AGRICULTURAL RESEARCH COUNCIL

Implementing Strategic Plan: 2015/16 – 2019/20

Through

Annual Business Plan: 2018/19

ARC MANDATE, VISION & MISSION

MANDATE: *In terms of the Agricultural Research Act*

To promote the agricultural and related sectors through:

- ➢ *Research*
- ➢ *Development, and,*
- ➢ *Technology Transfer*

VISION:

Excellence in agricultural research and development

MISSION:

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

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ARC ALIGNMENT TO NATIONAL PRIORITIES
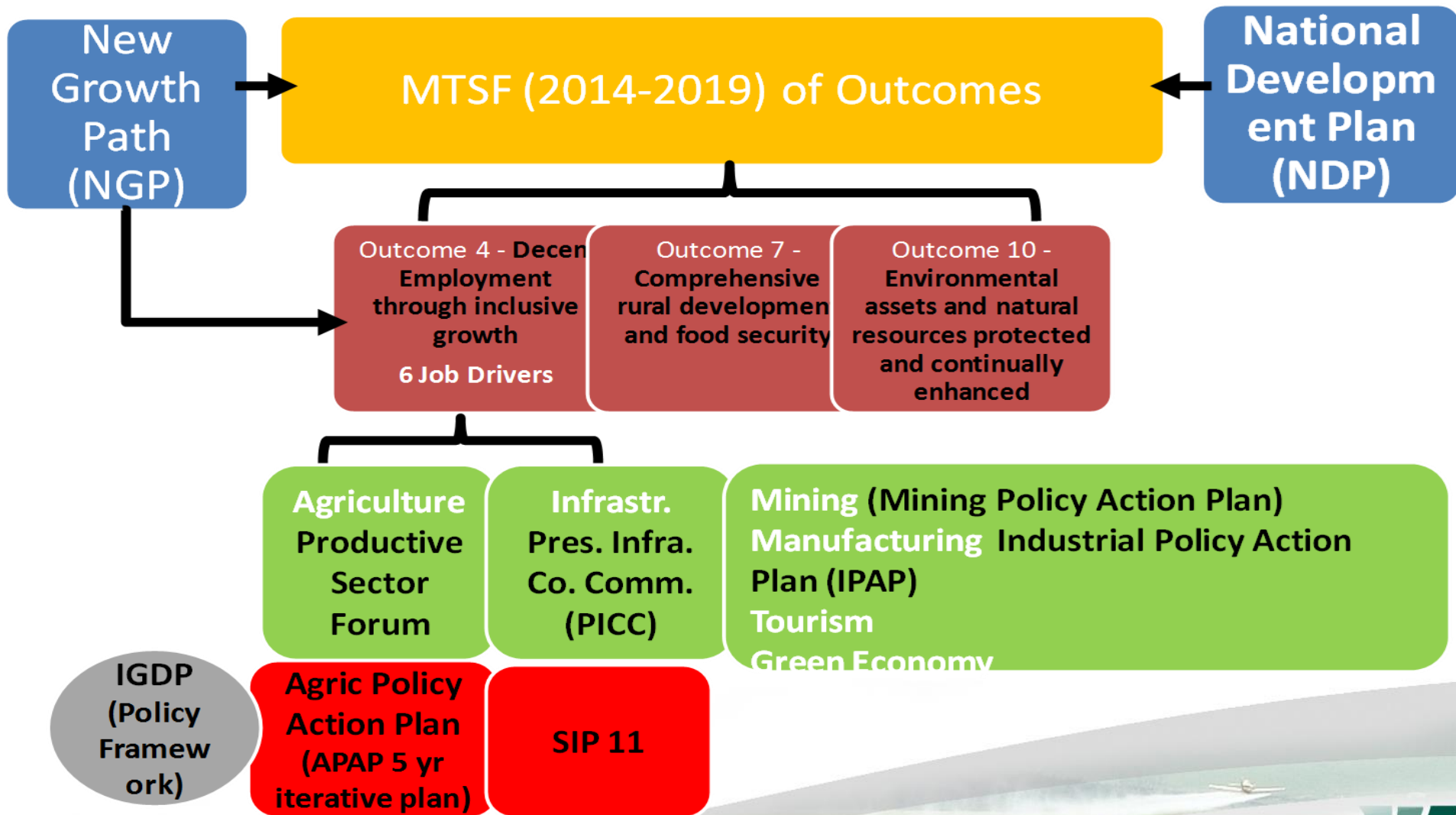
ARC CONTRIBUTION TO GOVERNMENT PRIORITIES & OUTCOMES (& SDG)

1. Contributing towards attainment of agricultural yields through improved agricultural production, productivity and biosecurity;

2. Enabling the country to respond and adapt to climate change concerns (water, land, energy, biotic and abiotic stress), including through sustainable natural resource utilization;

3. Contributing towards agricultural development, particularly smallholder farmer development;

4. Employment and Job creation across the full agricultural and agro – processing value chain; and,

5. Improved productivity, production, competitiveness and sustainability of animal and crop based agriculture;

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ARC SCIENTIFIC IMPACT FOR AGRICULTURAL 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
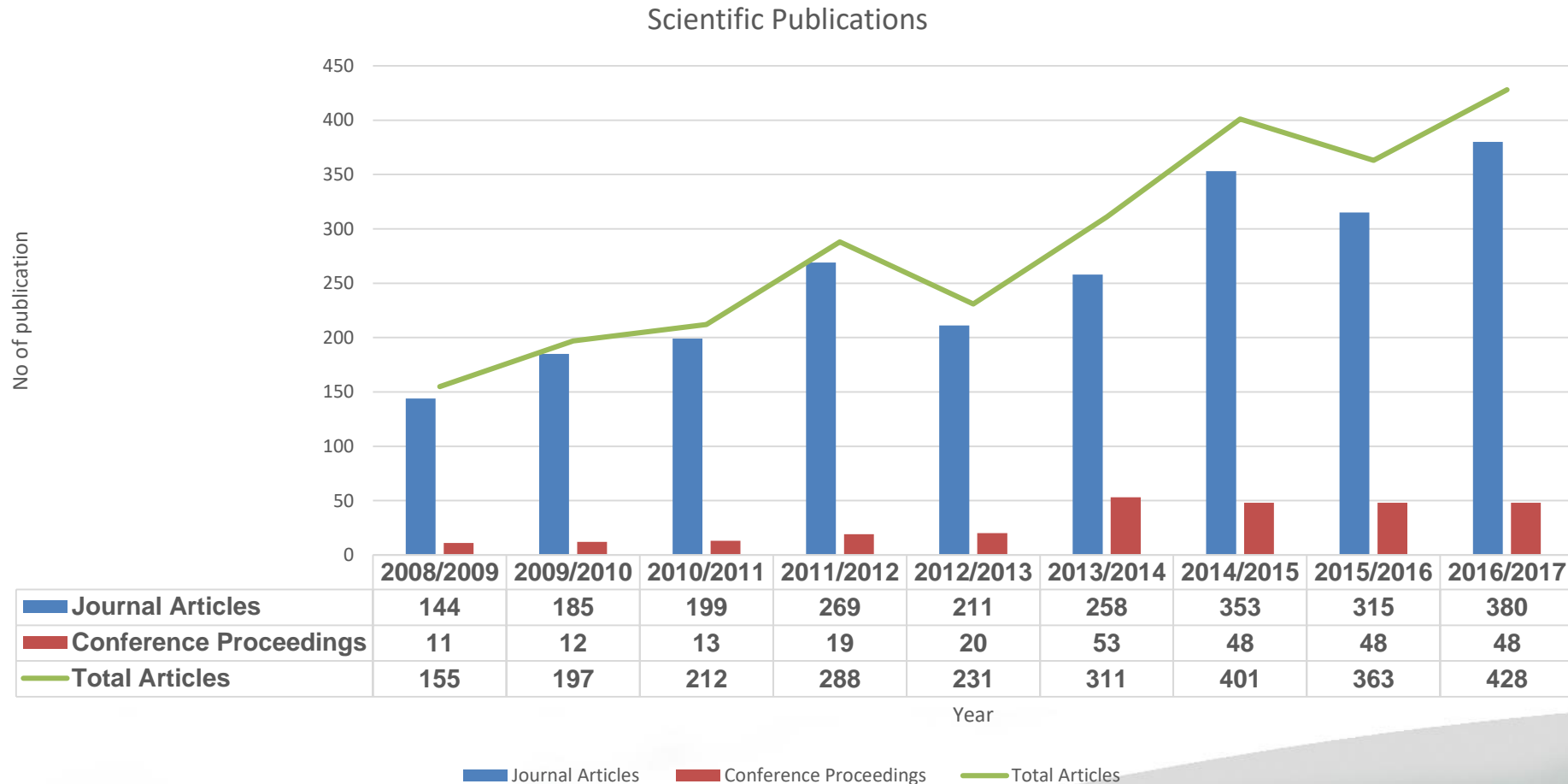- Scientific awards

AGRICULTURE DEVELOPMENT

1. Economic link to Innovation
2. **Applied research**
3. **Technology Transfer/dissemination**
4. **Agricultural Production & productivity**
5. **Food & Nutrition Security**
6. **Environmental Sustainability**
7. **Import Substitution**
8. **Export Promotion**
9. **Agrarian Transformation**
10. **New products (vaccines, cultivars etc)**

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ARC STRATEGIC GOALS

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 livestock, **wildlife and aquaculture** based agriculture;

3. To generate knowledge and technologies for the conservation and utilisation of natural resources;

4. To generate knowledge, solutions and technologies for food safety, quality and improved efficiencies in the agriculture value chain;

5. **To generate and disseminate knowledge and technologies for decision making and transformation of the agriculture sector**; and

6. Apply **best** resource management practices, towards a high performing and visible organisation.

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SCIENTIFIC SUCCESS THROUGH PEER REVIEWED PUBLICATIONS

Scientific Publications

	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Journal Articles	144	185	199	269	211	258	353	315	380
Conference Proceedings	11	12	13	19	20	53	48	48	48
Total Articles	155	197	212	288	231	311	401	363	428

Goal 1: To generate knowledge and technologies that will enhance the efficiencies in crop based agriculture

PURPOSE OF GOAL

➤ Broaden the food base for food and nutrition security and welfare.

➤ Optimised crop production systems to mitigate agricultural risks.

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

➤ Enhanced **crop protection** systems.

➤ Crops and mixed production systems developed for smallholder farmers.

OUTCOME

➤ Nutrient rich foods that may be biofortified (e.g. vitamin A, minerals – zinc, iron etc)

➤ Mitigation strategies against biotic and abiotic stresses that would improve productivity

➤ Sustainable production systems

➤ Reduction in post harvest losses

➤ New products and processes developed from primary agriculture

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ADVANCED BREEDING TECHNIQUES FOR FOOD SECURITY
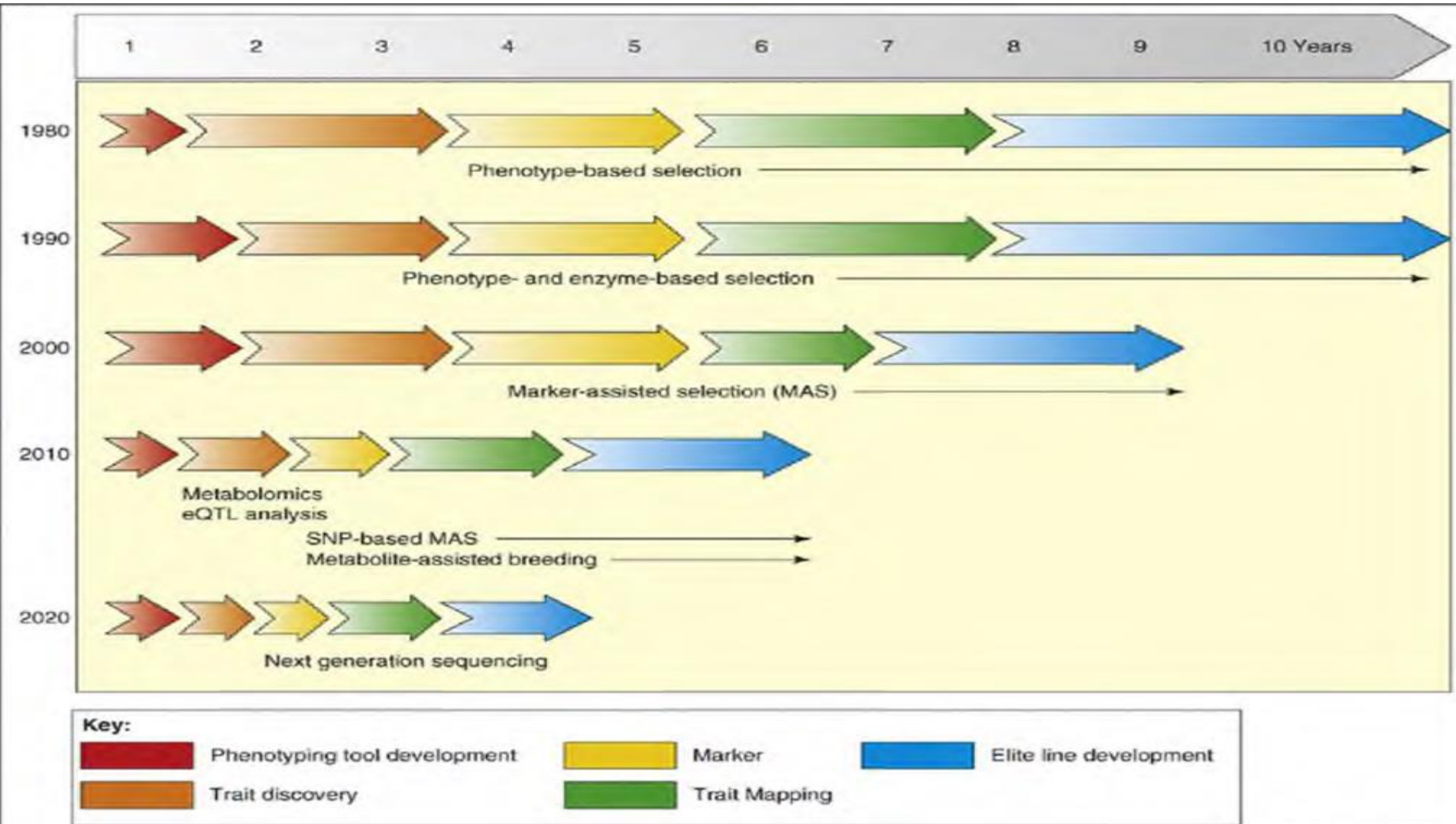
TRENDS in Genetics
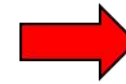
ADVANCED BREEDING TECHNIQUES FOR SHORTER CYCLES
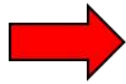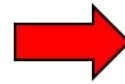
GLOBAL LAUNCH OF ARC SEEDLESS GRAPE VARIETY JOYBELLS, BERLIN GERMANY 9 FEBRUARY 2018

MARKETING AND PROMOTION OF WHEAT CULTIVARS RELEASED BY ARC IN THE PAST THREE YEARS

Winter Wheat Breeding Programme (Free State Dryland Areas):

a) Kubeta

b) Kougas

c) Wetzi

Irrigation Areas (Northern Cape, North West, Northern Province and Limpopo):

a) Koedoes

b) Renoster

c) Umzimbi

Spring Dryland Programme (Southern Cape, Western Cape):

a) Steenbok

PLANT HEALTH AND PROTECTION FOR DIAGNOSTIC, CONTROL AND MANAGEMENT OF PESTS, DISEASES AND INVASIVE WEEDS

CROP	PEST / DISEASE	Presence confirmed in SA
Maize, sorghum, lucern, cabbage, potato, soy	*Spodoptera frugiperda* (Fall Armyworm)	2017
Tomato	*Tuta absoluta* (Leafminer)	2016
Banana	BBTV (Banana Bunchy Top Virus)	2015
All	AFB (American Foulbrood)	2009
Wheat	*Tilletia indica* (Karnal Bunt)	2001
All	Invasive weeds (PomPom, Famine weed, Lantana, Cacti etc)	Biocontrol of invasive weeds last 100 years
Citrus	HLB (Huanglongbing)	Ethopia – disease Tanzania – vector
Maize	MLND (Maize Lethal Necrosis Disease)	Tanzania - disease

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Goal 2: To generate knowledge and technologies that will enhance the efficiencies in 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

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Managing Highly Pathogenic Avian Influenza disease for productivity

- Beginning of 2017, a high pathogenicity strain of serotype H5N8 of avian influenza had spread into Southern Africa. First reported HPAI infection affecting chickens in the region.

- ARC- OVR played a leading role in the isolation and molecular characterization of the virus isolated from Zimbabwe and four main locations in South Africa.
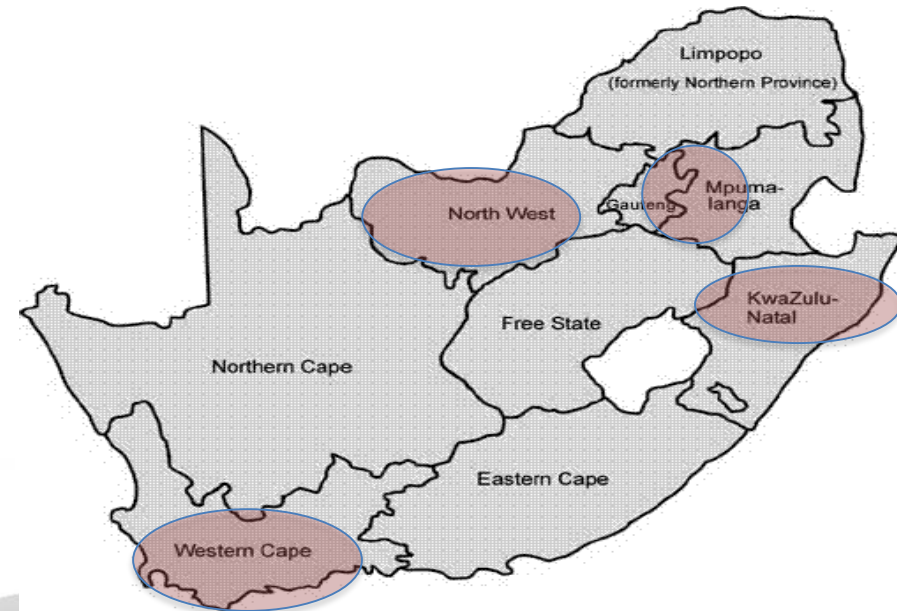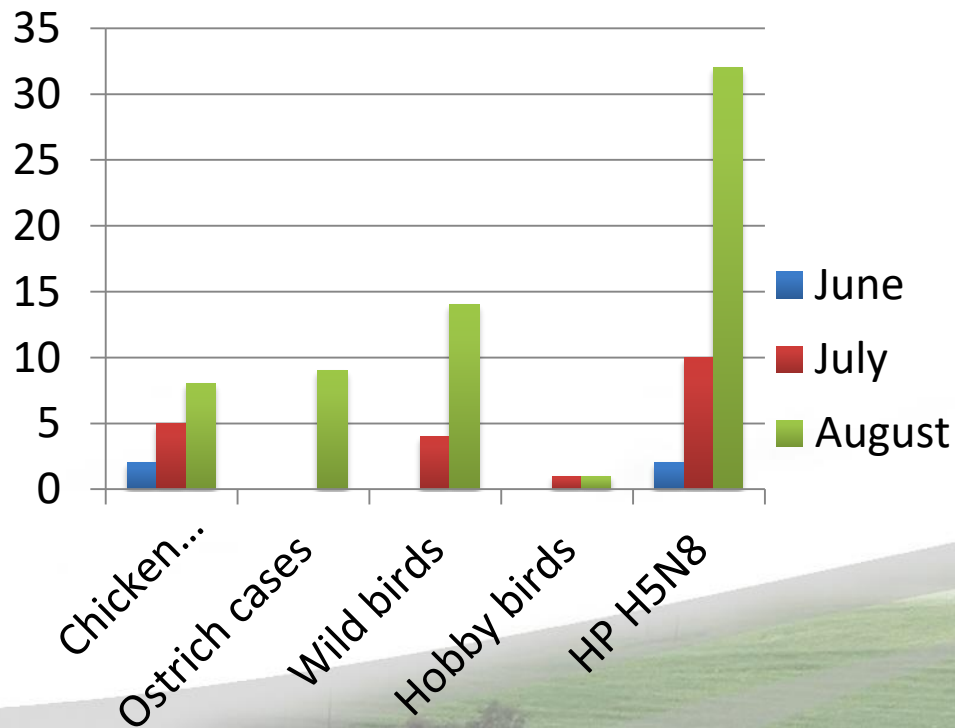
Economic Impact of Beef Recording Improvement Scheme
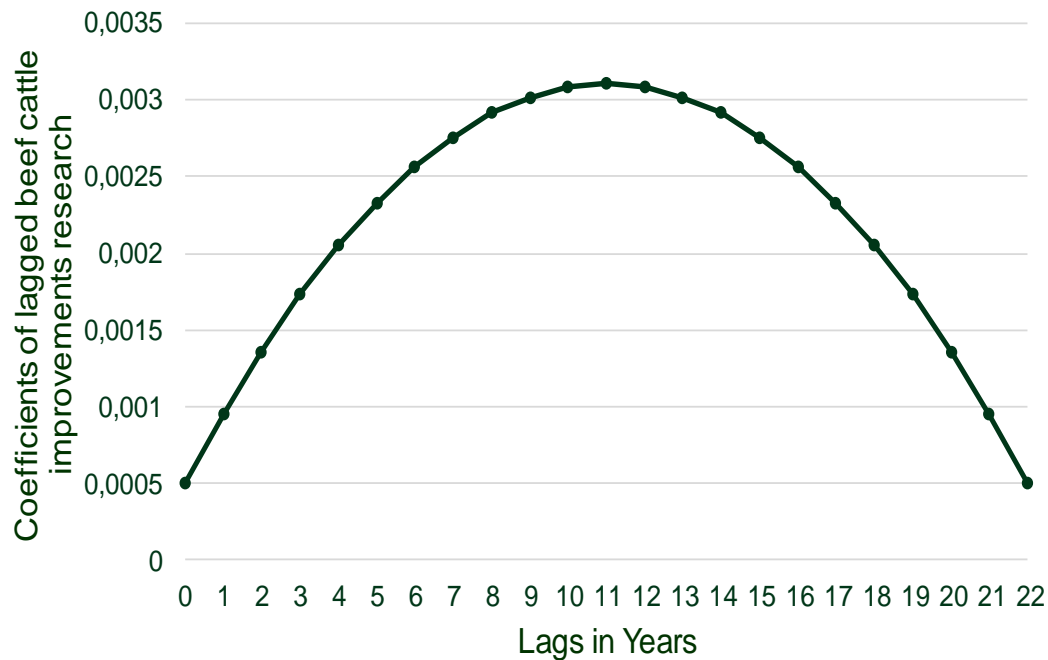
- ➤ Effects of investment reach maximum at year 11.
- ➤ Returns to initial investment start to decline in year 12.
- ➤ Long term investment in the programme is essential

Study over period 1970-2014 shows: Rate of Return = 31,2% >>> for every R100 increase in investment on beef cattle improvement research, the marginal returns to the beef industry is about R31.

Goal 3: To generate knowledge and technologies for the conservation and utilisation 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

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Enabling Climate Smart Agriculture: R4A – Dynamic Decision Support

Mobile phone Apps

Advisories for next 10 days:

- Maize planting dates
- Good spraying conditions for herbicides and pesticides.

Two modes:

- Smart phone
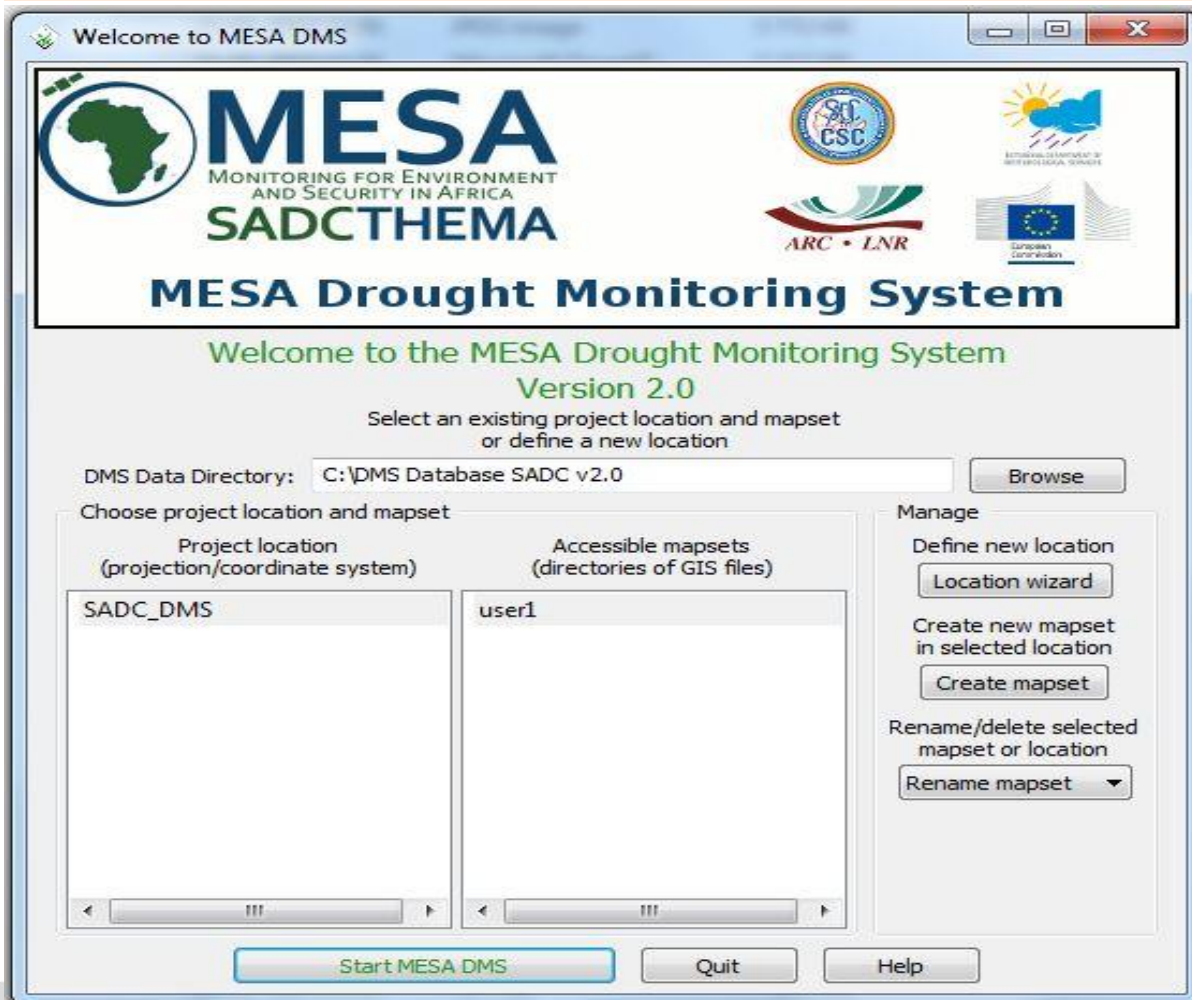- Unstructured Supplementary Service Data (*USSD*) & Short Messages Services (*SMS*) for basic phones

Available in 8 local languages

➤ Provides agric-advisory to farmers and extension based on rainfall information and forecasts at specific location.

➤ Crowd-sourcing to collect rain and visual weather observations to earn credits for further info.

➤ Uses a digital-delta HydroNet platform to integrate remotely sensed and observation data.
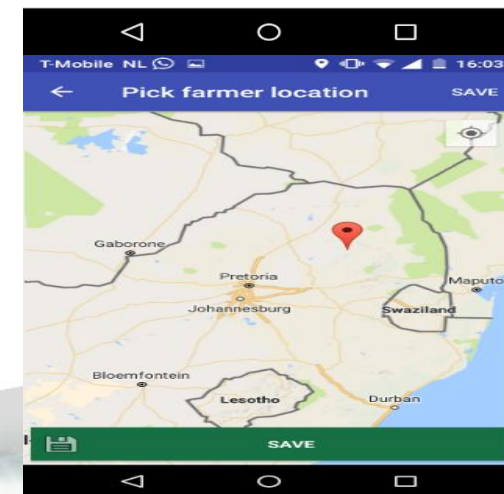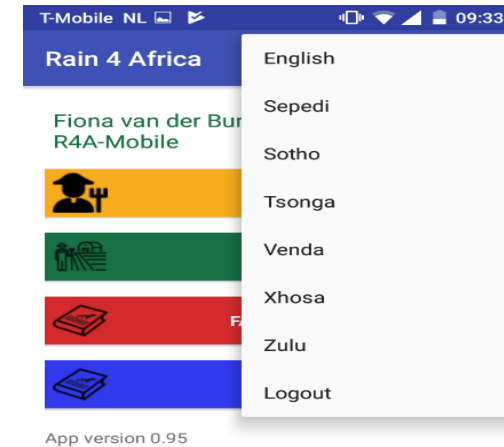
Drought monitoring

The ARC developed an open source free **software for drought monitoring** in southern Africa as part of the Monitoring of Environment for Security in Africa (MESA) project. Various drought monitoring products, including an automated drought report generation function, can be generated

Goal 4: To generate knowledge, solutions and technologies for food safety, quality and improved efficiencies in the agriculture value chain

FOCUS OF GOAL

- ➢ New food and non-food processes and products developed.
- ➢ Food science and technology developed for improved product quality and yield.
- ➢ Post-harvest losses reduced.
- ➢ New animal products developed.
- ➢ Agro-processing, biotechnology and informatics each cross-cutting across different areas of the agricultural value chain and intended to be applied to the full value chain of crops, animals and agricultural system research.

OUTCOMES WITH ASSOCIATED IMPACT

- • Develop process to create products from indigenous crops
- • Product yield, product quality and safety.
- • Product development and value adding (storage, processing and packaging).
- • Additional research focus areas include indigenous and high value products (indigenous herbal teas, medicinal and aromatic plants, fruits vegetables) to access niche product value chains.
- • Provision of scientific services to farmers and clients of the ARC.
- • Animal agriculture research groups conduct research primarily investigating the various factors involved in producing good quality meat, meat products and milk and milk products (safe, appealing, nutritious, affordable and tasteful).
- • Research into the processes involved in maximising yield without forfeiting quality and adding value to a basic product to increase quality and/or yield.

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AGRICULTURAL RESEARCH FOR FOOD IDENTIFICATION & HEALTH

Simple – complex processing

Abattoirs
Small –large
Single –mixed species

Consumer decides
on what to buy
and consume

Smallholder-large
commercial farms

Packaging, labelling, pricing of final product

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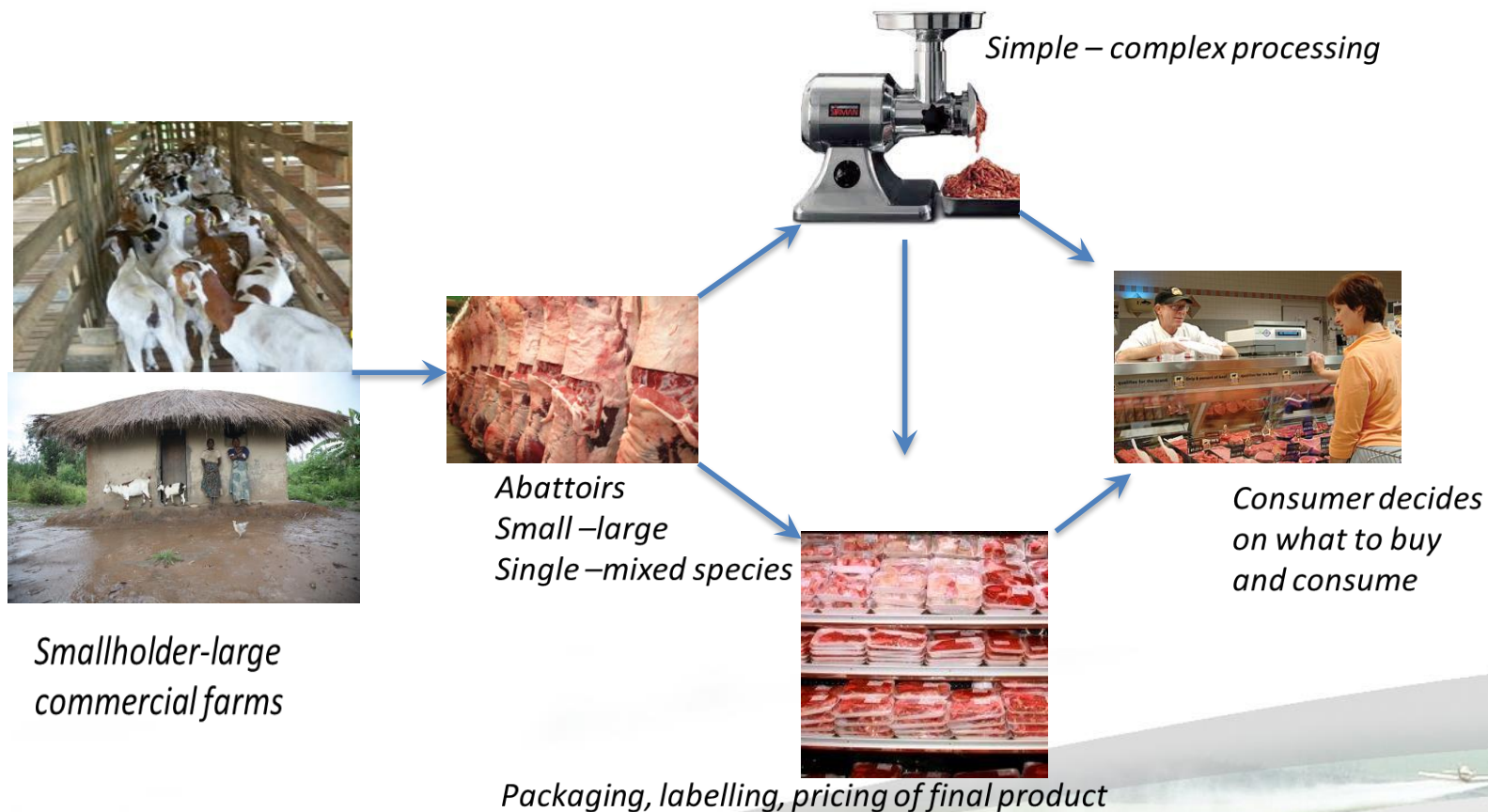
FOOD SAFETY AN INCREASING CONCERN WITH URBANIZATION

- ARC-OVR is one of the few laboratories in the country with capacity to test food and food items to ensure safety.

- The laboratory is active in testing various meat and meat products for food borne pathogens that include *Listeria monocytogenes*.

- 296 L. monocytogenes has been isolated from processed, raw and ready to eat meat and meat products.

- The highest number of isolates were from Gauteng province (31.45% and lowest from Western Cape (1.1%)

- We supplied 70 isolates to NICD to help with diagnosis of the current listeriosis outbreak

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POST HARVEST & AGRO-PROCESSING TECHNOLOGIES

Fruit processing and Commercialisation via SMMEs

Rooibos and Honeybush tea research to support primary production and processing
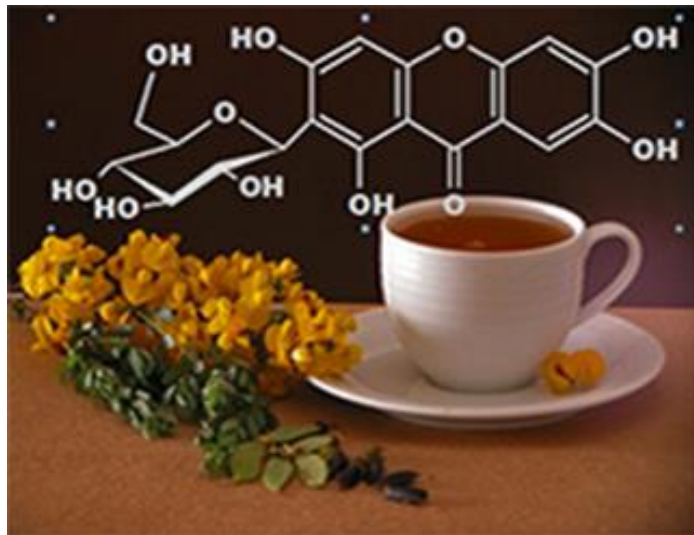
POST HARVEST & AGRO-PROCESSING TECHNOLOGIES

The ARC, Roodeplaat Agro-processing Centre provides a wide range of products and technical services on herbal and food supplements.

- **Products** include botanical plants and extracts (concentrate that can be added in various food, healthcare and cosmetic products); syrups; capsules; tinctures; powder formulations.

- Food and beverages products include: flavours and aromasextracts; syrups; essential oils packaged herbal teas

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Goal 5: To generate and disseminate knowledge and technologies for decision making and transformation of 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

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

COTTON TRIALS FARMERS' DAY LIMPOPO

SWEET POTATO GROWER ENTERPRISES

Chabe Farm (EC)

Chuene Project (LP)

Harvesting at Elizabeth's (GP)

Phezukhono (KZN)

Mr Moyo (GP)- Loading sweet potatoes for marketing

STRATEGIC GOAL 6

Apply best resource management practices, towards a high performing and visible organisation

HUMAN RESOURCE DIVISION

EMPLOYMENT EQUITY

ARC Capacity per Race - 31 December 2017

- African
- Coloured
- Indian
- White

74%
16%
0,5%
8%
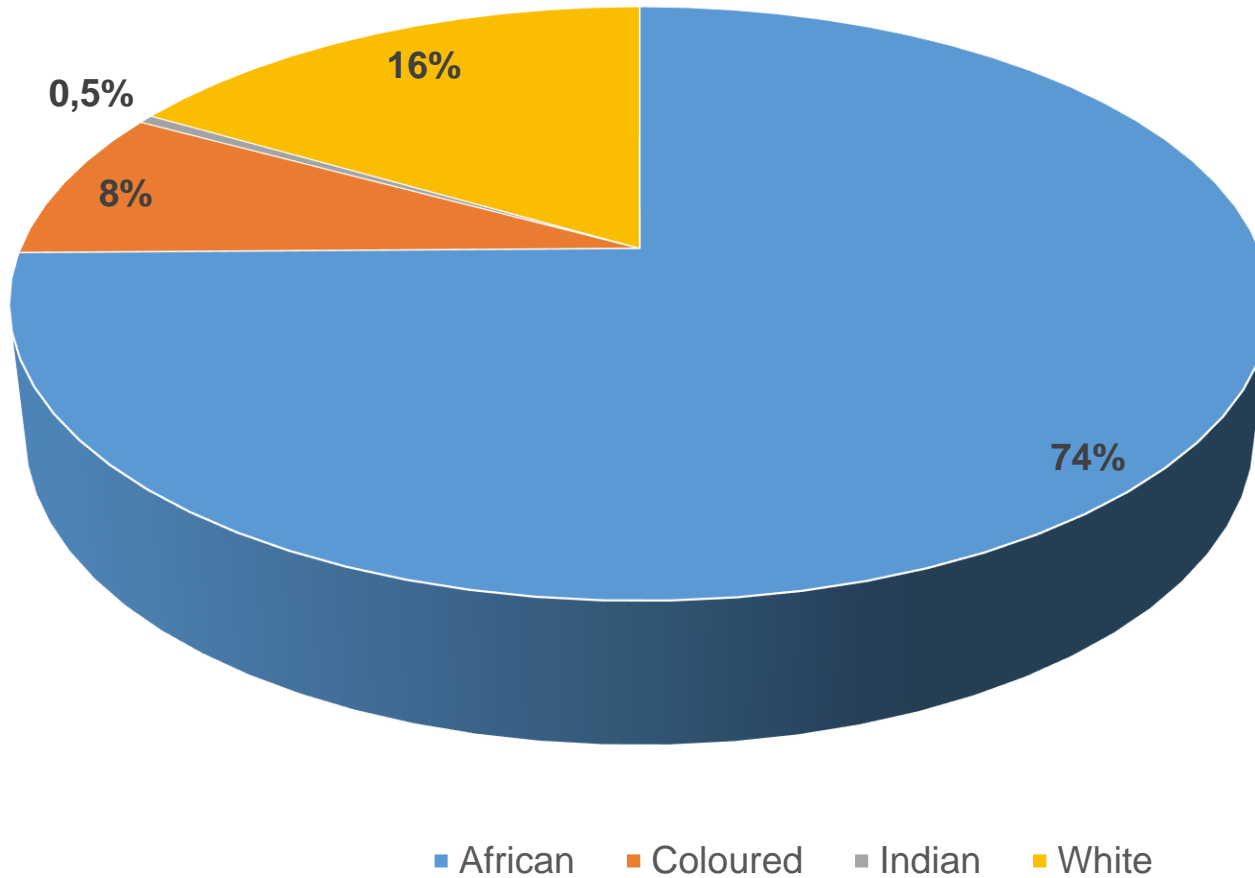
EMPLOYMENT EQUITY

ARC Capacity per Gender - 31 December 2017

41%

59%
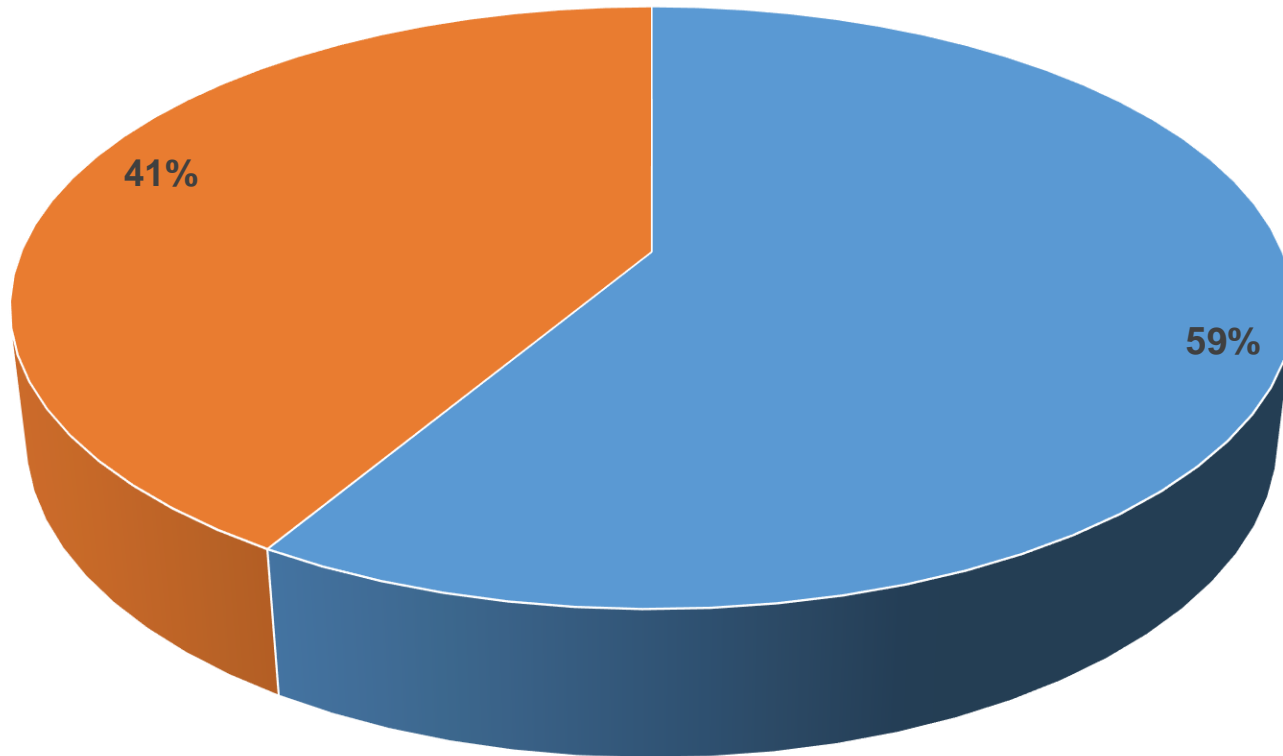
■ Male ■ Female

POST – GRADUATE STUDENTS AT ARC

	Post Doc	PhD	D Tech	MSc	M Tech	TOTAL
Male	6	53	0	44	3	106
Female	13	64	8	75	9	169
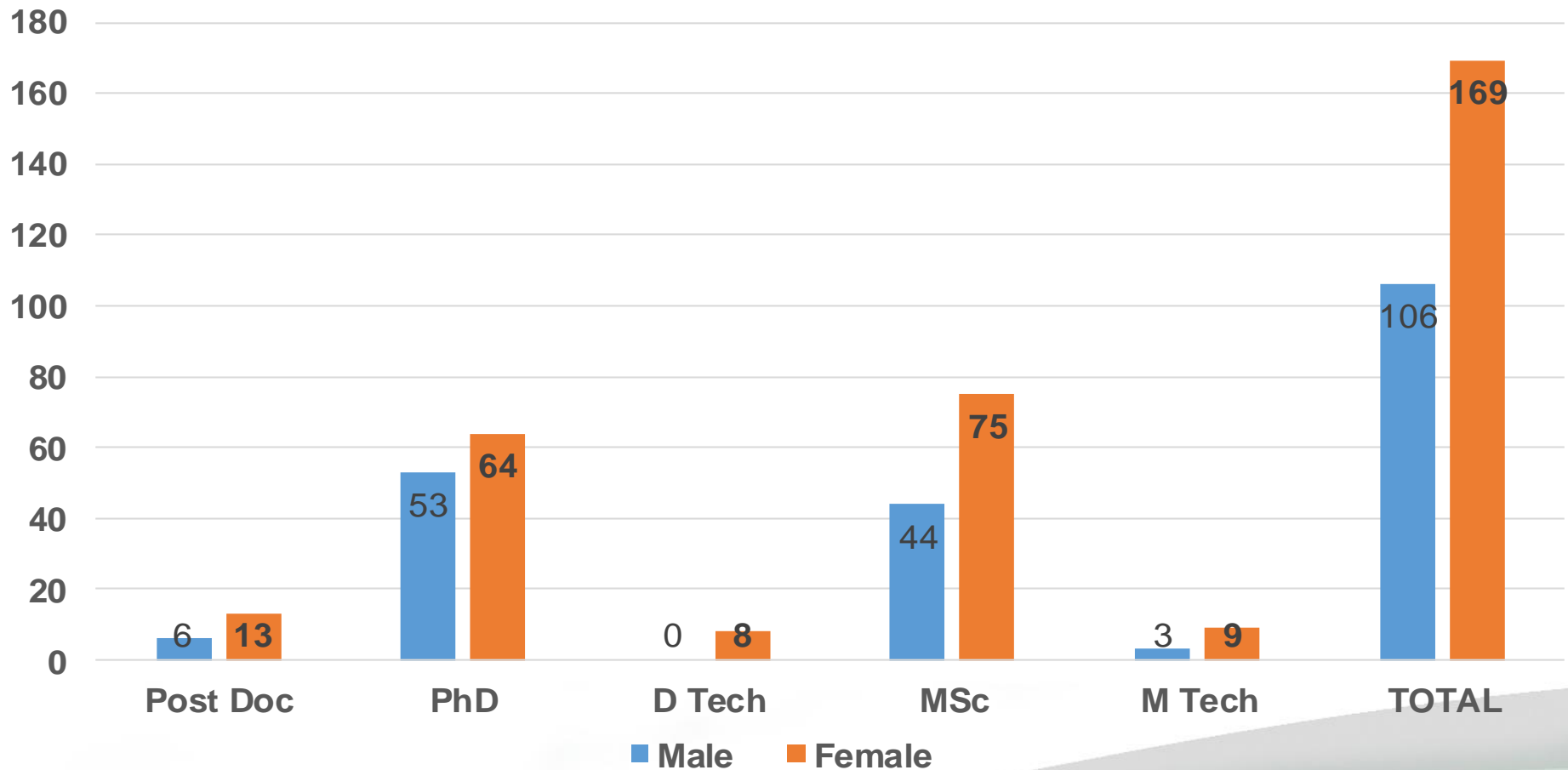
EMPLOYEE DEVELOPMENT PROGRAMME

STUDY PROGRAM: PERMANENT STAFF

■ Male ■ Female

	PHD	DTECH	MSC	MTECH	OTHER MDEGREES
Male	62	2	34	5	5
Female	75	1	39	9	2
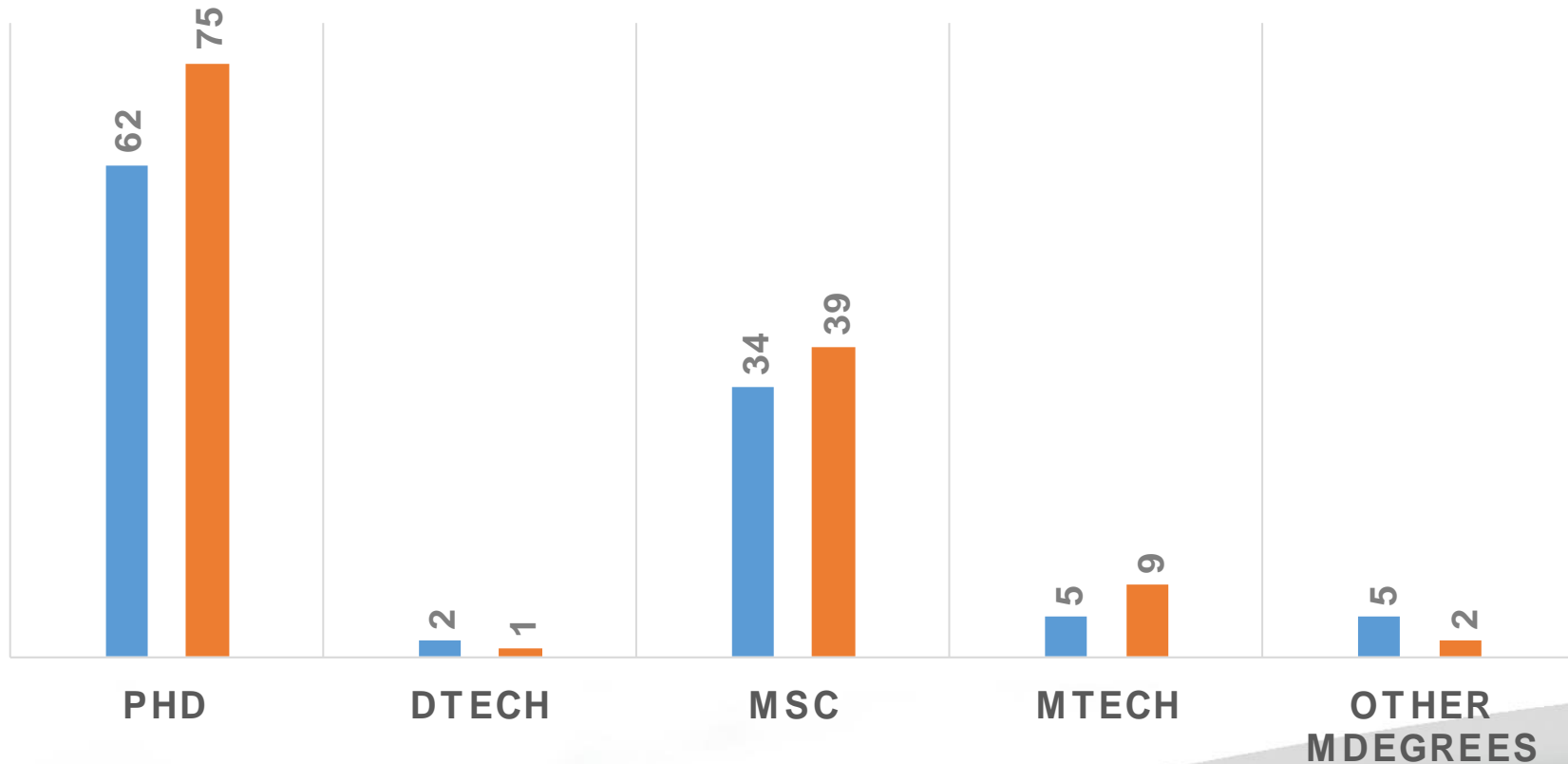
Budget Assumptions

a) Parliamentary Grant over MTEF ending 31 March 2018 reduced by R252 million (including DST funds)

b) 5.8% increase in Parliamentary grant

c) External Income growing at 4.2% in the last 2 years of MTEF

d) Salary increases

  ➢ 2018/19 – 4.0%

  ➢ 2019/20 – 5.0%

  ➢ 2020/21 – 5.0%

e) Operating expenses growing at inflation

f) Reduction in externally funded projects, including those from Departments

g) Discontinued Economic Competitiveness Support Packages

h) **No funding for the FMD (Foot and Mouth Disease) facility**

ARC Financial Position (MTEF) 2017/18 – 2020/21

Financial Performance	2017/18 Forecast R'm	Var. %	2018/19 Budget R'm	Var. %	2019/20 Budget R'm	Var. %	2020/21 Budget R'm
Parliamentary Grant	**886**	5.2%	**932**	5.6%	**984**	5.5%	**1,038**
PG - Operational	795	5.1%	835	5.6%	882	5.5%	930
PG - Capex	91	5.8%	97	5.6%	102	5.5%	108
External Income	375	21.6%	456	4.2%	475	4.2%	495
Other Income	34	(3.4%)	33	3.0%	34	5.9%	36
Total Revenue	**1,296**	**9.7%**	**1,421**	**5.1%**	**1,493**	**5.1%**	**1,569**
Expenses	**1,345**	**5.6%**	**1,421**	**5.1%**	**1,493**	**5.1%**	**1,569**
Personnel Costs	802	8.2%	867	5.0%	911	4.9%	956
Operating Costs	498	2.1%	508	5.5%	536	5.8%	567
Depreciation	46	0.1%	46	2.0%	46	0.0%	46
Surplus/(Deficit) for the year	**(50)**	**100%**	**0**	**0.0%**	**(0)**	**0.0%**	**(0)**

# Operational Expenditure vs Operational PG (2011/12 – 2020/21)
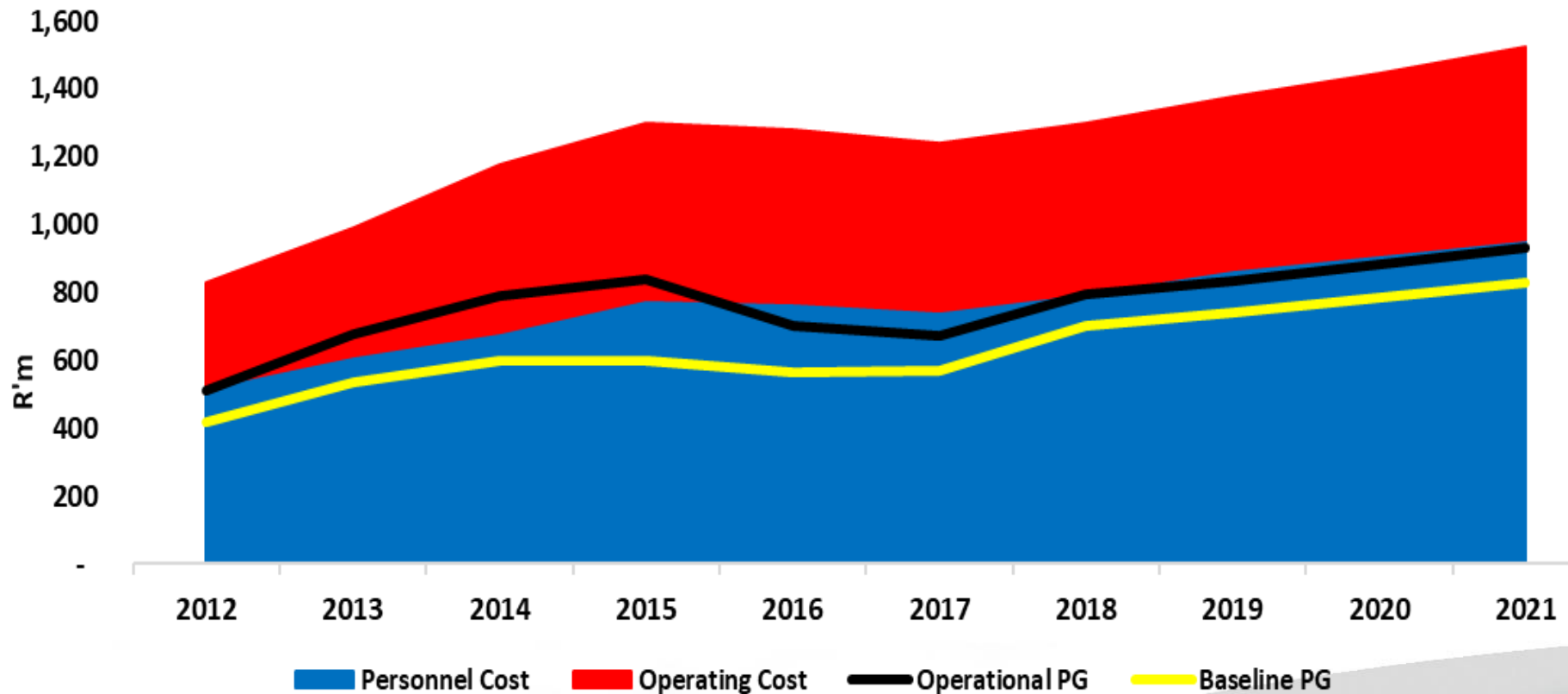
ARC Balance Sheet and Cash Flow 2017/18 – 2020/21

Balance Sheet	2017/18 Forecast R'm	Var. %	2018/19 Budget R'm	Var. %	2019/20 Budget R'm	Var. %	2020/21 Budget R'm
Property, Plant and Equipment	1,151	4%	1,201	5%	1,256	5%	1,318
Investments	4	0%	4	8%	4	(2%)	4
Current Assets (Excluding Cash)	256	(29%)	180	(6%)	170	6%	181
Cash Resources	(30)	280%	(112)	49%	(167)	37%	(228)
Total Assets	**1,381**	**(8%)**	**1,273**	**(1%)**	**1,264**	**1%**	**1,276**
Capital and Reserves	829	(4%)	800	(0%)	800	0%	801
Non-Current Liabilities	137	8%	127	7%	118	8%	108
Current liabilities	415	16%	347	0%	346	(6%)	367
Total Equity and liabilities	**1,381**	**8%**	**1,273**	**1%**	**1,264**	**(1%)**	**1,276**

Cash Flow	2017/18 Forecast R'm	Var. %	2018/19 Budget R'm	Var. %	2019/20 Budget R'm	Var. %	2020/21 Budget R'm
Net Cash Flow From Operating Activities	(9)	264%	14	230%	47	(0%)	46
Net Cash Flow From Investing Activities	(118)	19%	(96)	(6%)	(102)	(5%)	(108)
Cash And Cash Equivalents at Beginning Of Year	97	(131%)	(30)	(275%)	(112)	(50%)	(167)
Cash And Cash Equivalents at End Of Year	**(30)**	**(275%)**	**(112)**	**(50%)**	**(167)**	**(37%)**	**(228)**

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Background to ARC Financial Management

Cash at Year-End
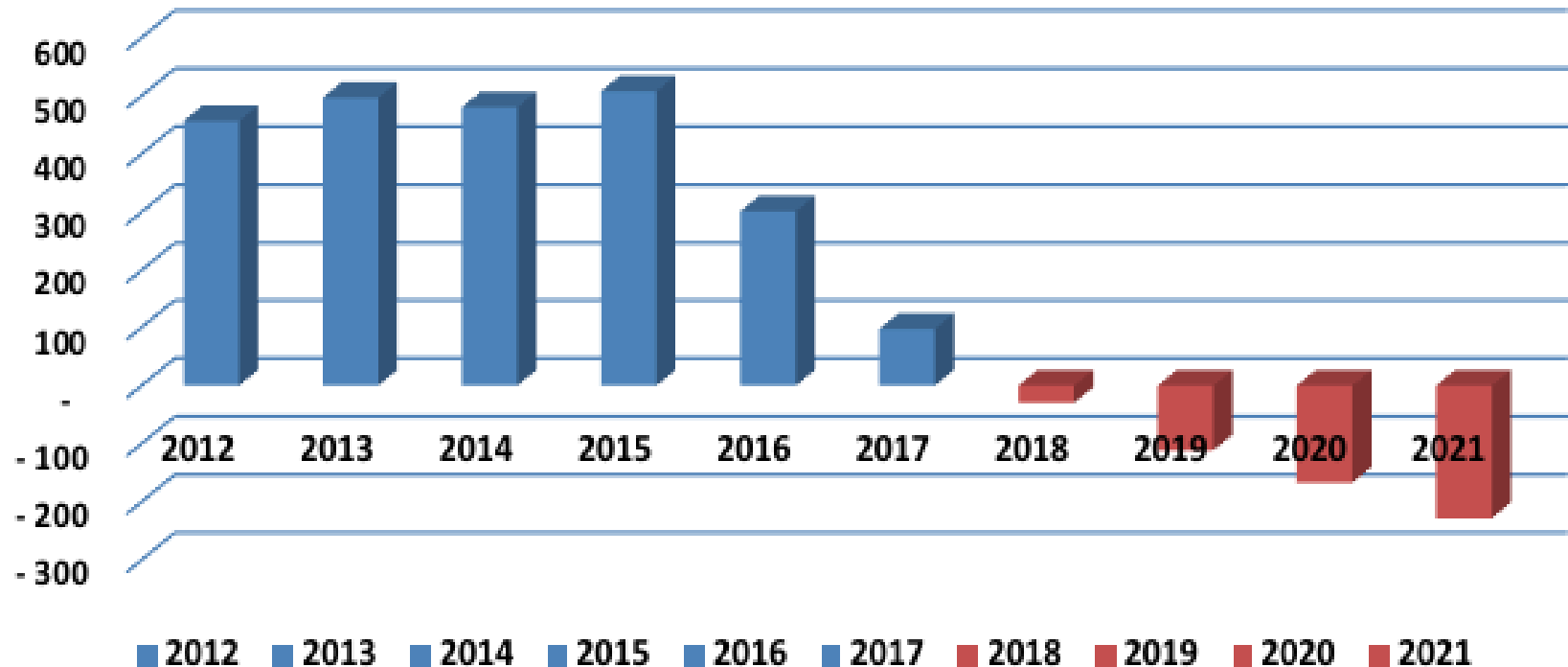
ARC Financial Outcome/s & Projections
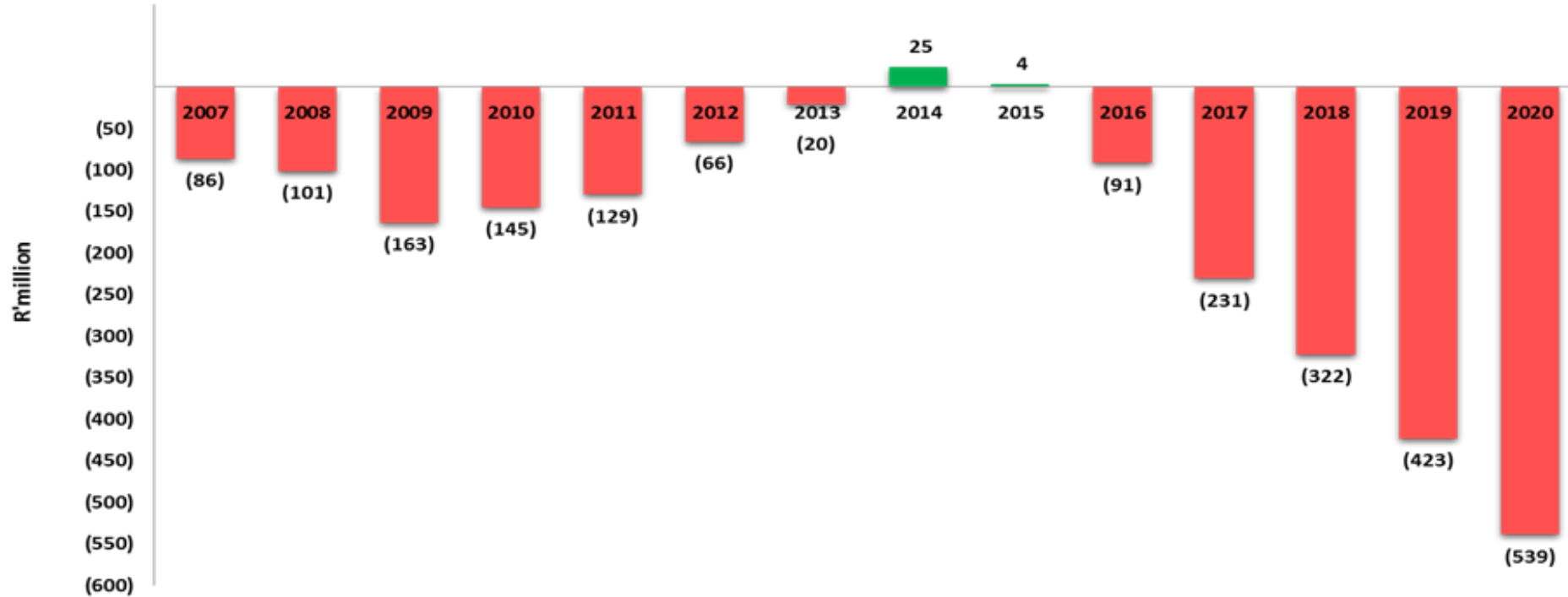
Implications of Budget Cuts

a) Income statements – Deficits over the MTEF
b) Return to negative cash position over MTEF
c) Student intake will be limited- capacity building
d) Possible Retrenchments
e) Vaccine development projects negatively affected
f) Review ARC pricing of Diagnostic and Analytical Services
g) Require full prepayments from Government Departments
h) Possible closure of some research facilities
i) KyD (Kaonafatso ya Dikgomo) activities to be curtailed
j) Review of all projects at ARC to reduce costs

Comments or Questions

Re a Leboha!
Siyabonga!
Ria Livhuwa!
Ha Khensa!
Siyathokoza!
Re a Ieboga
Siyabulela!
Baie Dankie!
Thank You

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