td>
</tr>
</tbody>
</table>
Remote sensing/imaging and near-range sensing systems - by 2030

- Applications in research and production environments for decision making (e.g. Land use mapping and management etc.)
- Complete range of technologies for sensing and detection
- Integration of data from different systems
- Delivery of analysed and interpreted data back to farmers at field level to mobile devices in near-real time
- Full integration of sensing systems for plant and animal phenomics
The above figures show that the current season (January 2016) is drier than the previous season (January 2015). The current situation is a result of El Nino, which restricted rainfall in most parts of the country last year. The figure of January 2016 indicates the degree of soil moisture deficit, which made planting impossible during the planting season.

Information about drought conditions has been communicated by the ARC to stakeholders including farmers.
Potential impacts of projected climate change on occurrence of droughts and production potential

Suitability for rainfed maize (long/medium growing period)
Criteria: rainfall, minimum temperature, maximum temperature and soil
Median of six climate projections for 2015, 2030, 2060 and 2090

Maize
RESEARCH ON CLIMATE CHANGE FOR AGRICULTURE RESILIENCE

• Modeling and Forecast data for farmers in the context of El Nino and 2015-16 Drought

• Future modeling for crop suitability studies and land use prediction

• Modeling for water use management
Strategic Goal 4
To generate knowledge, solutions and technologies for food safety, quality and improved efficiencies in the agriculture value chain

FOCUS OF GOAL:

a) New food and non-food processes and products developed
b) Improved quality and yield through developments in food sciences and technologies
c) Reduced post–harvest losses
d) Improved shelf life of agricultural products and food
e) New animal products developed

OUTCOMES WITH ASSOCIATED IMPACT:

a) Increased number of new food and non–food products and processes
b) Improved quality and safety of food through agro–processing
c) Improved quality and yield through developments in food sciences and technologies
d) Tools for animal and plant disease studies
e) Knowledge and information for decision support systems.
Strategic Goal 5
Translate research outputs in order to generate knowledge, facilitate decision making and contribute to the transformation in the agriculture 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

OUTCOMES WITH ASSOCIATED IMPACT:

a) Increased adoption and use of ARC technologies among smallholder farmers
b) Increased number of animal, crop and mixed production systems transferred to smallholder farmers
c) Increased skills base and capacity in agriculture sector
d) Increased use of and application of agriculture science and technology in decision making
e) Improved image and relations of ARC with stakeholders
Key achievements towards Strategic Goal 5

- More than 10,000 Smallholder Farmers trained in various provinces of South Africa.
- 1600 Extension Personnel trained, including Animal Health Technicians.
- 9000 Scientific Services rendered to smallholder farmers (Animal Diagnostics, Livestock Improvement, Soil & Water Analysis, Plant Health)
- 32 Scientific demonstration sites established (13 Dipping Facilities, 14 On-Farm Trials; 2 Crush-pens, 1 Auction Facility)
- Strong partnerships were forged with Provincial Departments, Municipalities and Traditional Leaders of Agriculture and Rural Development in various provinces.
IMPACT OF INVESTMENTS IN AGRICULTURE RESEARCH

Return on investment established for research programmes on:

- peaches and nectarines and
- plums

Genetic and Economic Impacts of the National Dry bean Breeding Programme established

- ARC-GCI’s dry bean varieties contributed about 11.65 kg of dry bean output per hectare per year between 1972-2014
- Value of yield benefits is about R31.8 million (in 2014 currency values) per year
- Area planted ARC varieties increased from 4.6% in 1992 to 35.9% in 2014
- Rate of return - 8.92% per year
Strategic Goal 6
Apply Resource Management Practices, towards a high performing and visible organization

FOCUS OF THE GOAL:
- Funding revenue and cost management
- Asset optimization and control
- Sound Corporate Governance
- Compliance, risk and audit
- Skills and Capacity Development
- Provision and Control of various tools of trade
- Human Resource policies, procedures and systems
- Corporate legal and business support services
- Information Communication Technology
- Ensuring optimal visibility of ARC
FINANCIAL PERFORMANCE
Background to ARC Financial Management

![Graph showing financial figures from 2007 to 2019]
Budget Assumptions

a) Parliamentary Grant cuts R194m for 2015/16-201617
b) Salary increases 6% - Estimate
c) Projected electricity increase 9.4%
d) Reduction rural development projects
e) External income remains flat
f) No allocation for the completion of the FMD facility
# ARC Financial Position (MTEF) 2015/16 – 2018/19

## Financial Performance

<table>
<thead>
<tr>
<th></th>
<th>2016 Forecast R'm</th>
<th>Var. %</th>
<th>2017 Budget R'm</th>
<th>Var. %</th>
<th>2018 Budget R'm</th>
<th>Var. %</th>
<th>2019 Budget R'm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parliamentary Grant (PG)</td>
<td>801</td>
<td>(6%)</td>
<td>755</td>
<td>19%</td>
<td>898</td>
<td>6%</td>
<td>950</td>
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<tr>
<td>PG - Operational</td>
<td>662</td>
<td>1%</td>
<td>668</td>
<td>21%</td>
<td>807</td>
<td>6%</td>
<td>854</td>
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<tr>
<td>PG - ECSP</td>
<td>57</td>
<td>(100%)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PG - CAPEX</td>
<td>83</td>
<td>5%</td>
<td>87</td>
<td>5%</td>
<td>91</td>
<td>5%</td>
<td>96</td>
</tr>
<tr>
<td>External Income</td>
<td>410</td>
<td>0%</td>
<td>410</td>
<td>6%</td>
<td>434</td>
<td>6%</td>
<td>461</td>
</tr>
<tr>
<td>Other Income</td>
<td>52</td>
<td>(47%)</td>
<td>27</td>
<td>2%</td>
<td>28</td>
<td>2%</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>1 264</strong></td>
<td><strong>(6%)</strong></td>
<td><strong>1 192</strong></td>
<td><strong>14%</strong></td>
<td><strong>1 361</strong></td>
<td><strong>6%</strong></td>
<td><strong>1 439</strong></td>
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</table>

## Expenditure

<table>
<thead>
<tr>
<th></th>
<th>2016 Budget R'm</th>
<th>Var. %</th>
<th>2017 Budget R'm</th>
<th>Var. %</th>
<th>2018 Budget R'm</th>
<th>Var. %</th>
<th>2019 Budget R'm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel Costs</td>
<td>772</td>
<td>6%</td>
<td>818</td>
<td>5%</td>
<td>859</td>
<td>5%</td>
<td>902</td>
</tr>
<tr>
<td>Operating Expenditure</td>
<td>471</td>
<td>(47%)</td>
<td>248</td>
<td>49%</td>
<td>369</td>
<td>8%</td>
<td>398</td>
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<tr>
<td>Depreciation &amp; Impairment</td>
<td>39</td>
<td>(5%)</td>
<td>37</td>
<td>5%</td>
<td>39</td>
<td>5%</td>
<td>41</td>
</tr>
<tr>
<td><strong>Net Surplus/(Deficit)</strong></td>
<td><strong>(19)</strong></td>
<td><strong>(564%)</strong></td>
<td><strong>89</strong></td>
<td><strong>5%</strong></td>
<td><strong>93</strong></td>
<td><strong>5%</strong></td>
<td><strong>98</strong></td>
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## ARC Balance Sheet and Cash Flow 2015/16 – 2018/19

### Balance Sheet

<table>
<thead>
<tr>
<th></th>
<th>2016 Forecast</th>
<th>2017 Budget</th>
<th>2018 Budget</th>
<th>2019 Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R'm</td>
<td>R'm</td>
<td>R'm</td>
<td>R'm</td>
</tr>
<tr>
<td></td>
<td>Var. %</td>
<td>Var. %</td>
<td>Var. %</td>
<td>Var. %</td>
</tr>
<tr>
<td>Property, plant and equipment</td>
<td>1 001 (10%)</td>
<td>1 104 (5%)</td>
<td>1 156 (5%)</td>
<td>1 210</td>
</tr>
<tr>
<td>Investments</td>
<td>5 (0%)</td>
<td>3 (0%)</td>
<td>5 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Current assets (excluding cash)</td>
<td>155 (24%)</td>
<td>119 (11%)</td>
<td>132 (8%)</td>
<td>120</td>
</tr>
<tr>
<td>Cash resources (net of bank overdraft)</td>
<td>384 (26%)</td>
<td>286 (26%)</td>
<td>361 (3%)</td>
<td>372</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td><strong>1 545 (2%)</strong></td>
<td><strong>1 514 (9%)</strong></td>
<td><strong>1 654 (3%)</strong></td>
<td><strong>1 708</strong></td>
</tr>
<tr>
<td>Capital and Reserves</td>
<td>982 (9%)</td>
<td>1 071 (9%)</td>
<td>1 164 (8%)</td>
<td>1 262</td>
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<tr>
<td>Non Current Liabilities</td>
<td>193 (0%)</td>
<td>193 (0%)</td>
<td>193 (0%)</td>
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<tr>
<td>Current Liabilities</td>
<td>371 (32%)</td>
<td>253 (19%)</td>
<td>301 (14%)</td>
<td>259</td>
</tr>
<tr>
<td><strong>Total Equity and Liabilities</strong></td>
<td><strong>1 545 (2%)</strong></td>
<td><strong>1 516 (9%)</strong></td>
<td><strong>1 658 (3%)</strong></td>
<td><strong>1 714</strong></td>
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### Cash Flow

<table>
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<tr>
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<th>2016 Forecast</th>
<th>2017 Budget</th>
<th>2018 Budget</th>
<th>2019 Budget</th>
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<tr>
<td></td>
<td>R'm</td>
<td>R'm</td>
<td>R'm</td>
<td>R'm</td>
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<tr>
<td></td>
<td>Var. %</td>
<td>Var. %</td>
<td>Var. %</td>
<td>Var. %</td>
</tr>
<tr>
<td>Net cash flow from operating activities</td>
<td>(39) (71%)</td>
<td>(11) (1 595%)</td>
<td>(166) (36%)</td>
<td>107</td>
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<tr>
<td>Net cash flow from investing activities</td>
<td>(86) 4%</td>
<td>(89) 5%</td>
<td>(93) 5%</td>
<td>(98)</td>
</tr>
<tr>
<td>Cash and cash equivalents at beginning of year</td>
<td>508 (24%)</td>
<td>384 (26%)</td>
<td>284 26%</td>
<td>357</td>
</tr>
<tr>
<td>Cash and cash equivalents at end of year</td>
<td>384 (26%)</td>
<td>284 26%</td>
<td>357 3%</td>
<td>365</td>
</tr>
</tbody>
</table>
Operational Expenditure vs Operational PG (2008/09 – 2018/19)
IMPLICATIONS OF BUDGET CUTS ON ARC OPERATIONS

a) Return to negative cash position over MTEF

b) Inability to fill critical vacancies – risks to biosecurity

c) Student intake will be limited - capacity building

d) Vaccine development projects negatively affected – inability to produce FMD vaccine

e) No funds available for scaling up technology dissemination

f) Multiyear projects negatively affected
PERCENTAGES PER YEAR

<table>
<thead>
<tr>
<th>Year</th>
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<th>Indian</th>
<th>White</th>
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<td>9.5</td>
<td>0.6</td>
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<td>2008</td>
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<tr>
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<td>0.7</td>
<td>36.2</td>
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<tr>
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<td>PhD</td>
<td>Total</td>
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### Age Distribution of Employees Per Year

#### Number of Employees Per Age Group Per Year

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<tr>
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<td>2005</td>
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<td>630</td>
<td>750</td>
<td>528</td>
<td>123</td>
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<tr>
<td>2006</td>
<td>372</td>
<td>596</td>
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<td>2007</td>
<td>328</td>
<td>553</td>
<td>828</td>
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<td>2008</td>
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<td>238</td>
<td>469</td>
<td>767</td>
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<td>195</td>
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<td>442</td>
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<td>554</td>
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<tr>
<td>2015</td>
<td>192</td>
<td>486</td>
<td>490</td>
<td>660</td>
<td>174</td>
</tr>
</tbody>
</table>

#### Employee Age Groups at ARC

![Graph showing employee age groups from 2004 to 2016](image-url)
ARC GENDER DISTRIBUTION OF EMPLOYEES

PERCENTAGES OF MALES TO FEMALES

ARC Employment Equity Capacity per gender

44% Male

54% Female
CRITICAL SUCCESS FACTORS FOR THE ANNUAL BUSINESS PLAN

1. Optimal use of resources (finances, equipment, infrastructure & people);
2. Successful recruitment of highly qualified, enthusiastic and energized people;
3. Development of a revised ARC ICT strategy;
4. Review of current funding model and development of a new sustainable funding model in consultation with key stakeholders (e.g. DAFF, DST, NT, Commodity Organizations, Farmers, etc); and,
5. Implementation of recommendations emanating from the ARC External Institutional Review
Re a Leboha!
Siyabonga!
Ria Livhuwa!
Ha Khensa!
Siyathokoza!
Re a leboga
Siyabulela!
Baie Dankie!
Thank You