



ANNUAL PERFORMANCE

PLAN

2022-2023

AGRICULTURAL RESEARCH COUNCIL





AGRICULTURAL RESEARCH COUNCIL

ANNUAL PERFORMANCE PLAN

FOR

2022/23

ACCOUNTING AUTHORITY STATEMENT

The Agricultural Research Council (ARC) has delivered outstanding research and technology options in the past financial year. The challenges for the organisation remain and have proven to be systemic in nature. The Council has realised that concerted effort and commitment from both the management and staff as well as the shareholder and stakeholders will be required to address these challenges. The changes required are not parallel processes but an inter-disciplinary, interconnected and complex web of fundamental shifts.

To enact and effect change, Council has decided to implement an Institutional Review, in line with the mandatory and statutory requirement for Public Entities and Science Councils to undergo periodic institutional reviews. The ARC has embarked on its 3rd institutional review which follows on the previous reviews of 2005 and 2015. The ARC Council established a Technical Review Committee for this review, comprising of executive management and support staff, as well as Council members to oversee and guide the process.

The purpose of the Institutional Review is to assess the extent to which the organisation's pre-determined objectives and targets - as outlined in the five-year and annual strategic plans covering the period 2015 to 2020, and particularly from the perspective of how planning, implementation and monitoring have enabled the organisation to fulfil its mandate.

The Institutional Review comes at a critical time when a number of key decisions will have to be made in relation to the redirection, re-visioning and repositioning of the organisation in line with the ARCs Vision 2050. As such, a forward-looking approach will be used in the articulation of the findings whilst the recommendations will also be formulated to determine short-, medium- and long-term priorities and scenarios. The review will follow a phased approach with a review of the reviews and the engagements with staff, management, stakeholders and the shareholders of the organisation, to craft an ARC for the future.

The ARC depends on a highly skilled workforce of scientists and technicians. During the last few years, ARC's external income has dropped substantially due to the external economic conditions affected by the Covid-19 pandemic as well as other factors. There were, however, inflation related increases in the parliamentary grant but the net effect was a decline in income.

Although the ARC management has been prudent and circumspect in containing the personnel budget, the overall drop in income meant that the personnel cost versus income ratio has widened. The pressure on the external income also meant that the ARC has been unable to keep up to date with market related salaries and performance incentives. The result is that key scientific HR capacity has left the ARC for greener pastures and although greater emphasis has been placed on training and skilling existing staff, financial resources have been too limited to make this an effective counter strategy.

A 360-Degree Leadership Assessment and a Culture Survey was undertaken to understand the stresses the organisation is facing and consequently to design a Change Management Strategy that would address some of the key HR constraints. The HR component of the APP was designed to address some of these challenges in line with the ARCs Financial Sustainability and Turnaround Plan.

The five-year independent Institutional Review currently underway will provide much needed input in refining the HR strategies going forward. The ARC is aiming to develop a high performing and sustainable organisation and in doing so will address the vacancy rate, employee support, equity ratios, people with disabilities, leadership dimensions, organisational values, change management, employee qualifications, staff turnover, training, the PDP (Professional Development Programme) and personnel costs as a % of income (especially the parliamentary grant). It is obvious that unless there is a significant

increase in the PG and/or external income, the personnel costs and incentives will continue to be unsustainable. Therefore, management and Organised Labour need to explore strategies to address these, being cognisant that as a research organisation the ARC need to retain and attract skilled staff.

The ARC has continued to operate within its budgetary allocation despite the challenges posed by Covid-19 under the stewardship of Council. The Committee will continue to ensure that when the APP 2022/23 is implemented, a special focus will be on the proper management and utilisation of the ARC's limited financial resources to ensure its financial sustainability and the achievement of its mandate. Emphasis will also be on the implementation of the Financial Sustainability and Turnaround Plan for the organisation to achieve financial sustainability and increase its external income which will contribute to the reduction of its dependence on the Parliamentary Grant and enhance its operations.

Council will ensure that management strengthen the capacity of Supply Chain Management to provide efficient and effective service to the operations of the ARC to enhance service delivery. As part of the ARC's Commercialisation Strategy, Council will investigate alternative uses for underutilised properties and existing ARC assets, to ensure proper maintenance and promote lease arrangements to generate additional income, which will be directed at enhancing the operations of the ARC to achieve its APP 2022/23 outcomes.

During 2021, the Council together with the Executive Management (EM) has focussed on building an integrated strategic direction based on the ARC's existing Strategic Plans, its Financial Sustainability and Turnaround Plan, and its Vision 2050, aligned to the emphasis placed by the Honourable Minister of Agriculture, Minister Didiza, on the importance of the ARC generating its own funds. Hence, Council has prioritised consequence management and accountability in its response to management reports, as well as the need for all managers and business units to take ownership of the audit requirements and the findings of the final Audit report.

Council has promoted a more integrated research view by the EM to recognise the overarching impact of the Climate Crisis, at both local and global levels. The EM has consequently profiled Climate Change in its respective ARC research programmes and outputs, as well as in its report on the ARCs contribution at COP26, and the potential financial opportunities emanating from COP26. To emphasise the holistic relationship between Research, Development and Evaluation, the role of ITC has been explored from a perspective of technology transfer as well as applications in research execution. Of particular importance for South Africa, the ARCs collaboration with the Surface Observation Funding Facility (SOFF) seeks to facilitate the establishment of more weather stations across South Africa, especially in its more remote regions, to capture more accurate and detailed meteorological data to improve weather predictions. This has an important consequence for the development and roll-out of ARCs vast array of cutting-edge Weather related Apps to the farming community. The overarching theme of the Climate Crisis will be taken forward during 2022, as the findings and recommendations of the institutional review become available towards realising the Financial Sustainability and Turnaround Plan and Vision 2050.

Another exciting development has been the ongoing development by management of a stakeholder-profiling map to build strong stakeholder relationships. The stakeholder-profiling map will be further elaborated with the intention that several research and funding scenarios will be developed to explore risks and opportunities, especially the strengthening of engagements with stakeholders for mutual benefit in terms of research outputs for stakeholders and research funding for the ARC.

The ARC management has also embarked on efforts towards analysing its carbon footprint towards achieving Net Zero carbon emissions. It is foreseen, that agro-ecological methods will receive greater attention in the drive towards more sustainable agricultural models as the ARC meets its triple bottom line of environmental, social, and corporate governance (ESG) requirements.

To place more emphasis on the social and ethical challenges in the South African context, the Council has established a Social, Ethics and Governance Committee. This committee plays a vital governance role in relation to corporate governance, in support of other operational committees, such as the transformation committee, environmental, health and safety committee and the employment equity committee.

The Social and Ethics committee will monitor the ARCs performance in social and economic development (including the United Nations Global Compact Principles, the Organisation for Economic Co-operation and Development recommendations regarding corruption, the Employment Equity Act and the Broad-Based Black Economic Empowerment Act), Good corporate citizenship, Environment, health and safety; Consumer relationships; and Labour and employment. The committee will also focus on skills development, and compliance with rules and regulations to enhance the social and ethics with the organisation for better delivery of services to its wide array of clients.

The ARC must work for the agricultural sector, and the road ahead will be difficult and hard choices will have to be made. I would like to express my sincere appreciation to the acting CEO's who were prepared to steer the organisation during the six-month period that the Council embarked on the appointment of the new CEO. Dr Hilton Vergotine and Dr Nthabiseng Motete, from Council and on behalf of Council, thank you very much for stepping in to take the lead position to steer the ARC. Your efforts are greatly appreciated.

On behalf of Council, I would also like to thank the staff of the ARC for your hard work which has brought amazing results and outputs.

To all the stakeholders who maintained a positive working relationship with the ARC, thank you. Council appreciates your commitment and invites you to continue working with us, for the ARC, with the ARC for the agricultural sector.



Ms. Joyene Isaacs

Chairperson of Council

AGRICULTURAL RESEARCH COUNCIL

CHIEF EXECUTIVE OFFICER AND PRESIDENT STATEMENT

In presenting the Annual Performance Plan (APP) for 2022/23 financial year from 01 April 2022 until 31 March 2023, the Senior and Executive Management of the Agricultural Research Council (ARC) places agility and resilience at the core of this plan. Furthermore, the APP is presented in terms of the Agricultural Research Act, 1990 (Act no. 86 of 1990, as amended by Act 27 of 2001¹), and the Public Finance Management Act, 1999 (Act no. 1 of 1999, as amended by Act 29 of 1999²).

The ARC takes cognisance of the compelling requirement to re-align the structure of its resources for efficient and effective execution of its mandate. Financial Sustainability is at the centre of resource re-alignment within an environment of enhanced control efficiency in governance, risk management, and compliance. To this end, the recently approved ARC Control Efficiency Improvement Plan (ACE.IP) seeks to address the negative audit findings by the Audit General of South Africa (AGSA). The ARC Financial Sustainability and Turnaround Plan remains as an important and critical instrument throughout the Medium-Term Expenditure Framework (MTEF) period; and aims for a financially sustainable business model that:

- a) Explores efficiencies and effectiveness of generating revenue from existing clients and new sources, inclusive of the business of the future.
- b) Effective and optimal use of financial and other resources through various means, inclusive of cost saving, efficiencies, competitive pricing of services, amalgamation and other mechanisms.
- c) Review of the ARC's organisational structure (e.g., optimal ratio of cost of employees to baseline operational parliamentary grant, reduction in the use of the parliamentary grant for the Professional Development Program (PDP) etc.);
- d) Non-personnel organisational reconfiguration, inclusive of amalgamation of ARC facilities, commercialisation of farming operations among others; and,
- e) Resource mobilisation through increased partnerships and other stakeholder relationships.

The metrics of the ARC Financial Sustainability and Turnaround Plan will continue to be monitored and evaluated for impact at all levels of business operations. Noting that 2022/23 financial period marks the middle of the current five-year strategic plan framework 2020/21 – 2024/25; the ARC shall assess the extent to which the impact statement on “sustainable agricultural systems for agrarian transformation, food and nutrition security”; as outlined in the five-year strategic plan, is attained.

Management boldly embraces institutionalisation of self-assessments and evaluations; including the five-year independent Institutional Review led by the ARC Council. Recommendations from the independent Institutional Review shall have significant implications for re-alignment of organisational resources going forward. There is no doubt that several internal and external stakeholders keenly await finalisation of the Institutional Review, which makes 2022/23 financial year the most critical for business turnaround, particularly under new leadership. The newly appointed Chief Executive Officer and President – Dr Litha Magingxa joins the organisation on 1 April 2022 and is expected to lead the ARC in a new direction. There will also be a change of guard in financial management of the organisation following resignation of the Chief Financial Officer (CFO) – Ms Maureen Manyama, and recruitment for a new CFO has commenced. By all indications, 2022/23 marks a period of major changes within the organisation.

The changes anticipated in 2022/23 are informing communication approaches with internal and external stakeholders at all levels of the organisation. A comprehensive stakeholder map was developed to

¹ Available: <https://www.arc.agric.za/Documents/Agricultural%20Research%20Act%20%2086%20of%201990.pdf>

² Available: <http://www.treasury.gov.za/legislation/PFMA/act.pdf>

guide and manage areas of common interest and to improve synergy going forward. To understand the organisation's internal stakeholders that include employees, the ARC undertakes 360-Degree Leadership Assessment and Culture Survey. The results of the assessment and survey have necessitated extensive consultation with employees, especially in view of the transition from previous leadership to new leadership. Accordingly, several executive roadshows are being implemented at the different campuses of the organisation to ensure stability, employee confidence and buy-in during a period of change. Furthermore, the outcomes resulting from the 360-Degree Leadership Assessment and Culture Survey are contributing to development of change management approaches. Key among the implementation plans of change management approaches are Employer Value Proposition that includes pursuit of the top employer certification during 2022/23 financial year. These interventions shall improve the image of the ARC through institutionalisation of best people practices demonstrated by the recently approved Human Capital Strategy.

The ARC participated in the national Food Systems Summit convened by the Department of Agriculture, Land Reform and Rural Development (DALRRD) in September 2021, in support of the United Nations Food Systems Summit (UNFSS). This was the ARC's contribution to the Decade of Action and of launch bold new actions to achieve the Sustainable Development Goals (SDGs) by 2030. As a national science council and a major stakeholder in science, technology, and innovation (STI), the ARC's role was to raise awareness and elevate public discussion about reforming the South African food systems by implementing actions that are good for people and planet. Stakeholders were mobilised to participate in the development of principles that guide leveraging of food systems to support SDGs. Summit objectives were addressed through five working groups/Action Tracks (1-5) as follows: -

- 1) Ensuring Access to Safe and Nutritious Food for All.
- 2) Shifting to Sustainable Consumption Patterns.
- 3) Boosting Nature-Positive Production at Sufficient Scales.
- 4) Advancing Equitable Livelihoods and Value Distribution.
- 5) Building Resilience to Vulnerabilities, Shocks and Stresses.

The ARC was leading preparations and guiding consultations on Action Track 5: Building Resilience to Vulnerabilities, Shocks and Stresses. In this regard, the preparations brought together key players from the worlds of science, business, policy, healthcare, and academia, as well as farmers, indigenous people, youth organisations, consumer groups, environmental activists, and other key stakeholders.

The term "food system" refers to the constellation of activities involved in producing, processing, transporting and consuming food. Food systems touch every aspect of human existence. The health of our food systems profoundly affects the health of our bodies, as well as the health of our environment, our economies and our cultures. When food systems fail, the resulting disorder threatens education, health, and economy, as well as human rights, peace and security. Scientists agree that transforming food systems is among the most powerful ways to change course and make progress towards all 17 SDGs. It is on this basis that the ARC undertakes to elevate multi- and trans-disciplinary research approaches on food systems in 2022/23 financial period.

Accordingly, the ARC aligns its 2022/23 APP to the Agriculture and Agro-processing Master Plan (AAMP) led by DALRRD; in order to contribute the necessary scientific solutions to the growth, transformation, employment and developmental challenges in agriculture, food and beverage sectors. Specifically, ARC's contributions will enable improved agricultural productivity and reduction of post-harvest losses to maintain national and household food security, sustainable growth of the agriculture sector and job creation. To this end, the ARC embraces new global trends for sustainable production and reduction of carbon footprint, including natural resource use efficiency (water, land, flora and fauna),

and energy. As a national Science Council, the ARC is most suited through its research and development and technology transfer mandate to provide the requisite solutions for sustainable agriculture that contributes towards enabling the country to meet its food demand/s.

Research and innovation are critical elements for enabling agricultural productivity, biosecurity, sustainable and competitive enterprises in the sector. As a key provider of scientific solutions and technologies for the management of pests and diseases as well as the mitigation/adaptation to climate change, a non-functional ARC would present significant threat to food and nutrition security, agriculture and economic growth, peace and development. It is therefore essential to ensure a financially resourced and sustainable ARC that can fulfil its mandate.

The outbreak and transmission of the SARS-CoV-2, the virus that causes the COVID-19 disease has presented unprecedented challenges for humanity, businesses and the economy at large. Various reports by Statistics SA suggest that the South African economy suffered a significant GDP contraction with associated losses in growth and jobs. Although agriculture was designated an essential service during the various movement restrictions (COVID-19 lockdowns), the transmission and spread of the virus negatively reduced interaction/s among various stakeholders in sector. Further, regulatory restrictions on alcohol sales reduced the production and processing of grapes for wine and barley for beer.

During the same period, the ARC experienced significant reduction in diagnostic and analytical laboratory services, mainly due to movement restrictions, particularly among farmers and associated service providers. To date, the consequences have been a significant reduction in research services, diagnostic and analytical services offered by the ARC; which in turn, resulted in lower external revenue generated. Accordingly, the ARC has considered the continued likely impact (risks) associated with COVID-19 on forward looking business prospects in the MTEF for the period FY 2023 – 2025 in the following manner:

- Future business operations and revenue generation.
- Impacts on cost drivers of the ARC.
- Impact of the reduction of employee related costs (linked to co-morbidities and unavailability of employees during critical times for the sector).
- Impact of non – payment from private customers.

In response, this APP 2022-2023 seeks to bring to reality objectives set in the Strategic Plan for 2020-2025 towards achievement of the ARC vision for *“excellence in research and innovation for sustainable agricultural systems and economic development”*.

In achieving its vision, the ARC will actively pursue its mission to *“conduct research, develop partnerships and human capital, to foster innovation for a sustainable agriculture sector”*. This is done to:

- 1) Promote sustainability and equitable economic participation in the agricultural sector.
- 2) Promote agriculture development and growth in related industries.
- 3) Facilitate sector skills development and knowledge management.
- 4) Facilitate and ensure natural resource conservation.
- 5) Promote national food and nutrition security, and
- 6) Contribute to improved health and better quality of life.

Informed by its mission, and aligned to the MTSF priorities³ and outcomes, the Agricultural Research Council has defined its outcomes for the period to 2025, which direct its strategic focus and inform the Outputs of this Annual Performance Plan, towards:

- 1) Researching, developing and disseminating solutions, processes and technologies to increase agricultural production and productivity;
- 2) Researching, developing and disseminating solutions, processes and technologies to promote sustainable ecosystems and natural resources;
- 3) Researching, developing and disseminating solutions, processes and technologies to improve the nutritional value, quality and safety of agricultural products;
- 4) Researching, developing and disseminating solutions, processes and technologies to enhance the resilience of agriculture;
- 5) Growing a skilled and capable agriculture sector through innovation, knowledge and technologies;
- 6) Securing partnerships and strategic alliances, and partnering with relevant stakeholders to support the realisation of the ARCs mandate, and
- 7) Implementing an enhanced operating model that is future focused and supports a sustainable, agile and performance orientated organisation.

The plan is ambitious, but with the continuous support of the Minister and the Council in leading the organisation, it is achievable. Your commitment to strong oversight and governance is acknowledged and appreciated. I also thank the staff of the Agricultural Research Council for their hard work and outstanding commitment.

In closing, I affirm my commitment to lead the Agricultural Research Council to the best of my ability, as it strives to deliver on the priorities, outcomes and outputs reflected in this Plan.



Dr Nthabiseng Motete

Acting Chief Executive Officer and President

AGRICULTURAL RESEARCH COUNCIL

³ Available: <https://www.dpme.gov.za/keyfocusareas/outcomesSite/Pages/mtsf2021.aspx>

OFFICIAL SIGN-OFF

It is hereby certified that this 2022/23 Annual Performance Plan:

- 1) Was developed by the executive and senior management team of the Agricultural Research Council, under the guidance of the Council;
- 2) Considers all the relevant policies, legislation and other mandates for which the Agricultural Research Council is responsible; and
- 3) Accurately reflects the outputs and targets which the Agricultural Research Council will endeavour to achieve over the 2022/23 financial year.



Dr. S. Venter
 EXECUTIVE:
 CROP SCIENCES
 (Acting)



Dr. A. Magadlela
 EXECUTIVE:
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Dr. P. Chaminuka
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 IMPACT &
 PARTNERSHIPS
 (Acting)



Ms. B Muthuri
 EXECUTIVE: HR,
 MARKETING &
 LEGAL SERVICES
 (Acting)



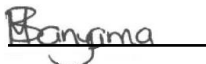
Dr. T. Sethibe
 EXECUTIVE:
 INFORMATION
 SYSTEMS



Dr. Hilton Vergotine
 GENERAL MANAGER: RISK AND PLANNING

25 February 2022

Date



Ms. Maureen Manyama
 CHIEF FINANCIAL OFFICER

25 February 2022

Date



Dr. Nthabiseng Motete
 CHIEF EXECUTIVE OFFICER AND PRESIDENT (Acting)

25 February 2022

Date

APPROVED BY:



Ms. Joyene Isaacs
 ACCOUNTING AUTHORITY
 CHAIRPERSON OF COUNCIL

25 February 2022

Date

ABBREVIATIONS AND ACRONYMS

4IR	4th Industrial Revolution
AAMP	Agriculture and Agro-processing Masterplan
AfCFTA	African Continental Free Trade Agreement
AGSA	Auditor-General of South Africa
AHS	African Horse Sickness
AP	Animal Production
APP	Annual Performance Plan
ARC	Agricultural Research Council
AU	African Union
AX	Microsoft Dynamics AX
B-BBEE	Broad-Based Black Economic Empowerment
BFAP	Bureau for Food and Agricultural Policy
BRICS	Brazil, Russia, India, China and South Africa
BT	Bluetongue
BVI	Botswana Vaccine Institute
CA	Conservation Agriculture
CARA	Conservation of Agricultural Resources Act No. 43 of 1983
CEC	Crop Estimates Committee
CEO	Chief Executive Officer
CETC	Community Education Training Centre
Cotton SA	Cotton South Africa
COVID-19	Coronavirus
CRM	Customer Relationship Management
CSA	Climate Smart Agriculture
CSIR	Council for Scientific and Industrial Research
DALRRD	Department of Agriculture, Land Reform and Rural Development
DFFE	Department of Environment, Forestry and Fisheries
DHET	Department of Higher Education and Training
DMRE	Department of Mineral, Resources and Energy
DOH	Department of Health
DPME	Department of Planning, Monitoring and Evaluation
DR	Disaster Recovery

DSI	Department of Science and Innovation
DTIC	Department of Trade, Industry and Competition
DWS	Department of Water and Sanitation
ECDC	Eastern Cape Development Corporation
EIA	Environmental Impact Assessment
EM	Executive Management
EMC	Executive Management Committee
EMDEs	Emerging Markets and Developing Economies
EPV	Employee Value Proposition
ERP	Enterprise Resource Planning
ESD	Enterprise Supplier Development
ESG	Environmental, social and corporate governance
EU	European Union
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment
FMD	Food and Mouth Disease
FSR	Farming System Research
GAP	Good Agricultural Practices
GC	Grain Crops
GDP	Gross Domestic Product
GE	Group Executive
GERD	Gross Domestic Expenditure on Research and Development
GG	Global Grade
GHG	Greenhouse Gas
GMP	Good Manufacturing Practice
GPS	Global Position System
GRAP	Generally Recognised Accounting Practice
HEI	Higher Education Institution
HP	Hewlett-Packard
HC/HR	Human Capital/Resources
IAF	Internal Audit Function
ICT	Information and Communication Technology
IDC	Industrial Development Cooperation
IGC	International Grains Council

IGR	Intergovernmental Relations
IMF	International Monetary Fund
INF-NVB	Deciduous Fruit, Vines and Wine
INTERGIS	Integrated Registration and Genetic Information System
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual Property Rights
IWYP	International Wheat Yield Partnership
KPI	Key Performance Indicator
KyD	Kaonafatso ya Dikgomo
LICs	Low Income Countries
LIFO	Last In First Out
LIMS	Laboratory Information Management System
M&E	Monitoring and Evaluation
MFU	Multi-Functional Units
MINMEC	Ministers and Members of Executive Council
MoA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoU	Memorandum of Understanding
MSc	Master of Science
MT	Maize Trust
MTBPS	Medium-Term Budget Policy Statement
MTEF	Medium Term Expenditure Framework
MTSF	Medium-Term Strategic Framework
MV	Military Veteran
NAMPO	South African Agricultural Trade Show
NARIS	National Animal Recording and Improvement Scheme
NDP	National Development Plan
NERPO	National Emergent Red Meat Producers Organisation
NGP	New Growth Path
NICD	National Institute for Communicable Diseases
NIPMO	National Intellectual Property Management Office

NRE	Natural Resources and Engineering (Soil, Climate and Water & Agricultural Engineering)
NRF	National Research Foundation
OECD	Organisation for Economic Co-operation and Development
OHSA	Occupational Health and Safety Act
OPEX	Operational Expense
OPOT	Oil and Protein Seed Development Trust
OTT	Office of Technology Transfer
OVR	Onderstepoort Veterinary Research
PDA'S	Provincial Department(s) of Agriculture
PDP	Professional Development Programme
PFMA	Public Finance Management Act
PG	Parliamentary Grant
PhD	Doctor of Philosophy
POPI	Protection of Personal Information
PHP	Plant Health and Protection
PPP	Public-Private Partnership
PRF	Poliomyelitis Research Foundation
PSA	Public Service Association
PSET	Post-School Education and Training
PwD(s)	People with Disability/ies
R&D	Research and Development
ROI	Return on Investment
RPO	Red Meat Producers Organisation
RQO	Resource Quality Objectives
SAAGA	South African Avocado Growers Association
SADC	Southern African Development Community
SAGAP	South African Good Agricultural Practices
SAHPRA	South African Health Products Regulatory Authority
SAMAC	South African Macadamia Association
SANReN	South African National Research Network
SANSOR	South African National Seed Organisation
SAPPA	South African Pecan Nut Producers Association
SAPS	South African Police Service

SCM	Supply Chain Management
SDG	Sustainable Development Goal
SET	Sector Education Training
SG	Small Grains
SHF	Small-Holder Farmer
SLA	Service Level Agreement
SM	Senior Manager
SMART	Specific, Measurable, Achievable, Realistic and Time-bound
SMME	Small, Medium and Micro Enterprise
SOC	State-Owned Company
SOE	State-Owned Entity
SOFF	Surface Observation Funding Facility
SONA	State of the Nation Address
SOPs	Standard Operating Procedures
SPI	Standardised Precipitation Index
SQL	Structured Query Language
S&T	Subsistence and Travel
SWOT	Strengths, Weaknesses, Opportunities, Threats
TSC	Tropical and Subtropical Crops
TVET	Technical and Vocational Education and Training
UK	United Kingdom
UN	United Nations
USDA	United States Department of Agriculture
VAT	Value Added Tax
VC	Value Chain
VCI	Vegetation Condition Index
VIMP	Vegetables, Industrial and Medicinal Plants (Vegetable and Ornamental Plant Institute and Industrial Crops)
VOCs	Variants of Concern
WCT	Winter Cereal Trust
WINETECH	Wine, Industry, Network for Expertise and Technology

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PART A: OUR MANDATE

In order to deliver on the priorities of the current government, and informed by instructing legislation and policy, the ARC has described its role through the 2020-2025 Strategic Plan as:

To conduct agricultural research and development and drive technology development and dissemination to:

- promote sustainability and equitable economic participation in the agricultural sector;
- promote agriculture development and growth in related industries;
- facilitate sector skills development and knowledge management;
- facilitate and ensure natural resource conservation;
- promote national food and nutrition security, and
- contribute to improved health and better quality of life.

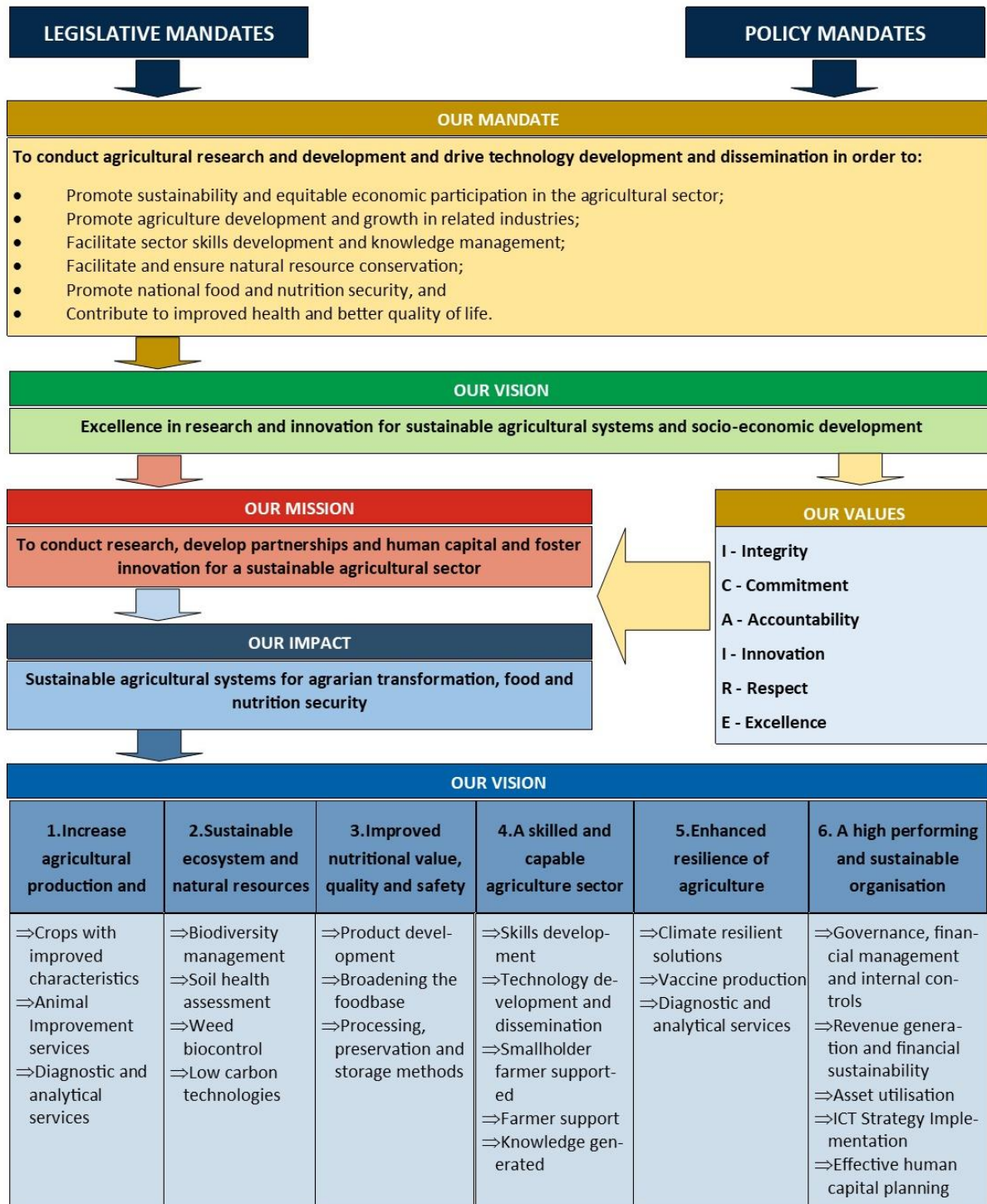
In line with this understanding, the Agricultural Research Council then articulates its strategic focus – its vision, mission and institutional values – for the period up to 2025 as follows:

VISION
Excellence in research and innovation for sustainable agricultural systems and economic development.
MISSION
To conduct research, develop partnerships and human capital, to foster innovation for a sustainable agriculture sector.

VALUES		
	Value	Description - What it means in practice
I	Integrity	We conduct our business in a transparent, honest, truthful, consistent, and ethical manner to ensure we foster trust among our employees and stakeholders.
C	Commitment	We commit ourselves to live the values of the ARC.
A	Accountability	We honour our commitments towards our employees and stakeholders in a responsible and reliable manner, taking ownership of our work and decisions.
I	Innovation	We conduct our business in a manner that fosters innovation to improve the growth of the organisation and the agricultural sector.
R	Respect	We treat our colleagues and stakeholders with respect and dignity in an equitable manner whilst embracing diversity.
E	Excellence	We conduct our work in an efficient, effective, and professional manner to ensure we create the highest quality and value.

IMPACT STATEMENT		
Sustainable agricultural systems for agrarian transformation, food and nutrition security.		
OUTCOMES		
OUTCOME 1: Increased agricultural production and productivity	OUTCOME 2: Sustainable ecosystems and natural resources	OUTCOME 3: Improved nutritional value, quality, and safety of agricultural products
OUTCOME 4: A skilled and capable agriculture sector	OUTCOME 5: Enhanced resilience of agriculture	OUTCOME 6: A high-performing and sustainable organisation

The following (as represented on the next page) is a visual representation of the strategic focus of the Agricultural Research Council for the period 2020-2025:



The ARC strategic focus to 2025

The above strategic framework and the six outcomes, in turn, inform the alignment of the delivery structure of the ARC and the development of outputs, output indicators, and annual and quarterly performance metrics, as outlined in the rolling annual performance plans for the period of the Strategic Plan.

The 2022/23 planning priorities, outputs, output indicators, annual targets and budget allocations for performance against the outcomes of the Strategic Plan are reflected in this APP.

1. UPDATES TO RELEVANT LEGISLATIVE AND POLICY MANDATES

There are no updates to the legislative mandates as outlined in the 2020/21 – 2024/25 Strategic Plan. In the subsequent years, updated information will be presented and discussed in this section, if/when necessary.

1.1. UPDATED LEGISLATIVE MANDATES

There are no updates to the legislative mandates as outlined in the 2020/21 – 2024/25 Strategic Plan. In the subsequent years, updated information will be presented and discussed in this section, if/when necessary.

1.2. UPDATED POLICY MANDATES

In addition to the policy mandates contained in the 2020/21 - 2024/25 Strategic Plan, the updates to the policy mandates are outlined in the below table.

NATIONAL FRAMEWORK	IMPLICATION
	Not Applicable

2. UPDATES TO INSTITUTIONAL POLICIES AND STRATEGIES

The table below provides updates to the institutional policies and strategies made during the 2021/22 FY that will be applicable for the 2022/23 Annual Performance Plan.

UPDATED /NEW INSTITUTIONAL POLICIES AND STRATEGIES	IMPLICATION
ARC Leave Policy	Existing Policy reviewed to be in line with the Basic Conditions of Employment Act and to assist in managing leave more effectively
Standby Allowance Policy	Existing Policy reviewed and updated to control standby in the ARC
Recruitment & Selection Policy	Existing Policy reviewed and updated to manage and enhanced Recruitment & Selection processes in the ARC
Guidelines for Remote Work and Telecommuting	New Policy to promote best practise for remote work and telecommuting to ensure Employee Value Proposition (EPV) and formal and transparent processes
Grievance Procedure	Existing Procedures reviewed and updated to assist in addressing and resolving grievances in the workplace
Leave Arrangements: Management Procedures	Existing Procedures reviewed and updated to be in line with the updated ARC Leave policy approved by ARC Council
Performance Management Policy	Existing Policy reviewed to include performance-monitoring interventions
ICT DR Plan	The disaster recovery plan was reviewed to update the ARC DR plan and activities, and to also to review ARC critical applications

UPDATED /NEW INSTITUTIONAL POLICIES AND STRATEGIES	IMPLICATION
Patch management procedure	The procedure was reviewed to update the process of patching the ARC environment
ARC Firewall Procedure	The firewall procedure was reviewed in order to update firewall requirements
Data management procedure	The data management procedure was reviewed to update data centre access and how to maintain ARC resources
ICT Security policy	The annual review policy done as a best security practice
S&T Policy	The existing S&T policy has been reviewed to be in line with the new requirements for international travel as well as to provide for the reimbursement of the costs incurred for compulsory medical tests due to COVID-19 pandemic
Related Parties SOPs	Management has developed Related Parties SOPs to improve the internal controls within the organisation
Segment Reporting SOPs	Management has developed Segment Reporting SOPs to improve the internal controls within the organisation
Unclaimed Monies SOPs	Management has developed Unclaimed Monies SOPs to improve the internal controls within the organisation

3. UPDATES TO RELEVANT COURT RULINGS

There are no court judgements or rulings, which have a material and/or direct bearing on the mandate and/or core operations of the Agricultural Research Council.

PART B: OUR STRATEGIC FOCUS

4. SITUATIONAL ANALYSIS

The Agricultural Research Council executes its mandate, and seeks to achieve its vision and mission, in a complex environment, impacted by global, national and provincial events, which directly affect the pursuit of its desired impact and in delivering on its mandate. The section below highlights the various external and internal factors that could affect the ARCs ability to fulfil its mandate.

4.1. EXTERNAL ENVIRONMENT ANALYSIS

GLOBAL ECONOMIC OUTLOOK

After the global economy contracted by 3.5% in 2020, it grew to 5.5% in 2021 as pent-up demand dissipated and fiscal and monetary support unwound across the world. The 2021 growth was regarded as the fastest post-recession recovery in 80 years although it remained below pre-pandemic projections, with poorer countries recovering more slowly.⁴ The US and China were expected to contribute more than a quarter of global growth in 2021. Advanced economies were expected to rise at a rate of 5.4% in Q2 of 2021, owing to a broader range of economies undergoing comprehensive vaccination programmes, and thus opening economic activities. On the other hand, the aggregate outlook growth in the Emerging Markets and Developing Economies (EMDEs) was predicted to reach 6% in 2021 as COVID pandemic effects eased and as EMDEs benefitted from a dramatic rising in commodity prices and better external demand because of a stronger global outlook. Although the recovery was strong, it varies across regions and largely suggests strong recoveries in a number of major countries, e.g. the United States, where the economic rebound was driven by substantial fiscal measures. On the other hand, growth in China slowed as the focus shifted from bolstering activity to reducing financial stability risks.

The global economy is entering a dramatic contraction with emerging threats from COVID-19 variations and a rise in inflation, debt, and income inequality, which might jeopardise the recovery in emerging and developing nations in 2022. In 2022, the global economy is projected to decelerate to 4.1% and further to 3.2% in 2023⁵. Global production is likely to stay roughly 2% under the estimates before the pandemic, and nearly two-thirds of EMDEs' per capita income losses will not be fully recovered. Because of increasing fiscal measures in the USA, growth in advanced economies is likely to slow to 4% in 2022. Moreover, because of the longer unwinding of fiscal aid and lower investment, the aggregate growth in the EMDEs is predicted to fall to 4.7% in 2022, which is 4.1% below the pre-pandemic projections in 2022, thus, putting output in 2022 at 4.9% below pre-pandemic levels. While trade volumes rose by 8.1% in 2021, they are projected to drop to around 6% in 2022. Services trade will lag behind goods trade until viral transmission rates drop sufficiently, owing to the slow rebound in cross-border tourist and business travel. Crude oil prices are expected to decline from their peak in 2021. Crude oil, the international pricing benchmark, averaged \$79 a barrel in the fourth quarter of 2021. Oil prices will average \$75 per barrel in 2022 and \$68 per barrel in 2023. The drop in prices is due to a shift in global petroleum inventory levels from decreases in 2021 to gains in 2022 and 2023.⁶

⁴ World Bank. 2021. Global Economic Prospects, June 2021. Washington, DC: World Bank. doi:10.1596/978-1-4648-1665-9. <https://openknowledge.worldbank.org/bitstream/handle/10986/35647/9781464816659.pdf>. Accessed 18 October 2021.

⁵ World Bank. 2022. Global Growth to Slow through 2023, Adding to Risk of 'Hard Landing' in Developing Economies. <https://www.worldbank.org/en/news/press-release/2022/01/11/global-recovery-economics-debt-commodity-inequality>.

⁶ U.S Energy Information Administration. 2022. [EIA forecasts crude oil prices will fall in 2022 and 2023](https://www.eia.gov/todayinenergy/detail.php?id=50858#:~:text=We%20forecast%20that%20the%20price%20of%20Brent%20crude%20oil%20in,b%20in%20the%20fourth%20quarter.&text=In%202023%2C%20we%20expect%20continued,averaging%200.6%20million%20b%2Fd). *Today in Energy*. <https://www.eia.gov/todayinenergy/detail.php?id=50858#:~:text=We%20forecast%20that%20the%20price%20of%20Brent%20crude%20oil%20in,b%20in%20the%20fourth%20quarter.&text=In%202023%2C%20we%20expect%20continued,averaging%200.6%20million%20b%2Fd>. Accessed 23 February 2022

Despite these anticipated recoveries, there are concerns about their long-term durability owing to the impacts of the pandemic on growth of per capita income, inequality and poverty, all of which will endure for a long time. Because the pandemic has exacerbated underlying difficulties, recovery is particularly slow in unstable and conflict-affected LICs. Inequality has been exacerbated by the pandemic's uneven impact on the highly vulnerable such as women, children, senior citizens and low-wage workers. Because of COVID-19 cases, vaccination barriers, and a partial withdrawal of macro-economic support, many other countries, primarily EMDEs, are still experiencing slow growth.

EMERGING MACRO-ECONOMIC FACTORS AND TRENDS

The COVID-19 pandemic, as well as the possibility of new viral variants, continue to have an impact on global economic activity, with major outbreaks stifling growth in several countries. While vaccination attempts have helped to curb the virus' transmission, progress has been uneven and focused in affluent economies but low in LICs, particularly Africa. COVID-19's ongoing spread suggests that outbreaks are still possible, especially given the advent of new varieties that are more virulent, lethal, and vaccine-resistant. To boost recovery efforts and control the pandemic on a worldwide scale, more equitable vaccine distribution will be required, particularly in low-income countries, as vaccination progress is a crucial component in near-term projection revisions.

Major downside risks, financial crises, compounded by high EMDEs debt levels, are dimming the global outlook and posing a risk to global economies' potential growth and key development goals.⁷ Businesses and consumers in debt-ridden countries like South Africa, India and Brazil will be badly impacted after the epidemic because a debt surge can lead to fewer government spending and higher financing costs.⁸ The EMDEs and developing continue to shift their focus from primary industries and towards higher Value-added enterprises in the global supply chain. Despite rising debt concerns and uncertain recovery prospects, developing nations will remain the principal drivers of global economic expansion in the long run. Between 2020 and 2040, emerging and developing markets will contribute for 75% of global GDP growth. The ratification of the African Continental Free Trade Agreement (AfCFTA) also comes in handy towards promotion of inclusive growth, more particularly in the African economy through trade liberalisation.

Policymakers' concerns about balancing a need to encourage recovery while maintaining price stability and fiscal sustainability have grown because of the pandemic's legacies. As the recovery grows more entrenched due to reasons such as pandemic limitations and extraordinary fiscal policy responses in numerous countries, policymakers must continue to push reforms geared towards enhancing growth and drive their respective economies into a resilient and inclusive development path.

SOUTH AFRICAN ECONOMIC OUTLOOK AND EMERGING TRENDS

South Africa's economic prospects have been harmed by the alarming COVID-19 outbreak, poor rate of COVID-19 vaccines, as well as recent electricity supply outages because of their influence on socio-economic activities and the impact on overall confidence. The third COVID-19 wave experienced in 2021 together with the social unrest and looting of businesses worsened the economic environment and increased job losses. Consumers, firms, and investors continue to express dissatisfaction with the operating environment, which is reflected in poor sentiment levels. Prior to the pandemic crisis, investment was already dropping due to policy instability, a lack of infrastructure that caused power outages, and a bleak outlook for government finances. Regulatory constraints in a variety of areas, particularly the network industries, continue to pose a risk to the recovery.

The economy expanded for the 4th quarter in a row in Q2 of 2021, increasing by 1.2%. This came after a revised upward 1.0% increase in real GDP in Q1 of 2021. The rapid recovery that began at the end

⁷ World Bank. 2021. Global Economic Prospects, June 2021. Washington, DC: World Bank. doi:10.1596/978-1-4648-1665-9. <https://openknowledge.worldbank.org/bitstream/handle/10986/35647/9781464816659.pdf>. Accessed 18 October 2021.

⁸ Euromonitor. 2021. Five Key Trends Shaping the Global Economy in 2021 and Beyond. <https://www.euromonitor.com/article/five-key-trends-shaping-the-global-economy-in-2021-and-beyond>

of 2020 slowed in the first half of 2021, owing to a long-lasting second wave of the virus that hampered economic activity. Six industries, including agriculture experienced growth during the first and second quarters of 2021, yet, despite these gains, the economy was still 1.4 percent smaller than it was before the COVID-19. Following the 2020 catastrophic recession, the country's economy is predicted to grow at 3.5% in 2021 and 2.1% in 2022, with the rebound assisted by a steady lifting of COVID-19 restrictions, higher metal prices, domestic demand, and commodity exports.

While South Africa lost a net 1.4 million jobs in 2020 and faced a jobless economic recovery in 2021, historical employment-growth correlations predicted that the country had to add over 400,000 jobs in 2021 (based on GDP forecasts). Despite this, the country shed roughly 300,000 formal positions in the first half of 2021. The closure of firms (due to the pandemic, load shedding, and other circumstances) and the scaling down of activity by others have had a significant detrimental impact on employment in South Africa. Furthermore, because of the social unrest in July 2021, which had a negative impact on economic activity and physical infrastructure, Gauteng and KwaZulu-Natal lost a combined 323,000 jobs in the third quarter of 2021. In the third quarter of 2021, this resulted in a total loss of 660,000 job possibilities. As a result, overall employment (formal and informal) fell to 14.28 million people.⁹ Notwithstanding the fact that expansionary monetary and fiscal policies have increased activity, GDP will remain much lower than in 2019 until 2022¹⁰. Due to growing pressure on the fiscal space, and weakened public investment growth, South Africa's near-term growth prospects remain gloomy. As seen by consistently high unemployment, major structural impediments to potential growth, such as labour market rigidities, remain in place.

GLOBAL OUTLOOK FOR AGRICULTURE

The impacts of COVID-19 pandemic have put unprecedented strain on the agriculture sector, calling for action to sustain the resilience and sustainability of the sector. This is also to ensure the achievement of the 2030 Sustainable Development Goals targets (SDGs).¹¹ This is contingent on a speedy recovery from the global COVID-19 pandemic, as well as stable weather circumstances and favourable policy environments. Given the underlying issues as well as the effects of the COVID-19 pandemic, LICs' diets are likely to remain heavily focused on staples and guaranteeing food security for an expanding population will remain a major challenge and are thus calling for action to ensure productivity gains. The productivity gains can only be achieved with continued investments in infrastructure and R&D, as well as a significant acceleration of digitalisation, technology, improved data, and human capital advances. The COVID-related transportation and logistical interruptions also underlined the importance of intra-regional agri-food trade, particularly in Africa. Furthermore, COVID-19 has proved that trade restrictions are ineffective, weakening global market trust and posing a threat to global food security.¹²

Total grains (wheat and coarse grain) grain stocks are expected to decline by the end of the 2020/21 season to a five-year low because of declines in maize inventories (IGC 2021).¹³ Global grains production is projected to successive records for the five-year period 2021/22 to 2025/26 (IGC 2021) and further growth is projected to 2030 (USDA 2021) (see below).¹⁴ Global growth in demand for grains is expected to come from developing countries (USDA 2021). Rice production and consumption are expected to increase up to 2025/26 due to improvements in yields and growth in food uptake in the Far East Asia. Rice output in the sub-Saharan region, is expected to grow although the region is a low rice-

⁹ PwC. 2022. South Africa Economic Outlook. *A challenging time for consumers*. <https://www.pwc.co.za/en/assets/pdf/economic-outlook/economic-outlook-challenging-time-for-consumers.pdf>. Accessed 23 February 2023.

¹⁰ StatsSA. 2021. Gross domestic product, Second quarter 2021. <http://www.statssa.gov.za/publications/P0441/P04412ndQuarter2021.pdf>

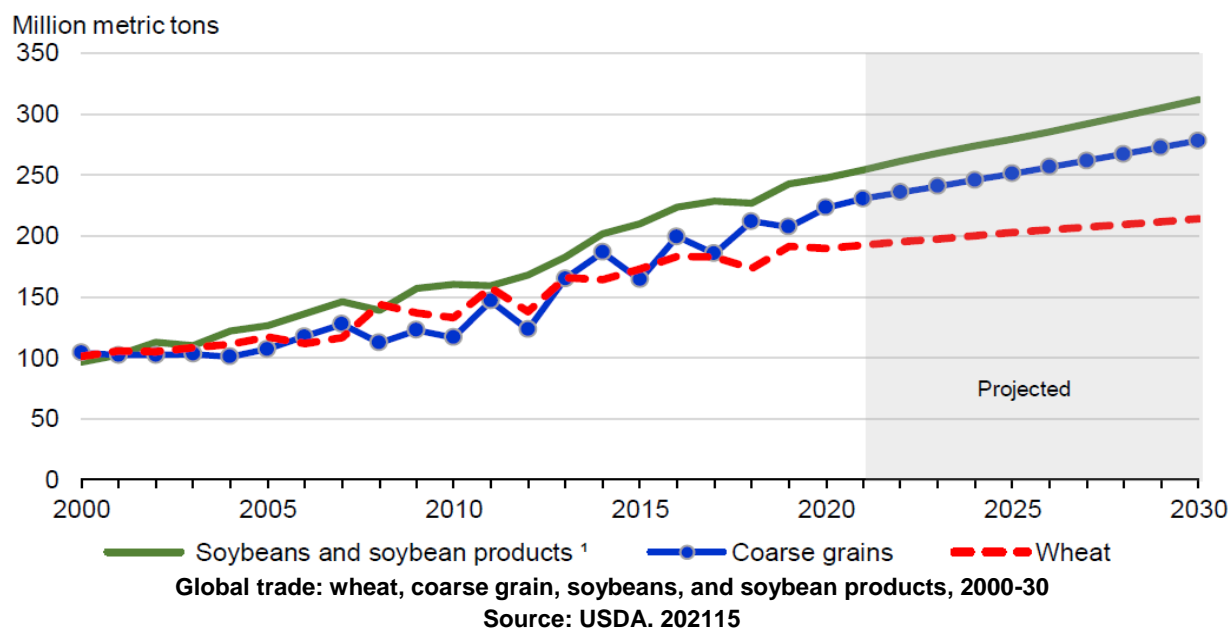
¹¹ OECD/FAO (2021), *OECD-FAO Agricultural Outlook 2021-2030*, OECD Publishing, Paris, <https://doi.org/10.1787/19428846-en>.

¹² OECD/FAO (2021), *OECD-FAO Agricultural Outlook 2021-2030*, OECD Publishing, Paris, <https://doi.org/10.1787/19428846-en>.

¹³ <https://www.igc.int/en/markets/marketinfo-forecasts.aspx>

¹⁴ USDA. 2021. USDA Agricultural Projections to 2030. Office of the Chief Economist, World Agricultural Outlook Board, U.S. Department of Agriculture. Prepared by the Interagency Agricultural Projections Committee. Long-term Projections Report OCE-2021-1, 103 pp. <https://www.usda.gov/sites/default/files/documents/USDA-Agricultural-Projections-to-2030.pdf>

producing region. Rice trade is also projected to increase in the region as a result of increased demand. Despite the negative effect of the COVID-19 pandemic, soybean production is expected to increase in the 2022/2023 season. Soybean demand is also expected to grow in the period to 2025/26 owing to local and international demand as well as growth in the biodiesel sectors in Brazil, the US and Argentina (IGC 2021).



The global wheat production is also projected to increase to 2025/26 although curbed by competition from maize and soybean (IGC 2021). Consumption is also expected to increase by 2030, with China being a major contributor growing to wheat use (USDA 2021). Over 70% of the projected increase in world wheat production will be from the European Union, China, India, Russia, United States, Canada and Ukraine, while Africa, Middle East and Southern Asia are projected to be the major wheat importers (USDA 2021). Global maize yields and area planted are expected to reach records high over the next five-years to 2025/26 (IGC 2021). World consumption is expected to grow, led by industrial use (ethanol) (USDA 2021). There is a positive global outlook in the livestock sector to 2030. Global consumption of beef, pork and poultry is expected to increase by 2030. The projections are estimated at 8.9% for beef, 17.3% for pork and 16.3% for poultry (USDA 2021). The fastest growth in demand is expected in Southeast Asia, Latin America, Africa and the Middle East (USDA 2021), while 60% of growth in production is projected to be from Brazil, China and United States (USDA 2021).

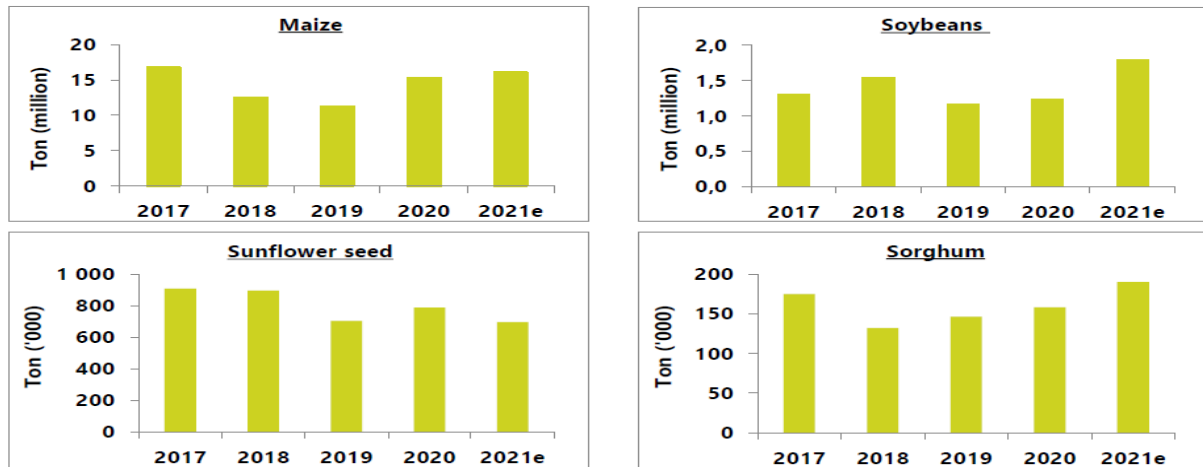
SOUTH AFRICAN AGRICULTURAL OUTLOOK

The 2020/21 season in South Africa's agriculture industry was one of the best in the country's history. Bumper harvests of grains, oilseeds, and some fruits enhanced export revenues and improved farm incomes, particularly for cereals, where the strong yield corresponded with higher crop prices. When the current 2021/22 season began, it promised to be spectacular. The first rains arrived on time, and planting began in the eastern parts of South Africa in October, roughly inside the best planting window. However, the continued heavy rains have caused difficulties for several places. The Free State, the North West, Limpopo, and areas of the Eastern Cape and KwaZulu-Natal have all flooded. In some areas, this has resulted in crop damage and a delay in planting. Various crop surveys have now

¹⁵ USDA. 2021. USDA Agricultural Projections to 2030. Office of the Chief Economist, World Agricultural Outlook Board, U.S. Department of Agriculture. Prepared by the Interagency Agricultural Projections Committee. Long-term Projections Report OCE-2021-1, 103 pp. <https://www.usda.gov/sites/default/files/documents/USDA-Agricultural-Projections-to-2030.pdf>

suggested that growth of harvests in 2021/22 may be lower than previously envisaged¹⁶. The 2022/23 season in South Africa is projected to be the continuation of a lengthy era of favourable weather and agricultural activities.

Agriculture output is predicted to rise again in 2021, though at a slower pace than the 2020/21 year. According to the predictions for summer crops, another bountiful maize harvest is forecast (estimated at 16.1 million tons in 2021, up 5.2 percent from 2020), while soybean and sorghum yields are likely to be much higher than in 2020.¹⁷



Projections for key agricultural crops production in 2021

Source: IDC, 2021¹⁸

Agriculture, forestry, and fisheries grew by 6.2% and contributed 0.2 of a percentage point to GDP expansion. Increased production of field crops, horticulture, and animal products accounted for the majority of the rise. The agriculture industry performed relatively well in the first quarter of 2021, according to BFAP (2021), expanding by 7.5% in real terms compared to the

The drivers of growth for agriculture are outlined below:

- A stable and favourable policy and investment environment, as well as effective farmer support programmes.¹⁹
- Increased agricultural exports due to increased demand in the EU in 2021/22, as well as the ratification of the Africa Continent Free Trade Area (AfCFTA) which is expected to drive stronger economic momentum for Sub-Saharan Africa, thus leading to export promotion across the region in the medium to long term.
- The poultry and sugar industries are also expected to drive domestic consumption and exports, as well as enhancing competitiveness, increasing output and investment, contributing to socio-economic and rural development, and transforming the sectors.
- Ensuring that the commercial and subsistence farming communities have access to land, particularly by repurposing marginalised or underutilised land, will boost agricultural

¹⁶ Farming Portal. 2022. South Africa's agriculture: activity outlook and policy landscape in 2022. <https://farmingportal.co.za/index.php/all-agri-news/news-of-the-day/7384-south-africa-s-agriculture-activity-outlook-and-policy-landscape-in-2022>. Accessed 23 February 2022

¹⁷ IDC. 2021. Economic overview: Recent developments in the global and South African economies. Department of Research and Information. <https://www.idc.co.za/wp-content/uploads/2021/05/Economic-Overview-IDC-Research-Information-publication-May-2021-External.pdf>

¹⁸ IDC. 2021. Economic overview: Recent developments in the global and South African economies. Department of Research and Information. <https://www.idc.co.za/wp-content/uploads/2021/05/Economic-Overview-IDC-Research-Information-publication-May-2021-External.pdf>

¹⁹ BFAP. 2021. <https://www.bfap.co.za/wp-content/uploads/2021/09/BFAP-Baseline-2021.pdf>

productivity. Furthermore, improvement on land rights concerns will benefit new and small-scale farmers.

- Enhanced emphasis on R&D and adoption of agricultural technologies.
- Expansion of export markets for field crops, horticulture, and livestock segments through effective trade policy to improve access to the traditional external markets like India and China.

Despite concerns about the economy's recovery following COVID-19, the sector's bright outlook presents opportunities for increased performance in agricultural R&D and conversely ARC business. Agricultural R&D in South Africa is predicted to contribute to greater yields and lower post-harvest losses, in keeping with global trends in satisfying rising demand for food driven by population expansion. The development of vaccinations for numerous livestock diseases, as well as diseases transmitted between animals and humans (zoonotic diseases) and diseases transmitted through food (food-borne pathogens), is becoming an increasingly important topic of research. Through the Foot and Mouth Disease (FMD) vaccine facility and contribution towards delivery of other livestock vaccines, the ARC is well placed to deliver impact in this area.

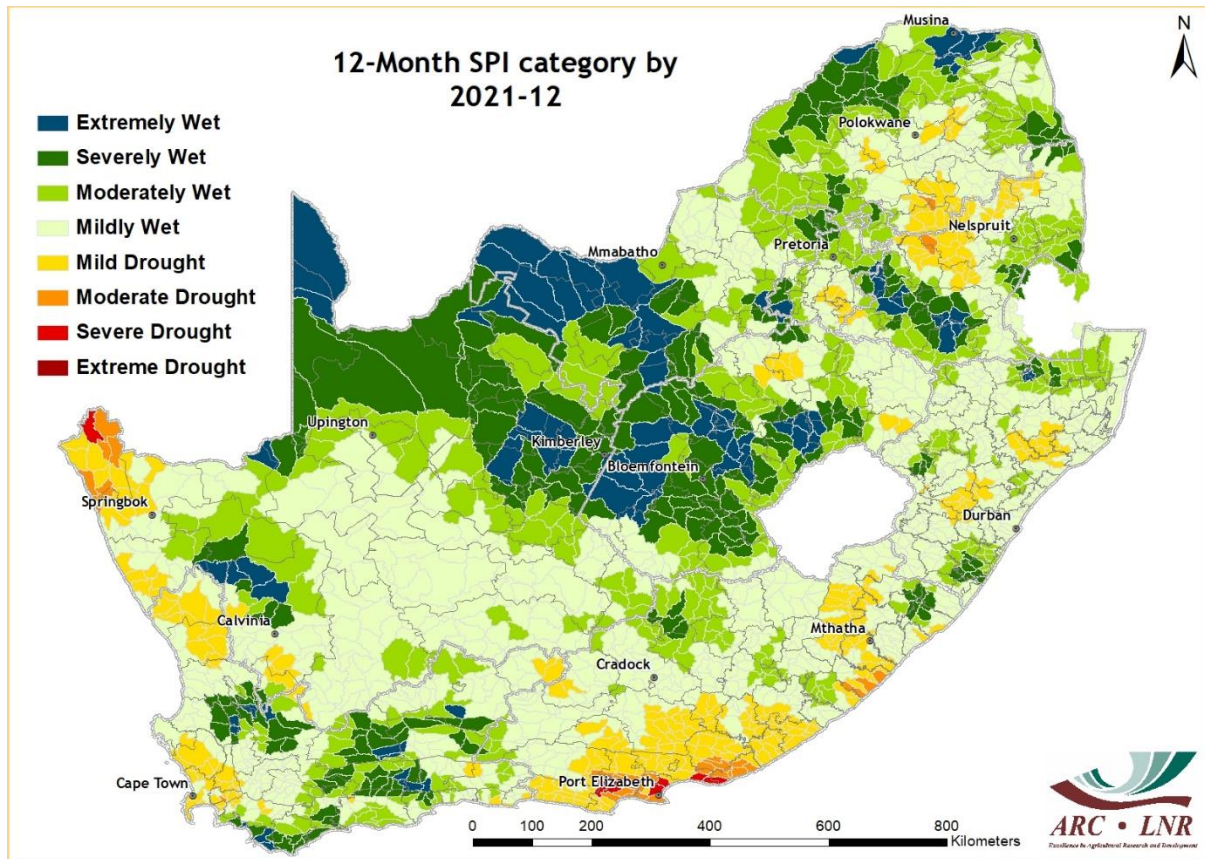
The 2020 South African Economic, Reconstruction and Recovery Plan identifies six priority areas for economic recovery. The ARCs business areas contribute significantly to three of these areas i.e., food security, the green economy and gender equality and economic inclusion. Specific areas include contributions in the fruit and horticulture sector and towards development of hemp and cannabis sub-sectors. Through the newly established organisational inter campus research forum to engender a culture of multi, inter and transdisciplinary research, the ARC will be able to exploit local and international opportunities for impactful R&D interventions.

The development of the AAMP has reached the stage of compilation of the first draft action plan with goals and targets. Development of the action plan is led by government and industry in a collaborative manner, through a coordination and negotiation mechanisms of seven (7) clusters. ARC is involved in leadership of two clusters (Animal & Animal Products, and Field Crops) and participates actively in two other clusters (Horticulture, Agro-processing). It is anticipated that once the action plans and the targets are finalised, ARC will provide a pivotal role together with other industry stakeholders in the implementation of the plans across all the clusters.

In line with global trends, there is opportunity for the development of digital innovations in the SA agriculture sector, with a focus on ideas that meet the restrictions of smallholder farmers and are suited for farmer adoption. The ARC has the ability and opportunities to commercialise its technologies and repurpose some of its assets for commercial production in high value commodities. The recently ratified AfCFTA, presents further opportunity for the promotion of sustainable and inclusive development, industrial development and diversification, regional value development and enhanced agricultural development through efficient trade in Africa, thus ensuring the ARC increases its footprint in the continent with some medium- and long-term benefits.

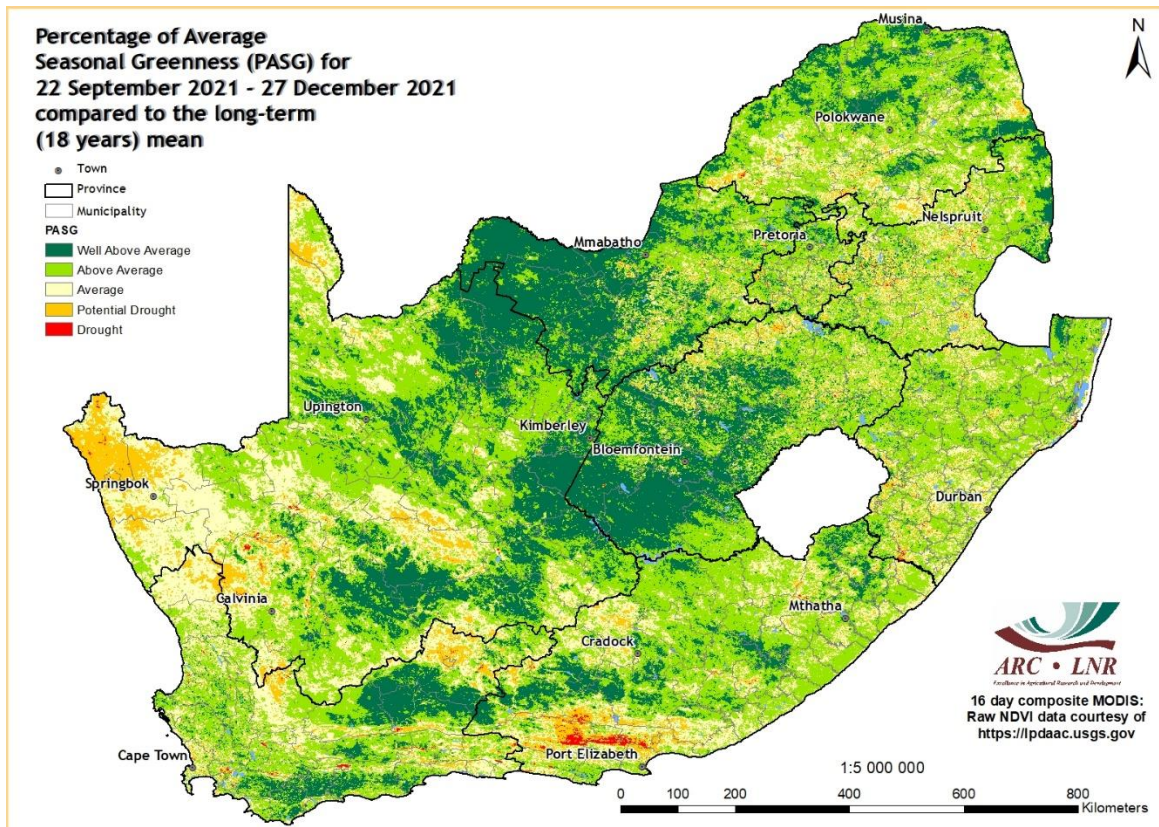
CURRENT AND FUTURE CLIMATE CONDITIONS WITH IMPLICATIONS ON AGRICULTURAL PRODUCTION

At the advent of the 2021/22 summer rainy season, seasonal forecasts favoured prospects for normal to above-normal rainfall over the summer rainfall region. The forecasts were indeed confirmed by extensive, wet conditions during the latter part of 2021 and first few days of 2022. Rainfall recorded between November and mid-January over some of the central parts of the country, including parts of the western maize-production region, totals in the vicinity of the long-term yearly average. By this point, the 2021/22 summer therefor is the second very wet summer in a row over much of the summer rainfall region. In summary, the Standardised Precipitation Index (SPI) map, based on data from the ARC and SAWS weather station networks, shows how wet the period 1 January – 31 December 2021 was over especially the central to northern parts of the country. This calendar-year period represents the contribution of late-summer 2020/21 and early summer 2021/22.



Standardised Precipitation Index (SPI) for the 12-month period up to December 2021.

The extremely wet conditions at the 12-month time scale has resulted in the levels of dams in the larger river systems being very high for this time of the year. Moreover, the large multi-year drought-affected region that was present over the south-western parts of the country has now diminished greatly in size and intensity, owing to abundant rainfall since October 2021 over most of the affected region. The winter rainfall region also received near-normal to above-normal rainfall during the 2021 winter. Only the southern interior of the Eastern Cape together with an area in the vicinity of the Richtersveld remain reminiscent of the earlier larger drought-affected area, where some stress is still visible in the cumulative vegetation activity for the last three months of 2021, visible in the latest Vegetation Condition Index (VCI) map for South Africa, produced from the MODIS (Moderate Resolution Imaging Spectroradiometer) data archive.

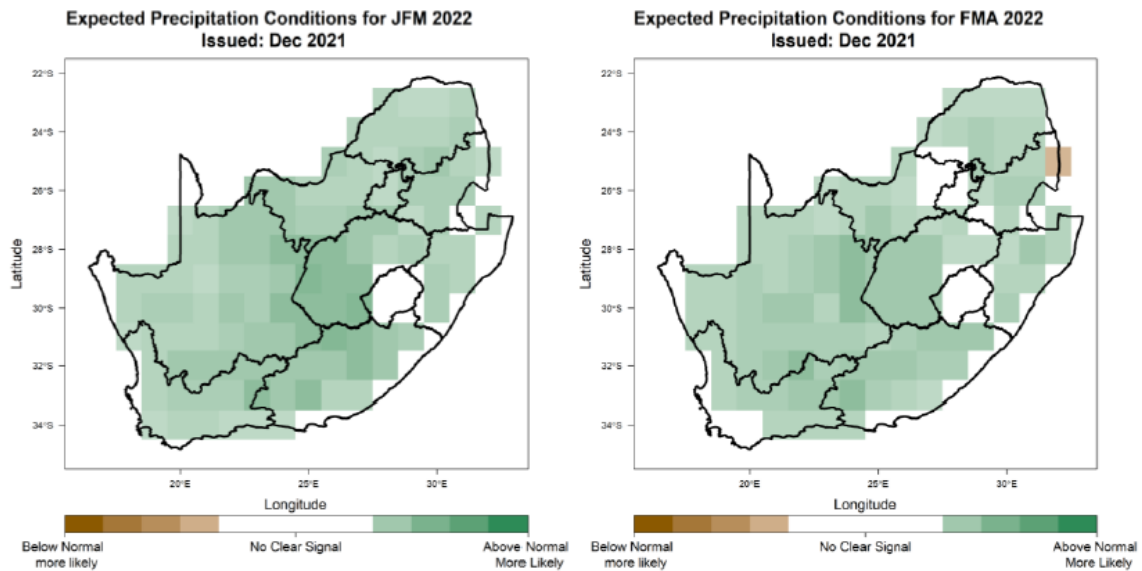


Percentage of Average Seasonal Greenness (PASG) for the period September to December 2021, showing areas with above-average (below-average) vegetation activity in green (brown).

Apart from the small drought-affected areas mentioned above, the rest of the country experiences an overwhelmingly favourable situation with regard to vegetation activity, owing to the wet conditions. Rainfall and vegetation activity imagery indicate improving grazing conditions and also near-record maize and soybean production during the 2021/2022 summer. However, due to the extremely wet and cool conditions during December 2021 and early January 2022, there are some indications of water damage to crops, especially over the western maize-production areas of the north-western Free State. Conversely, the northern parts of Limpopo have received fairly little in the way of rainfall since the beginning of January, and medium-term forecasts seem to suggest a further extension currently of the drier conditions over this region. Over the winter rainfall region, above-normal vegetation activity reflects very favourable conditions during the 2021 rainy season, supporting wheat and other winter grain production.

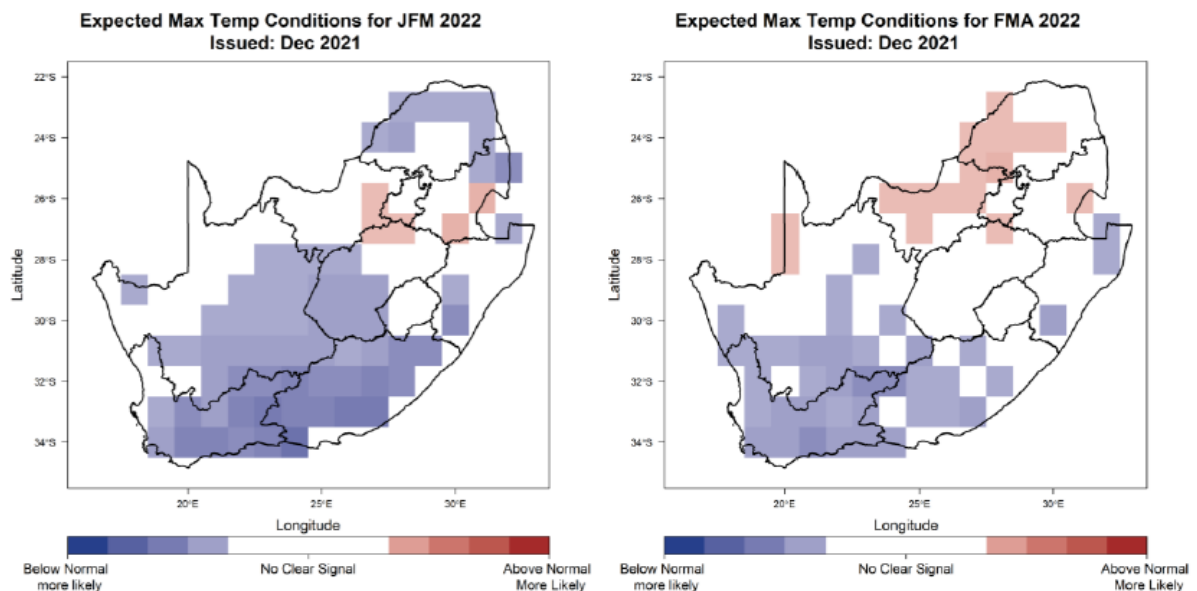
Looking forward to the rest of the 2021/2022 summer, the figure below shows the latest seasonal forecast for rainfall for the rest of the summer (November, December, January and December, January, February respectively), issued by the South African Weather Service²⁰⁹. The forecast is consistent with other seasonal forecasts issued by other international organisations.

¹⁹ Available: <https://www.weathersa.co.za/>



January-February-March (JFM-left) and February-March-April (FMA-right) 2022 seasonal precipitation prediction by the South African Weather Service. The map indicates the highest probability from three probabilistic categories namely Above-Normal, Near-Normal and Below-Normal.

As seen above, the latest seasonal forecasts, issued by December 2021, indicates an expected continuation of wet conditions during the remainder of summer. Coupled with above-normal rainfall, most of the country is expected to be relatively cool while warming somewhat relative to the norm later in the far north (current seasonal temperature outlook below). The near-normal to below-normal maximum temperatures expected over most of the country are indicative of somewhat greater cloud cover usually associated with wetter conditions.



January-February-March (JFM-left) and February-March-April (FMA-right) 2022 seasonal maximum temperature prediction by the South African Weather Service. The map indicates where Above-Normal, Near-Normal or Below-Normal maximum temperatures are more likely.

While normal to below-normal maximum temperatures during the middle to late part of the summer are usually supportive of crop production, the very wet and cool conditions so far have had a negative impact in some of the grain production areas.

Given the current conditions discussed above, together with the latest seasonal forecasts, the following points will be important to monitor:

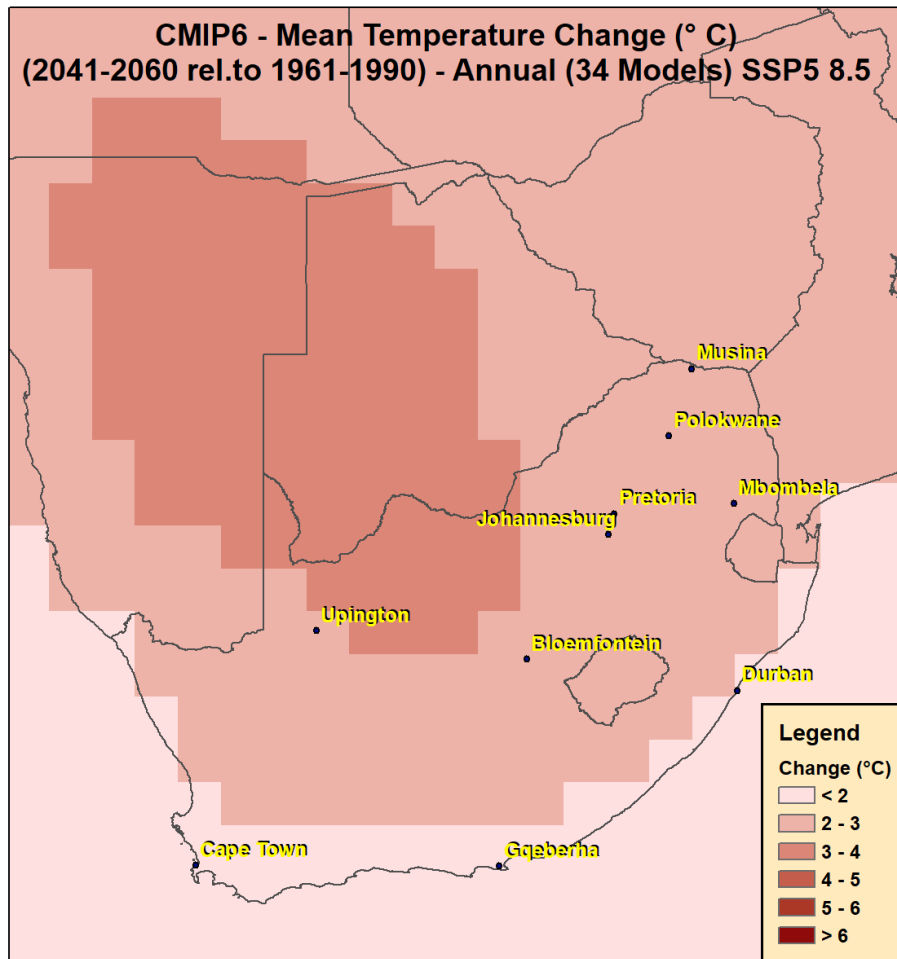
- Given the expectations of wet and cool conditions, the high levels of dams owing to relatively high rainfall since early 2021 during the previous summer already, and saturated conditions of soil, may pose a risk of flooding especially in the large river systems should widespread heavy rain occur during the next few summer months.
- A continuation of wet and cool conditions may be a threat to the grain crop for 2021/22, as some water damage and damage related to wet and cool conditions have already been reported from the main grain production region, especially the western parts. Moreover, given the earlier observed wet and cool conditions, together with the fact that summers tend to be cooler and wetter during summers when La-Niña conditions are present as well as the outlook according to the seasonal forecast for further wet and cool conditions, there is an elevated risk for fungal pathogens in summer crops. Medium term outlooks currently (in mid-January 2022) are indicative of somewhat warmer and drier conditions during the remainder of the month, but it still remains to be seen what happens later during February to April).
- The current drier conditions over the northern parts of Limpopo will have to be closely monitored for its effect on grazing, given the current drier medium-term forecast for the region. It happens sometimes during La Niña summers that the north-eastern extremes of the country miss out on the above-normal rainfall that sometimes focus more strongly on the central parts of the country.

Seasonal forecasts are uncertain for the winter period (May to August) in South Africa, thus predictions of rainfall, way before the commencement of the winter growing season, is not recommended. Dam levels in the Western Cape are also relatively close to capacity – owing to the relatively high rainfall in the 2020 and 2021 winters. However, given a long-term trend related to climate change in the climate system over the Southern Ocean, somewhat warmer, drier winters may become more prevalent in future – and this trend may indeed increase the chances for the coming winter to be somewhat drier than expected given natural climate variability.

Decadal-scale forecasting is non-existent – but research in this field will make it possible in the future to carry out meaningful assessments of the expected conditions beyond the current summer. In view of the current seasonal forecast capability and scope, it is impossible to make a scientifically based assessment of the expected conditions for the period following the current summer. It can be seen though that the tendency for a very late start to the rainy season (that dominated the 2017 – 2019 period) has been interrupted during both the 2020/2021 summer and 2021/2022 summers and may also be replicated for the coming 2022/23 summer. In general, statistically speaking, chances for a drier summer during the next year or two are increasing given the usual occurrence of multi-year wet and dry periods over the summer rainfall region. Over the south-western extremes, the drier winters that had been present over the winter rainfall region have also been replaced by normal to above-normal rainfall during the winters following 2019. Multi-year dry periods have been observed over the winter rainfall region on numerous occasions since the 17th century and is not necessarily an indication of climate change.

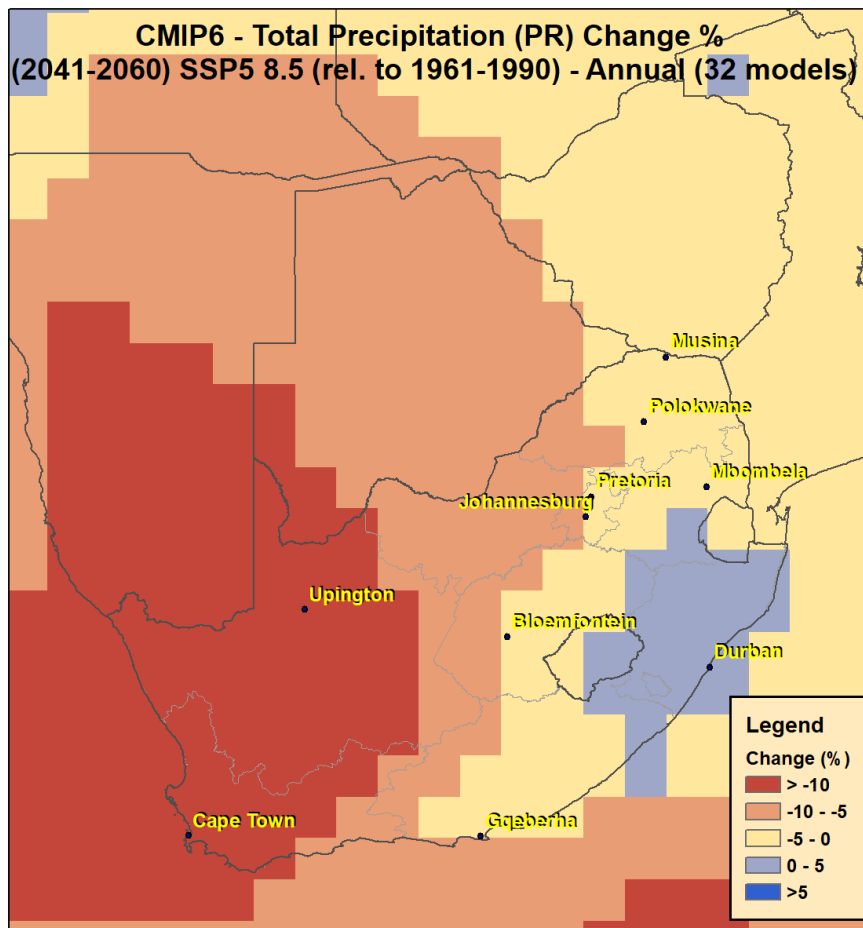
Looking further ahead, the latest International Panel on Climate Change (IPCC) Assessment Report (AR6) has recently been released. Regarding the outlooks for South Africa, expected trends through the 21st century remain similar to that associated with the previous assessment report (AR5). Features captured in the report, particularly for South Africa, include a warming trend through the 21st century,

exacerbated in the presence of higher atmospheric carbon dioxide concentrations, and focussing with largest increases over the central to north-western parts of the interior (figure below).



Projected mid-century mean temperature change relative to the 1961-1990 mean under a low-mitigation scenario. Original data obtained from the IPCC Working Group I (WGI): Sixth Assessment Report - Interactive Atlas.

Regarding rainfall, the western parts of the country are expected to become drier while the signal for the eastern parts of the country is uncertain (figure on next page). There is also a robust signal for drier conditions over the winter rainfall region, associated with a southward displacement of frontal systems in a warmer climate.



Projected mid-century mean annual mean rainfall change (%) relative to the 1961-1990 mean under a low-mitigation scenario. Original data obtained from the IPCC Working Group I (WGI): Sixth Assessment Report - Interactive Atlas.

Over and above the projected change in annual mean rainfall, there are also indications that the length of the dry season over the summer rainfall region may extend. This will be the result of a later advent of the summer rainy season on average.

The projected change in temperature and rainfall will have implications for both dryland and irrigated cultivation as well as livestock production. The findings with regards to these will remain similar to those found in studies based on the IPCC AR5 model results and is related to higher temperatures causing marginal areas (the warmer, drier parts) to become unsuited for production of crops currently produced in those areas whilst such crops may be produced in areas that are currently less suited because of temperatures being too low. Over the winter rainfall region, irrigation water and rainfall for dryland production of grains may become scarce as the region is expected to become more arid.

Once a large body of models used in AR6 have been downscaled, it will be worthwhile to investigate the latest projected impacts of the climate change signal on crops and livestock.

REFLECTIONS ON THE CLIMATE CHANGE BILL

Climate change issues are being prioritised by government with the approval of the latest climate change bill. The bill calls for all economic activities to implement mitigation and adaptation measures that can assist South Africa to transition to low-carbon society. The ARC is ready to contribute towards

all government initiatives that includes setting up of forums at municipal, provincial and presidential level.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURE AND WATER RESOURCES

South African agricultural output has always been susceptible to the high variability of climatic conditions across the country. Approximately 90% of the country is classified as sub-arid, semi-arid, or sub-humid, with the remaining 10% classified as hyper-arid (Schulze, 2011; DEA, 2013). Furthermore, only 14% of the country is considered arable, with only one-fifth of the land having high agricultural potential (DEA, 2013a). Although the use of improved seeds and fertilizers is increasing globally, it remains limited in Africa, where most farming is done manually (smallholder and subsistence farmers) with limited capital. According to the sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), further increases in surface temperature and evaporation are projected over South Africa, and the decrease in precipitation by the mid-21st century. These projected changes are expected to increase uncertainty in crop and livestock production while diminishing water availability and quality.

CLIMATE IMPACT DRIVERS AND THEIR PROJECTED CHANGES

Temperature influences many agricultural processes and is used as an indicator of the energy status of the environment. It is one of the climatic variables that is projected to rise due to global warming. Global climate models (GCMs) used in IPCC's AR6 indicate a projected increase in mean air temperature over South Africa. By the middle of the 21st century, annual temperatures are expected to rise across the country with the largest increases focussed on the central to northern parts of the country. Temperatures are expected to rise at an accelerating rate by the end of the century. Given the observed and projected increase in temperatures, extreme heat events ($T_{\max} \geq 35^{\circ}\text{C}$ on 3 or more consecutive days) are also expected to become significantly more numerous, with largest projected increases over the relatively warm central to northern and northwestern parts of the country where the 35°C threshold is exceeded more often. Concomitantly, the number of cold spells (i.e., ≥ 3 or more consecutive days with minimum temperatures $< 0^{\circ}\text{C}$) in South Africa is expected to decrease.

To a large extent, precipitation is the most important factor in determining potential agricultural activities and suitability across the country. GCMs projections show a high degree of certainty for a decrease in rainfall over the western parts of the country and a medium degree of certainty for a decrease in rainfall over the north-eastern parts (summer rainfall region). There are also indications of a possible increase in rainfall over the south-eastern parts of the country, but these are made with low confidence given weaker agreement between participating models. Meanwhile, heavy precipitation events and pluvial floods are projected to become more prevalent in the eastern half of the country by the mid-21st century.

Aridity is projected to increase across the country. Hydrological droughts are expected to worsen with a medium degree of certainty over West Southern Africa and with a high degree of certainty over East Southern Africa. Meanwhile, agricultural, and ecological drought are projected to worsen with a high degree of certainty over the eastern parts of the country. The table on the next page lists a summary of climate impact drivers and how they will change in the future over Southern Africa.

A summary of climate impact drivers (CID) and their projected changes in southern Africa based on the AR6 report²¹.

CLIMATE IMPACT DRIVER	WEST SOUTHERN AFRICA		EAST SOUTHERN AFRICA (SUMMER RAINFALL REGION)	
	FUTURE CHANGES	TREND/ATTRIBUTION	FUTURE CHANGES	TREND/ATTRIBUTION
Mean air temperature	High confidence of increase	Upward trend without attribution	High confidence of increase	Upward trend without attribution
Extreme heat	High confidence of increase	Upward trend with high confidence of attribution	High confidence of increase	Upward trend with high confidence of attribution
Cold spell	High confidence of decrease	Downward trend with high confidence of attribution	High confidence of decrease	Downward trend with high confidence of attribution
Frost	High confidence of decrease	-	High confidence of decrease	-
Mean precipitation	High confidence of decrease	Downward without attribution	Medium confidence of decrease	Downward trend without attribution
Heavy precipitation and pluvial flood	-	-	High confidence of increase	Upward trend without attribution
Aridity	High confidence of increase	-	High confidence of increase	-
Hydrological drought	Medium confidence of increase	-	High confidence of increase	-
Agricultural and ecological drought	High confidence of increase	Upward trend without attribution	Medium confidence of increase	Upward trend without attribution
Fire weather	High confidence of increase	-	High confidence of increase	-
Mean wind speed	Medium confidence of increase	-	Medium confidence of increase	-
Tropical cyclone	-	-	Medium confidence of increase	-

IMPACTS ON AGRICULTURE

One method for assessing the effects on agricultural activities is to map areas of suitability and potential shifts. A decrease in climatic suitability for rain fed maize production across South Africa's maize-growing region is expected, with unsuitable conditions in the more marginal northern and western edges of the current production area towards the end of the 21st century. This corresponds to a projected increase in aridity, agricultural and ecological droughts across East Southern Africa by the mid-21st century. Although heavy precipitation events are projected to increase for this region, extreme precipitation from intense bursts of rainfall may harm plants during the growing season, promote ripening-grain lodging in standing crops, and cause soil erosion. Similarly, a reduction in the climatic suitability area for rain fed soybean is projected across South Africa, with Limpopo experiencing the greatest reduction. A similar shift in climatic suitability for rain fed sunflower is also projected, with a shift from optimal to sub-optimal (over Gauteng and Mpumalanga) and from sub-optimal to marginal/unsuited (over South Africa's extreme north-eastern regions). Climate suitability zones for rain fed potatoes and smuts finger grass (*Digitaria eriantha*) are also expected to shrink, with shifts from optimal to suboptimal. Rain fed groundnut, cotton, and macadamia climatic suitability, on the other hand, is expected to increase by 2090, while rain fed wheat is projected to remain unchanged.

²¹ Available: <https://www.ipcc.ch/assessment-report/ar6/>

Regarding livestock production, lower and upper critical temperatures are used to determine the thermally comfortable zone for each livestock type to ensure its optimal development and productivity. Therefore, projected increased temperatures and evaporation may increase the prevalence of heat stress on livestock as well as livestock water requirements in South Africa.

IMPACTS ON WATER RESOURCES

Humans and wildlife rely on water supplies to survive. Agriculture, energy production, navigation, recreation, and manufacturing all require water. Many of these uses place a strain on water supplies, which is projected to intensify because of climate change. Moreover, climate change is predicted to increase water demand while decreasing supply in many locations. This shifting balance would make it difficult for water managers to meet the needs of rising populations, sensitive ecosystems, farmers, ranchers, energy producers, and manufacturers all at the same time. Higher temperatures and more intense, less predictable weather are expected to alter rainfall availability and distribution, as well as river flows and groundwater, and affect water quality.

The effects of climate change on water quality are generally understudied, both globally and in southern Africa. In general, the impacts are descriptive in nature, based on an understanding of how water quality responds to predicted changes in climatic drivers such as temperature, evaporation, rainfall, and hydrology (DEA, 2013b).

As the temperature of the air rises, so does the temperature of the water. Increased water temperatures can have a significant impact on the quality of irrigation water, the dissolved oxygen content of water, the rates of chemical and biological reactions in water, and have far-reaching health consequences by promoting the incubation and transmission of water-borne diseases. Moreover, heat waves (extreme hot days) can have short-term impact on water quality and increase fish mortality due to low oxygen concentrations caused by rapid decomposition process, as well as put stress on the temperature sensitive fish species.

Enhanced evaporation from open water bodies such as dams and wetlands, as well as soil and plant systems, will lead to concentration of salts and other constituents when the volume of open water bodies, due to increased temperatures, and thus leading to reduced water quality over the country. Projected increase in heavy precipitation and pluvial flooding, particularly over the East Southern Africa, have potential to flood low-lying water and wastewater treatment plants, as well as damage sewer infrastructure, resulting in raw sewage discharge into rivers. Generally, climate change is expected to have the greatest impact on South Africa's water resources, as extreme flooding and drought become more common in both wetter and drier futures. To meet domestic, urban, and industrial needs, water will almost certainly be supplied from remote sources.

A summary of the impacts of climate change on agriculture and water resources.

CLIMATE CHANGE EFFECT	IMPACT ON WATER RESOURCES	IMPACT ON AGRICULTURE
Increased heavy precipitation events and pluvial flooding	Flooding	Damage to crops due to soil erosion and waterlogging
	Adverse effects on quality of surface and ground water	
Increased aridity, agricultural and ecological droughts	Changes in run-off	Lower yields due to land degradation
	Increased water pollution due to lower dissolution of sediments, nutrients, dissolved organic carbon, pathogens, pesticides, and salt	Increased livestock deaths
Increased temperatures	Increased water temperature	Less water available for agriculture
	Increase in evaporation	Changes in crop productivity and growing season
	Decrease in nutrient and oxygen concentration in water bodies	Changes in species composition and biodiversity

THE 26TH SESSION OF THE CONFERENCE OF THE PARTIES (COP 26) TO THE UNFCCC AND IMPLICATIONS FOR AGRICULTURE

COP26 was held in Glasgow, Scotland, United Kingdom, from 31 October to 13 November 2021. The goals of the event relate to agriculture in one way or the other. Following discussions at COP26, it was reported the significant progress has been made in both reducing the impact of climate change on the agriculture sector and lowering the sector's contribution to global warming. In a major deal at COP26, more than 100 countries promised to end and reverse deforestation by 2030.

The COP26 goals included

- Securing global net zero emissions by mid-century through the phase-out of coal, curtailing deforestation, speed up the switching to electric vehicles and encouraging the investment in renewables
- Adapting to protect communities and natural habitats – which may be achieved through protecting and restoring ecosystems and through building defenses and resilient infrastructure and agriculture to avoid loss of homes and livelihoods.
- Mobilisation of finance through contributions expected from developed countries as promised earlier together with large contributions from international financial institutions, aiming to unleash the trillions in private and public sector finance required to secure global net zero.
- To accelerate action to tackle the climate crisis through collaboration between governments, businesses and civil society while also setting clear rules related to the Paris Agreement.

At COP26, the following were some of the main points recognised concerning agriculture:

- Importance of soil and nutrient management practices and optimal use of nutrients which are key to climate-resilient, sustainable food production systems and global food security.
- Importance of improving sustainable production and animal health which will contribute to reducing greenhouse gas emissions while enhancing sinks on pasture and grazing lands.
- The need to continue working on Agriculture under the UNFCCC process and towards adopting a decision at COP 27 in 2022.
- The Koronivia Joint Work on Agriculture (KJWA) which has an impact on financing entities and can help to better align international organisations and processes in their work on agriculture and climate change.
- Governments considered the outcomes of the last three workshops of the KJWA which provides a road map to address issues related to agriculture in a holistic manner through a series of international workshops.

There was acknowledgement of how the working mode of the KJWA promotes inclusivity through knowledge sharing between decisions makers, farmers, indigenous peoples, women and youth. Topics covered through the KJWA workshops more recently include

- Improved livestock management systems, including agropastoral production systems and others.
- Improved nutrient use and manure management towards sustainable and resilient agricultural systems.
- Sustainable land and water management, including integrated watershed management strategies, to ensure food security.
- Strategies and modalities to scale up implementation of best practices, innovations and technologies that increase resilience and sustainable production in agricultural systems according to national circumstances.

Earlier KJWA also covered the following:

- Development of early warning systems and contingency plans in relation to extreme weather events and their effects such as desertification, drought, floods, landslides, storm surge, soil erosion, and saline water intrusion.

- Assessment of risk and vulnerability of agricultural systems to different climate change scenarios at regional, national and local levels, including but not limited to pests and diseases.
- Identification of adaptation measures, considering the diversity of the agricultural systems, indigenous knowledge systems and the differences in scale as well as possible co-benefits and sharing experiences in research and development and on-the-ground activities, including socioeconomic, environmental and gender aspects

Noting the degradation of ecosystems and loss of biodiversity at COP26, the contribution by the FAO highlighted the need for innovation and technology to produce more with less. Given vast, untapped potential for technological innovation and digitalisation that can help build green and climate resilient agri-food systems, the FAO pointed out the need for innovations that span across agri-food systems, from food production to consumption and waste management, as well as policy and financing. This contribution by FAO aligns very well with the ARCs Vision 2050 where issues of innovation and technology development are to be mainstreamed. The ARC plans to develop solutions that can contribute to a more resilient and productive Agricultural sector.

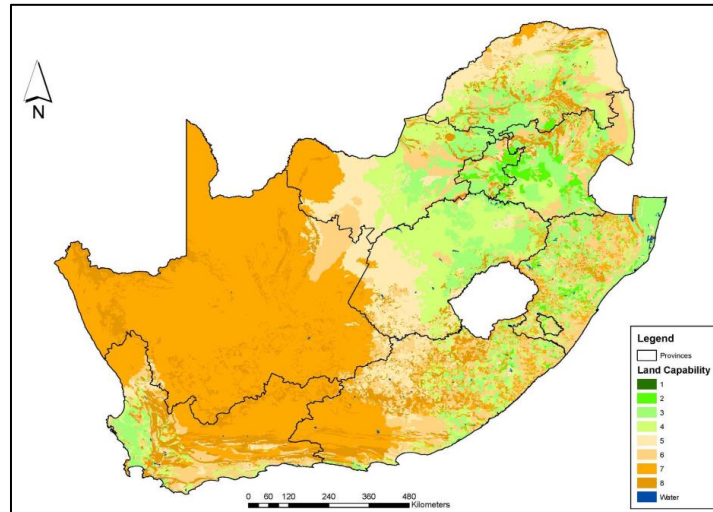
ARC CONTRIBUTION TO PROTECTION OF HIGH VALUE AGRICULTURAL LAND

Land capability is defined as “*the extent to which land can meet the needs of one or more uses under defined conditions of management, without permanent damage. Land capability is an expression of the effect of physical factors (e.g., terrain form and soil), including climate, on the total suitability and potential for use for crops that require regular tillage, for grazing, for forestry and for wildlife without damage. Land capability involves the consideration of (i) the risks of damage from erosion and other causes, (ii) the difficulties in land use caused by physical factors, including climate and (iii) the production potential.*”

CARA²² is the principal Act governing the protection of agricultural natural resources. The Act was assented to on 21 April 1983 and came into effect on 1 June 1984 and replaced the Soil Conservation Act 76 of 1969. Currently, it is the only Act that directly addresses the issue of the protection of agricultural natural resources. The conservation measures outlined in the Act are necessary, as sufficient land for agricultural production is needed to feed the growing population. In order to achieve this objective, the status of agricultural natural resources in the country needs to be protected, maintained or improved through remediation and/or rehabilitation. The Act also has the responsibility of ensuring that agricultural practices are not conducted in a way that contributes to the degradation of the environment. CARA falls within the mandate of DALRRD in complying with section 24 and 27 of the Constitution of the Republic of South Africa, 1996. The sustainable use of agricultural natural resources is one of DALRRD’s key priority areas and is required for food security and sustainable development.

DALRRD’s 2021 Land Capability Report and Protection and Development of Agricultural Land Bill provides additional guidelines and tools for the protection of agricultural land, especially high potential agricultural land, as well as the processes involved in the application thereof. This could further result in a more cost-effective and time-effective procedure, as well as improved communication and relations between all parties involved.

²² Available: <https://cer.org.za/wp-content/uploads/2014/02/CARA-Regs.pdf>



Land capability classification of South Africa. (Collet, 2008)

ARC will contribute to DALRRD initiatives through the following activities:

- Assess the status of agricultural natural resources or pieces of land in the country for specific purposes per request
- Mapping suitable areas for growing various crops such as hemp, maize, sugar beans etc.
- Mapping of high value land and assisting the government to protect such pieces of land from other competing needs such as mining and housing developments etc.
- ARC can also contribute by assisting the department to evaluate applications for specific land use purposes
- Identify and map areas which require rehabilitation

IMPLICATIONS OF COVID-19 PANDEMIC

The national COVID-19 situation is constantly evolving. The first case of COVID-19 was confirmed on 5 March 2020 and on 15 March 2020, President Cyril Ramaphosa declared a national state of disaster, and announced measures such as immediate travel restrictions and the closure of schools from 18 March 2020. The National Coronavirus Command Council was established on 17 March 2020 and a week later on 23 March 2020 a national lockdown effective from 27 March 2020 was announced. Lockdown level 5 was a response to the raging first wave of the pandemic. A gradual and phased easing of the lockdown restriction was announced on 01 May 2020, lowering the national alert level to level 4, then to level 3 on 01 June and to level 2 on 17 August 2020. Following a dramatic drop in the number of cases, the alert level was lowered to level 1 on 21 September 2020.

On 8 June 2021 South Africa “technically” entered its third wave of COVID-19 infections after recording 9,149 new cases in a 24-hour period. The third wave was principally driven by the delta variant whose infections were more severe showing increasing number of cases, higher positivity rate and increased mortality. The President moved the country to adjusted alert level 4 as a result. At the height of the third wave South Africa hit a record of more than 26 000 cases in a day. As of 19 July 2021, South Africa had recorded 2.3 million cases and 67 000 deaths since the pandemic started.

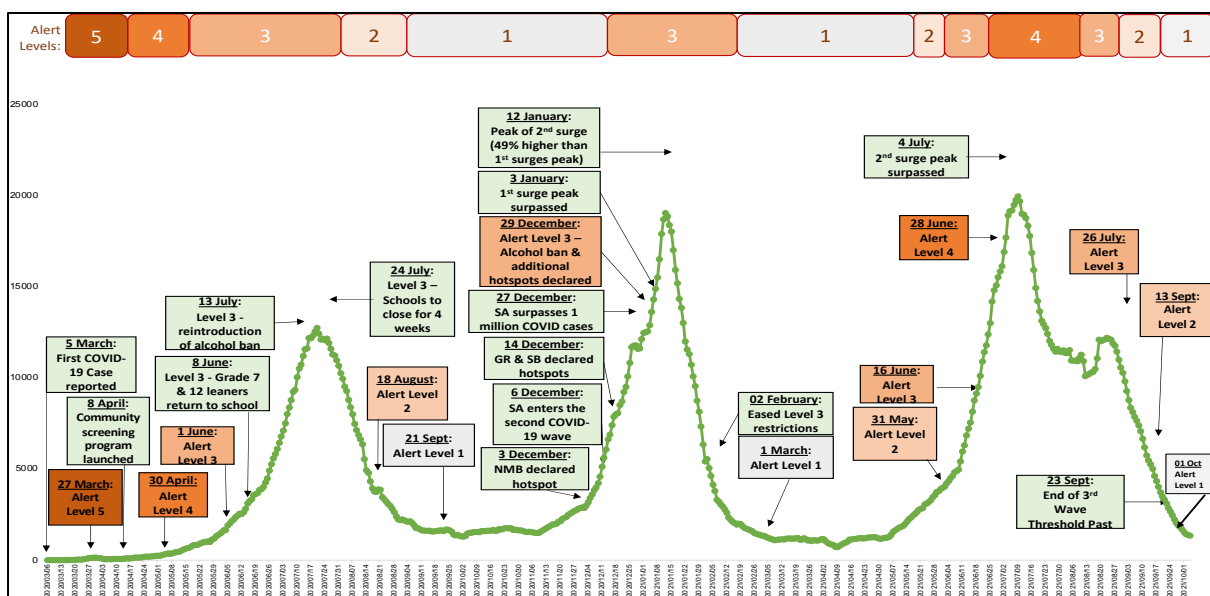
Even though vaccinations of the wider population apart from specific high-risk group commenced in earnest, the initial uptake was much lower than expected pointing to the need for more vaccine education to counter the apathy and misinformation. At the same time was increasing evidence that hospitalisations and mortalities were almost non-existent in the vaccinated population, an indication of the effectiveness of the vaccines. The two vaccines that were approved for use on the population were the Pfizer BioNTech (BNT162b2) vaccine popularly known as COMIRNATY and the Johnson & Johnson’s Janssen (JNJ-78436735) vaccine. The Pfizer BioNTech is an mRNA two shot vaccine recommended to be given between 21 and 28 days apart while the J&J is a viral single shot vaccine.

Even though the pace of vaccinations picked up later it was nowhere near the anticipated levels required to move the country to endemic stability by December 2021.

The ARC which largely escaped mortalities during the first two waves of the pandemic experienced a lot of cases and a number of mortalities among its employees during the third wave. The organisation was forced to implement work from home and rotational schedules when the number of cases started rising.

The country and the WHO continue to monitor the emergence of variants of concern and their possible escalation into variants of interest. Epidemiological modelling indicates the likely possibility of a fourth wave of the disease in late November/early December 2021.

The graph below published with permission from the National Department of Health gives a timeline of the COVID situation from 6 March 2020 to 1 October 2021.



The lockdown restrictions due to COVID-19 have adversely affected the country's economy. A report from StatsSA²³ indicates that during April, May and June 2021, when the country operated under widespread lockdown restrictions in response to COVID-19, the economy suffered a significant contraction with Gross Domestic Product (GDP) falling by just over 16% resulting in an unprecedented, annualised growth rate of -51%. There is no quick fix to the COVID-19 situation; the economic performance of the country is expected to remain depressed in the short to medium term.

As of 19 February 2022, Africa had recorded 11, 125, 307 COVID-19 cases out of which there were 247 263 deaths and 10, 283, 773 recoveries. A total of 93, 368, 500 tests had been conducted reflecting a meagre 6% of the total population of 1, 393,117,266 as of 21 February 2022. This low vaccination coverage on the continent has been a source of concern because it makes it difficult to attain population immunity. To date only 12.13% of the population is fully vaccinated. However, the advent of the Omicron variant spelt somewhat good news because whereas that variant was highly transmissible it also caused mild symptoms with fewer hospitalisations and high recovery rates. The recovered individuals contributed to the higher population immunity levels. Across the globe this has been the case with most governments now deciding the worst is over and lifting most restrictions and returning their countries to near normality. The lifting of these restrictions is already paying dividends in form of economic rebounds

²³ Available: <http://www.statssa.gov.za/?p=13224>

across the globe. However, the authorities and WHO continue to monitor the situation for new and more virulent variants.

Efforts to produce vaccines on the continent have continued with South Africa, Rwanda, Egypt, Senegal, and Morocco pioneering the drive. Production of the Sinovac vaccine has already commenced in Egypt while production of other vaccines in the remaining four countries is expected to commence in due course. This development is expected to alleviate the vaccine supply situation on the continent.

IMPACT OF COVID-19 ON THE SECTOR

The agricultural sector was one of the few that recorded appreciable growth figures in Q3 of 2020 when lockdown restrictions were eased. This was mainly due to its classification as an essential services sector. Even then, strict travel restrictions imposed on people's movements across the country during the lockdown levels 4 and 5 to contain the spread of the virus, impeded access to economic activities, limited the ability of agricultural stakeholders to interact with other key sectors in the full implementation of their farming activities. This was even though the agricultural sector was identified as an essential business sector. As a result, the sector will not fully recover from the losses suffered during the COVID-19. The impact of the reduced downstream demand for the products of the sector due to the lockdown conditions also continues to affect the productivity of the sector e.g., impact of reduced production of grapes as a result of the ban on the sale and consumption of wine. Barley growers are facing similar challenges. In the last few weeks, South African Breweries has announced a cumulative divestment of close to R5 billion from the sector, citing restrictions on the sale and consumption of beer under various lockdown levels, which have all but stopped the sale of alcohol. This decision will have significant impact on the sector's barley growers, just as the wine industry is also experiencing its effects.

While the agricultural sector as whole recorded appreciable growth during the Q3 of 2020, economic performance of the different sub-sectors varied. For example, the trade of livestock through live actions was affected with the smallholder sector experiencing the most challenges. Livestock is an integral economic activity in rural community and therefore the pandemic had a major impact in the rural economy. Given the general lack of statistics in rural agriculture, it would be worthwhile that concerned effort is put into quantifying the impact of the pandemic in rural agriculture.

IMPACT OF COVID-19 ON THE ARC

A significant decrease in diagnostic and research activity due to COVID-19 resulted in a loss of revenue for the ARC. Operating at reduced capacity, employee morbidity and mortality, inability to conduct outdoor research that required the involvement of critical stakeholders, and budget cuts redirected to COVID-19 activities across the country were factors that contributed to under-performance in external revenue. The mitigation measures taken to address some of the above constraints, although well intentioned, will not be sufficient to address the persistent challenges brought about by COVID-19. The Crops Sciences division will experience a significant impact as the demand for crops used in production of beer and wine has fallen, while samples submitted for diagnostic and analytical services to the Animal Sciences Division and the Biotechnology Platform have also witnessed a significant drop, resulting in reduced revenue for the organisation.

The downside of COVID-19 impact on the ARC includes safety concerns and anxieties for its employees, work from home challenges, morale and mental health of the employees and the negative effects of downsizing and even eminent layoffs of some employees. The VOCs threaten to perpetuate the pandemic for some time leading to pandemic fatigue. The closure of firms that conduct business with the ARC and the resulting decline in consumer purchasing power will inevitably affect the demand for the products and services offered by the ARC. With consumers struggling to make ends meet, entities that provide services of public good like the ARC face a two-edged sword of reduced funding from the National Treasury and reduced demand for their products and services, which affects their ability raise external income.

Ironic as it might sound, the ARC can still benefit from the changes brought about by COVID-19. The organisation can leverage its adaptability strength to become more flexible and efficient by switching to digital operations, to have a lean workforce and to benefit from reduction in the operating costs by means of embracing the benefits of remote work for its employees. The organisation can also offer support services in the surveillance of new and emerging variants and submit proposals to access and participate in COVID-19 research.

4.2. INTERNAL ENVIRONMENT ANALYSIS

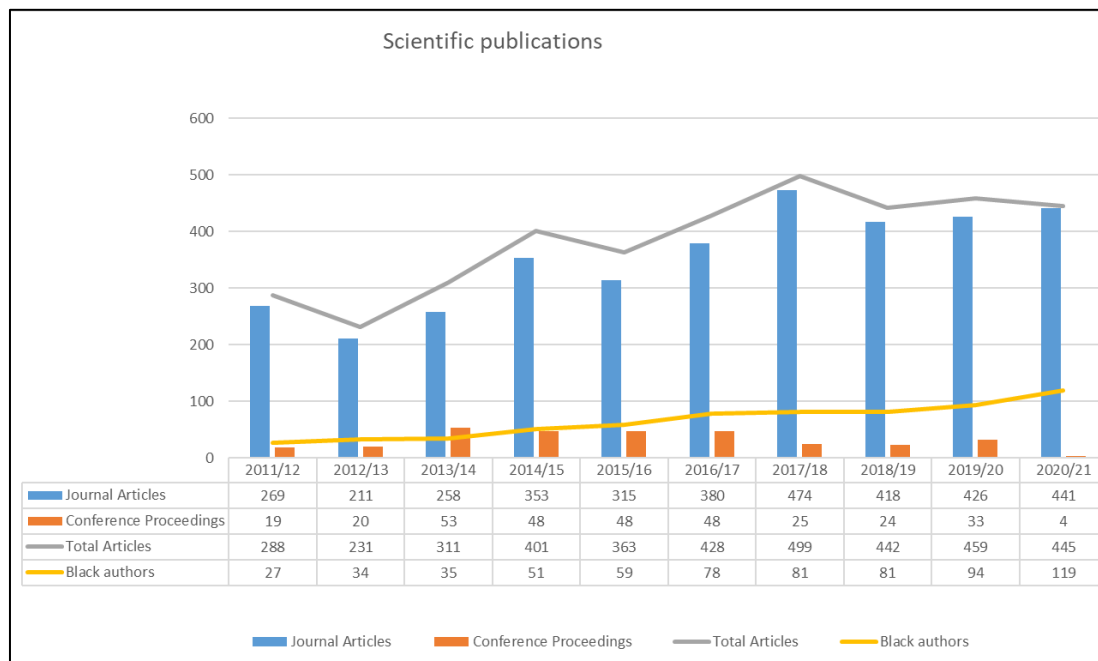
ANALYSIS OF ORGANISATIONAL PERFORMANCE TO INFORM THE FUTURE

Agriculture production and productivity are essential to fulfil the food and nutrition security demands of the population. However, agriculture production and productivity in South Africa is often subjected to a wide range of biotic and abiotic constraints such as soil health, water, temperature, pests and diseases, climate change and other factors of production (e.g. input such as labour, financial resources, technology, skills etc.) to name a few.

Research and innovation serve as the basis to provide scientific solutions for improved yields, productivity and quality of agricultural products throughout the value chain. It is important to note that outcomes of research and development often require long lead periods prior to dissemination, including generating the scientific information and knowledge for better production and productivity.

Trend analysis indicates that the ARC has successfully contributed to the scientific knowledge base of our economy as per peer-reviewed publications emanating from research and development.

In the last 10 years the ARC has more than doubled the number of peer reviewed scientific publications from 212 in 2010/11 to 445 in 2020/21 (as depicted on the next page). This includes a significant increase in the number of peer-reviewed publications by previously disadvantaged authors (black scientist as per South African definition) from 27 in 2010/11 to 119 in 2020/21. Further, the ARC achieved these impressive results through research collaborations with a broad range of external partners from domestic and international organisations. Of particular significance is the improved quality of science reflected through publications with ISI rating (impact factor) of 2.0 or better. These peer reviewed scientific publications were achieved to address ARC outcomes 1 to 5. These publications suggest increased likelihood of scientific information that will be utilised towards technology and product development, with greater influence on possible new innovations.



Applications of scientific data, information and knowledge are essential towards developing solutions, technologies and innovation for sustainable agriculture. In this regard, a number of examples are hereby provided demonstrating the success of the ARC in delivering applicable solutions and technologies for the sector.

RESEARCH HIGHLIGHTS

The ARC collaborated with the Onderstepoort Biological Products (Pty) (OBP) to study the efficacy of the attenuated heartwater vaccine. Study results indicated that the vaccine is safe and effective in cattle, goats and sheep; thus, providing important data and scientific insights towards enabling regulatory approval for use by farmers.

Food safety remains an important public health concern for South Africa. Metagenomic studies at the ARCs biotechnology platform showed evidence of diverse and highly variable microbial communities in products of animal origin that could not be identified through traditional laboratory culture techniques. This is an important achievement for managing food safety, labelling and shelf life.

Poor agricultural productivity among smallholder farmers is a serious concern for food and nutrition security and sustainable livelihoods. A multidisciplinary collaborative study to enhance resilience through integrated maize-legume rotations, intercropping and conservation agriculture along with improved seed varieties of maize and beans resulted in improved yields among smallholder farmers. This study suggested a need to scale up sustainable agriculture intensification practices as a mechanism for increased production and productivity among smallholder farmers.

Climate change has been estimated to reduce yields of wheat by 5.5% globally and projected to decline by a further 1.6%, mainly due to trends in temperature, precipitation, and carbon dioxide. Working with partners in Poland, the ARC has successfully developed models for in – field monitoring of crop growth and yield assessment, which serves as an important tool to estimate crop yields prior to harvest.

The ARCs Cultivar Development Programme serves as a critical element towards crop improvement for productivity, resilience, competitiveness, and growth of agricultural enterprises. In the last 10 years the ARC has successfully developed and released more than 200 cultivars of wheat, maize, dry beans, groundnuts, citrus, macadamia, soybean, potato, grapes, litchi, pears, apples and peaches to mention

a few. Analyses of ARCs cultivar development program for various selected crops has indicated significant impact on yield, productivity and resilience to abiotic and biotic stress, while also fulfilling the needs of producers and agro processors.

Broadly, economic impact analysis studies of several ARC cultivars developed and released for use in commercial settings indicate a net benefit to farmers for adoption, competitiveness and sustainability of enterprises.

In addition to cultivar development, the ARCs crop production programme focusses on the development of sustainable production and protection systems that are increasing the resilience of the agricultural sector towards mitigating the impacts of climate change. In this regard, the research conducted on water-nutrient use efficiency of various crops, the development of alternative and new crops that are better adapted to harsh climatic conditions, the development of a range of cropping and rotation systems in which biodiversity conservation is key, development of appropriate integrated pest and disease managements systems, including an increased focus on soil health towards improved farming sustainability are key aspects of research focused to ensure improved crop productivity.

Livestock agriculture is the world's largest user of land resources and Sub-Saharan Africa is not different. In South Africa approximately 84% of the surface area is available for farming. However, a large part of this is not suitable for crop production, with approximately only 13% that is arable. Approximately 71% of the farming land is only suitable for extensive livestock farming.

Climate forecasts indicate an average increase in temperature of 1.5 to 2°C by 2050, ranging from 0.5 at seaboard to 3°C in eastern Namibia and western Botswana. It also forecasts a generally drier southern African region, except for central regions and Eastern Cape that may be wetter.

As a result of the changes in climate, more emphasis needs to be put on climate-smart livestock production systems and also assist the livestock farmer to cope with the effects of climate change, and ARC-Animal Sciences Division has taken up this challenge to develop climate smart livestock production systems to enhance productivity and to cope with the effects climate change. These initiatives include:

- Quantification of the effect of climate on production and reproduction
- Comparison of alternative production (cross breeding) and feeding systems
- Technologies to reduce the carbon and water footprint from livestock production systems

Expression of animal disease from infections or infestations is a product of many factors including the interaction between the pathogen, vector, host and environment. The vector population and activity are in turn influenced by the climate and the environment. There is more than anecdotal evidence that suggests the vector range of some diseases has been increasing because of climate change; principally the vector expanding into areas where it previously could not survive or thrive in sufficient numbers to transmit the pathogens responsible for disease. A good case in point is the *Rhipicephalus appendiculatus* tick, the vector of East Coast Fever (Corridor disease). It has also been demonstrated that the range of *Ornithodoros* ticks, the vectors for African Swine fever (ASF) have been expanding southwards in South Africa. The result has been more outbreaks of ASF further south than previously experienced in the country.

Rift Valley Fever (RVF) is another disease intrinsically linked with climate. It has been observed that the more rains and flooding experienced in a season the more likely that RVF outbreak will occur. These links of climate and the environment to disease outbreaks led the OVR's involvement in the RVF project that develop models to predict outbreaks from climate data. Being able to predict these outbreaks not only saves money but also prevents the loss of human lives from infection with this zoonotic disease. The consortium behind the project includes the ARC's Soil Climate and Water campus, University of Pretoria, University of Free State and Eco Alliance, partners from the United States. More climate

orientated projects targeting other diseases are still required to build better prediction models for disease outbreaks.

The Animal Sciences Division recognises that for the livestock sector to increase its contribution to the economy of the country and thus development, the whole livestock has to improve its productivity measures. Historically the livestock sector is dichotomous such that there is a segment of it that is as good as any in the world and there is a segment that is characterised by poor productivity and suboptimal husbandry practices. The Division has efforts that are dedicated to uplifting the less fortunate subsector that are discharged under our Animal Improvement Scheme called Kaonafatso ya Dikgomo (KyD). During the financial year 2020/21, the ARC successfully provided training, quantitative genetic analysis and advice for breeding to more than 4800 smallholder farmers who participated in the KyD Animal Improvement Scheme. This included support for participation in the livestock value chain, such as auctions to create market opportunities for smallholder farmers. For example, at a livestock auction held at Kwafuduka in KwaZulu-Natal 121 farmers, including 45% women sold 295 head of cattle to the tune of R2,3 million.

ARC RESEARCH FOCUS AREA

Research-focused areas serve as an organisational framework for achieving ARCs Vision 2050. It is of particular importance that Vision 2050 has been consulted and endorsed by a wide range of agricultural stakeholders, including DALRRD. The ARC 2050 research focus areas are as follows:



ARC Vision 2050 research focus areas

Various legislative mandates could potentially affect the ARC and will be monitored during the 2022/23 financial year including:

- **Plant Health (Phytosanitary) Bill (B14-2021)²⁴**

The Plant Health (Phytosanitary) Bill has been in development for many years and is aimed at replacing the old Agricultural Pest Act 36 of 1983 (APA) that had limited scope. This new Bill aims to strengthen the mandate of DALRRD with respect to import and export regulation and to close the loopholes that existed in the APA regarding the implementation of regulatory oversight of pests and diseases of phytosanitary importance. South Africa has been following the standards as prescribed by the International Plant Protection Convention (IPPC) and the new Bill aims to incorporate the standards and a strengthened mandate into one approach. The implementation of the Bill and the various aspects thereof; as well as the role of the Agricultural Research Council (ARC) will be clarified and aligned in due course.

²⁴ Available:

<https://www.parliament.gov.za/bill/2298248#:~:text=To%20provide%20for%20phytosanitary%20measures,of%20the%20Republic%3B%20and%20to>

- **Protection and Development of Agricultural Land Bill (B8-2021²⁵).**

The Bill seeks to promote the preservation and sustainable development of agricultural land, establish evaluation and classification system for agricultural land, demarcate protected agricultural land to ensure that high potential agricultural land is preserved and protected against non - agricultural uses in order to promote long term agricultural production. Implement a coordinated national framework, including norms and standards and authorisations for the use of agricultural land. Promote and encourage viable farming units from long term economic, environmental, and social perspective, discourage land use changes from agricultural to non -agricultural uses to prevent the fragmentation of the agro ecosystem, facilitate concurrent land uses on agricultural land without jeopardising long term food security. Provide for mitigation measures to counteract the loss of agricultural land and impact of non-agricultural land developments on agricultural production capacity, and establish a national agro eco information system with georeferenced information to support the object of the act.

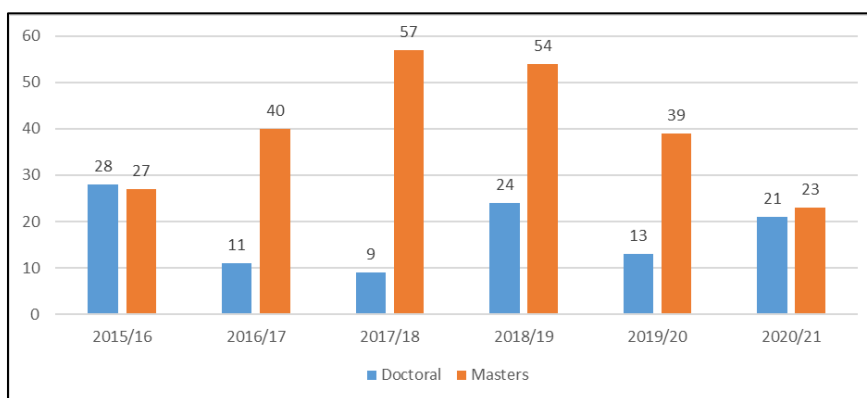
- **Climate change Bill (B9-2022)²⁶**

The National Climate Change Bills addresses issues related institutional and coordination arrangement across the three spheres of government namely national, provincial and local. It further highlights the need the spheres of government and entities, sectors as well business to respond to challenges of climate change. The bill further addresses the matters relating to, the national adaptation to impacts of climate change, greenhouse gas emissions and removals, and policy alignment and institutional arrangements.

ARC PROFESSIONAL DEVELOPMENT PROGRAMME (PDP)

As a mechanism to ensure a skilled and capable agricultural sector, the ARC implemented the Professional Development Programme (PDP) in 1996. The primary focus of the PDP is to provide postgraduate training and skills development in the applications of research and development as well as technology transfer. Although the PDP students undertake applied training by the ARC, universities in South Africa and elsewhere certify the educational qualifications. Such applied research and development training by the ARC provides a unique opportunity for PDP participants to conduct their studies under practical social and economic conditions of commercial enterprises and communities.

Briefly, over the last 10 years the ARC has successfully trained and supervised a total of 1880 PDP students who completed the program. The chart below shows the number of PDP students who graduated in each of the last five years (2015 to 2021). During the last 5 years, the ARC graduated per annum an average of 40 PDP students with MSc degrees and 21 with PhD degrees, with a combined average of 58 PDP graduates per year. Further, available information indicates that no less than 90% of the graduates from the PDP are in employment by various organisations including the ARC, private agricultural sector companies, universities and other employers throughout South Africa, demonstrating the significant impact of skills transfer among the youth.



ARC PDP Graduates

²⁵ Available: https://www.gov.za/sites/default/files/gcis_document/202012/43990gon1338.pdf

²⁶ Available: <https://www.parliament.gov.za/bill/2300773>

PART C: MEASURING OUR PERFORMANCE

The Agricultural Research Council Impact and Outcomes reflected in the 2020-25 Strategic Plan are unpacked in the 2022/23 Annual Performance Plan, as reflected in the sections below.

5. INSTITUTIONAL PERFORMANCE INFORMATION

As the ARC does not have Treasury approved budget programmes, the ARC Results Based Plan and performance information is packaged against the six (6) outcomes defined in the 2020-2025 Strategic Plan, and reflecting the contributing Business Divisions, as follows:

ARC OUTCOME	CONTRIBUTING BUSINESS DIVISIONS
1. Increased agricultural production and productivity	1) Crop Sciences 2) Animal Sciences
2. Sustainable ecosystems and natural resources	1) Crop Sciences 2) Research and Innovation Systems (RIS)
3. Improved nutritional value, quality and safety of agricultural products	1) Crop Sciences 2) Research and Innovation Systems (RIS)
4. A skilled and capable agriculture sector	1) Crop Sciences 2) Animal Sciences 3) Research and Innovation Systems (RIS) 4) Impact and Partnerships
5. Enhanced resilience of agriculture	1) Crop Sciences 2) Animal Sciences 3) Research and Innovation Systems (RIS)
6. A high-performing and sustainable organisation	1) Office of the CEO 2) Human Capital Management, Marketing and Legal Services 3) Impact and Partnerships 4) Finance 5) ICT and Infrastructure 6) All other Divisions

For each outcome, the focus and priorities, the contribution of the relevant business divisions and the outputs, output indicators and annual and quarterly targets, are presented in the sections that follow.

5.1. ARC OUTCOME 1: INCREASED AGRICULTURAL PRODUCTION AND PRODUCTIVITY

ARC OUTCOME 1: FOCUS AND PRIORITIES AND CONTRIBUTING DIVISIONS

The focus of Outcome 1 is to generate knowledge and technologies (intellectual property and tools) that will diversify, improve the quality and increase the value of crop and animal based agricultural production and related processes and products; enhance productivity towards increased food security, commercial exports and income for the agricultural sector, and enabling farmers and producers to maximise their efficiency and productivity.

The Outcome focuses on improving the productivity, competitiveness and sustainability of both commercial and smallholder agriculture through research and development in:

- 1) Crop research and development: including a wide range of grains, vegetables, indigenous ornamental plants, medicinal plants, deciduous fruit and grapes, tropical and subtropical fruits and niche crops, such as herbal teas. Industrial crops research and development will focus on fibre crops, such as cotton and hemp.
- 2) Livestock-based agriculture: through research and technology in areas related to animal health, production and improvement, as well as secondary production processes. The research and development is focused on both production and companion animals, and increasingly in the areas of aquaculture and wildlife.

Outcome 1 is aligned to the 2019-2024 Medium Term Strategic Framework (MTSF) and the strategic priorities and outcomes of the DALRRD and DSI as follows:

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
<p>Priority 2: Economic transformation and job creation:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Unemployment reduced to 20%-24% ▪ 2 million new jobs especially for youth ▪ Economic growth of 2%-3% ▪ Growth in levels of investment to 23% of GDP 	<p>Outcome 1: More decent jobs created and sustained, with youth, women and persons with disabilities prioritised:</p> <ul style="list-style-type: none"> - Create jobs through Job Summit Commitments, Operation Phakisa, and other public sector employment programmes <p>Outcome 3: Industrialisation, localisation and exports:</p> <ul style="list-style-type: none"> - Support localisation and industrialisation through government procurement <p>Outcome 5: Reduce concentration and monopolies and expanded small business sector:</p> <ul style="list-style-type: none"> - Facilitate the increase in number of functional small businesses with a focus on 	<p>Outcome 3: Redress and equitable access to land and producer support:</p> <ul style="list-style-type: none"> - Number of smallholder producers commercialised - Skilled and employable youth in the agriculture sector <p>Outcome 4: Increased production in the agricultural sector:</p> <ul style="list-style-type: none"> - 10% increase in agricultural production by 2025 <p>Outcome 5: Increased market access and maintenance of existing markets:</p>	<p>Industrialisation, localisation and exports:</p> <ul style="list-style-type: none"> - Masterplans developed for all national priority sectors by end 2021 – DSI supporting <p>Improve competitiveness through ICT adoption:</p> <ul style="list-style-type: none"> - GERD of 1.1% as a percentage of GDP by 2024 - Commercialisation of intellectual property

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
	township economies and rural development	<ul style="list-style-type: none"> - % Increase of domestic use (value added) of agricultural products 	
<p>Priority 5: Spatial integration, human settlement and local government:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Rapid land and agrarian reform contributing to reduced asset inequality, equitable distribution of land and food security 	<p>Outcome 7: Sustainable land reform:</p> <ul style="list-style-type: none"> - Land reform projects provided with post-settlement support. <p>Outcome 8: Agrarian Transformation:</p> <ul style="list-style-type: none"> - Smallholder farmers supported for food production and commercial activities - Smallholder farmers supported with skills and infrastructure and financial support measures to increase productivity - Agri-hubs and agro-processing facilities established <p>Outcome 9: Effective regulatory framework of agricultural produce and exports:</p> <ul style="list-style-type: none"> - Review the standards on SAGAP and Global GAP to enable smallholder farmers' participation in the domestic and global GAP - Governance and operational review of the National Fresh Produce Markets, and Agency role in market access for smallholder farmers' participation 	<p>Outcome 6: Integrated and inclusive rural economy:</p> <ul style="list-style-type: none"> - Provide support to rural enterprises and industries in areas with economic opportunities - Increase job opportunities and ensure skills development - Facilitate infrastructure development to support rural economic transformation 	<p>Inclusive rural economy:</p> <ul style="list-style-type: none"> - Provision of applications and products for precision agriculture, human settlement, and water bodies information layers - Demonstrations in partnership with the Department of Mineral Resources and Energy to assess the appropriateness of new technologies such hydrogen fuel cells to improve service delivery
<p>Priority 7: A better Africa and the world:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ A better South Africa 	<p>Outcome 1: Increased Foreign Direct Investment (FDI) into South Africa:</p> <ul style="list-style-type: none"> - Source investment for the identified sectors in the South African economy <p>Outcome 2: Increased and diversified exports resulted/ contributed to an export orientated economy:</p> <ul style="list-style-type: none"> - Facilitate exports through the Export Marketing and 	<p>Outcome 5: Increased market access and maintenance of existing markets:</p> <ul style="list-style-type: none"> - % Increase of agricultural exports 	<p>Improve competitiveness through ICT adoption:</p> <ul style="list-style-type: none"> - Commercialisation of intellectual property <p>Agenda 2063 aligned programmes</p> <p>Compliance with international protocols and commitments</p>

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
	Investment Assistance Scheme (EMIA) fund Outcome 4: Increased regional integration and trade: - Implementation of the detailed implementation plans for prioritised project of the Indicative Strategic Implementation Plan - Implementation of the African Continental Free Trade Agreement (AfCFTA) and other trade agreements in order to grow intra-Africa Trade		

Outcome 1 is the focus of the following ARC Divisions:

- 1) Crop Sciences, and
- 2) Animal Sciences.

ARC OUTCOME 1: OUTPUTS, OUTPUT INDICATORS AND TARGETS

In contributing towards the ARCs desired impact of “**sustainable agricultural systems for agrarian transformation, food and nutrition security**”, the 2022/23 Performance Plan for Outcome 1 is reflected in the log frame tables on the next pages:

ARC OUTCOME 1: Outputs, Output Indicators and Annual Targets

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
1. Increased agricultural production and productivity	Crop Sciences	Crop production technologies developed and information dissemination	Number of cultivars registered	7	8	11	6	11	8	6
			Number of field trials	235	541	215	271	204	193	181
			Number of technical reports	362	442	258	170	174	164	152
			Number of cultivar evaluations	0	0	60	40	39	30	30
	Animal Sciences	Animal improvement services	Number of farmers participating in each of the animal improvement schemes	465	247	200	210	220	230	240
			Number of technical reports	0	0	1 000	900	1 000	1 100	1 200

ARC OUTCOME 1: Output Indicators, Annual and Quarterly Targets

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
Crop Sciences	Crop technologies developed and information dissemination	Number of cultivars registered	11	4	0	3	4
		Number of field trials	204	130	38	17	19
		Number of technical reports	174	22	96	22	34
		Number of cultivar evaluations	39	0	0	4	35
Animal Sciences	Animal improvement services	Number of farmers participating in each of the animal improvement schemes	220	110	45	35	30
		Number of technical reports	1 000	250	250	250	250

ARC OUTCOME 1: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The Outcome is aligned to ARC Vision 2050 through a focus on the research, development and dissemination of solutions, processes and technologies for the ongoing genetic improvement of crops and livestock, enhancing the agriculture value chain and supporting inclusive market-orientated development for smallholder farmers, agri-businesses and enterprises in the agriculture value chain.

For the 5-year period to 2025, the research and development priorities of Outcome 1 are:

- 1) Crop cultivar development through genetic improvement and modification
- 2) Securing and maintaining the health of animals through the application of cutting-edge technologies
- 3) Promoting the adoption of animal recording and improvement schemes by livestock farmers, as a platform for economic and community development in the smallholder sector
- 4) Characterising and evaluating crops in terms of quality, nutritional composition, shelf life and suitability for processing
- 5) Disease and pest control by means of enhanced genetic diversity
- 6) Provision of strategies for management of pests, diseases, and alien invaders
- 7) The improvement of agricultural productivity and profitability through adaptive and innovative management and production systems, such as conservation agriculture
- 8) Developing production practices and systems, including rotation, intercropping, irrigation, fertigation, weed management, plant densities and general practices
- 9) Breeding and improving forage varieties, including grasses and legumes
- 10) Lowering of input costs
- 11) Developing efficient and cost-effective feeding strategies for ruminant and non-ruminant animals
- 12) Production systems for low input, low decision-making, and marginal production areas
- 13) Training of crop growers and extension staff to ensure sustainable production
- 14) Providing the South African livestock industry with appropriate and internationally recognised recording and improvement services

Key enablers to support delivery of the Outcome include:

- 1) Financial resources;
- 2) Human capital;
- 3) Equipment;
- 4) Internal policies and operating procedures;

- 5) Land and buildings;
- 6) Enabling policies and regulations from government;
- 7) Enabling support and facilitation by the shareholder;
- 8) Stakeholder mobilisation and partnerships, and
- 9) Industry buy-in (farmers).

ARC OUTCOME 1: RESOURCE CONSIDERATIONS

Financial Resources

DIVISION	AMOUNT IN R '000
Crop Sciences	69 566
Animal Sciences	24 442
Total expenses:	94 008

Human Capital

DIVISION	RESEARCHERS	RESEARCH SUPPORT	OTHER SUPPORT
Crop Sciences	242	569	101
Animal Sciences	109	154	44

5.2. ARC OUTCOME 2: SUSTAINABLE ECOSYSTEMS AND NATURAL RESOURCES

ARC OUTCOME 2: FOCUS AND PRIORITIES AND CONTRIBUTING DIVISIONS

The focus of Outcome 2 is to generate knowledge and technologies (intellectual property and tools) that will conserve natural resources and sustain agriculture.

The Outcome focuses on improving the productivity, competitiveness and sustainability of both commercial and smallholder based agriculture through research and technology in areas related to efficient energy utilisation, water management and irrigation practices; the rehabilitation, utilisation, development and protection of natural agricultural resources; new and improved conservation and climate smart agriculture systems; improved monitoring and characterisation systems for natural resources and genetic material; and mechanised farming and irrigation practices, techniques, equipment and machinery.

Outcome 2 is aligned to the 2019-2024 Medium Term Strategic Framework (MTSF) and the strategic priorities and outcomes of the DALRRD and DSI as follows:

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
<p>Priority 5: Spatial integration, human settlement and local government:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Institutionalise spatial / territorial integration to fast track transformation and resilience of sub-national regions ▪ Natural Resources are managed and sectors and municipalities are able to respond to the impact of climate change 	<p>Outcome 4: Greenhouse Gas Emission Reduction (Mitigation):</p> <ul style="list-style-type: none"> - Implement 4 sectors Green House Gas emission reduction implementation plan (contribution from the largest emitters of GHG) - Transition plans for high carbon emitting sectors (energy, transport, agriculture and waste to low carbon economy) developed by 2024 <p>Outcome 6: State of ecological infrastructure improved:</p> <ul style="list-style-type: none"> - Rapidly and intensively rehabilitate and restore land - Water resource classes and Resource Quality Objectives (RQOs) by 2024 <p>Outcome 8: Agrarian Transformation:</p> <ul style="list-style-type: none"> - Degraded land rehabilitated to production <p>Outcome 11: Effective water management system for the benefit of all:</p> <ul style="list-style-type: none"> - Feasibility studies for rehabilitation vs new dams - Review current Water Legislations 	<p>Outcome 6: Integrated and inclusive rural economy:</p> <ul style="list-style-type: none"> - Provide support to rural enterprises and industries in areas with economic opportunities - Increase job opportunities and ensure skills development - Facilitate infrastructure development to support rural economic transformation 	<p>Inclusive rural economy:</p> <ul style="list-style-type: none"> - Provision of applications and products for precision agriculture, human settlement and water bodies information layers - Demonstrations in partnership with the Department of Mineral Resources and Energy to assess the appropriateness of new technologies such hydrogen fuel cells to improve service delivery <p>Reduced Vulnerability of Key Sectors to Climate Change:</p> <ul style="list-style-type: none"> - Provide information for air quality information system, land cover and land use mapping, frequent information on weather patterns, and human activity on critical resources such as water, land and air - Provision of decision support tools, human settlements layer, water bodies information layer

Outcome 2 is the focus of the following ARC Divisions:

- 1) Crop Sciences, and
- 2) Research and Innovation Systems.

ARC OUTCOME 2: OUTPUTS, OUTPUT INDICATORS AND TARGETS

In contributing towards the ARCs desired impact of “sustainable agricultural systems for agrarian transformation, food and nutrition security”, the 2022/23 Performance Plan for Outcome 2 is reflected in the log frame tables on the next pages:

ARC OUTCOME 2: Outputs, Output Indicators and Annual Targets

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
2. Sustainable ecosystems and natural resources	Crop Sciences	Natural Resource Management	Number of technical reports	71	73	89	77	78	76	79
			Number of field trials	61	52	59	64	59	70	68
			Number of services rendered	166	105	197	500	559	615	569
			Number of biological control solutions developed	0	0	0	1	0	0	0
	RIS	Soil and Water Science	Number of samples analysed for soil health and water quality	416	481	628	95	144	147	147
			Number of scientific solutions	0	0	0	1	0	0	0
			Number of technical reports	28	17	29	13	19	21	23
			Number of services rendered	0	0	356	305	400	455	505
		Weed Science	Number of technical reports	0	0	12	12	12	12	12
			Number of services rendered	12	10	10	5	5	5	5
	Ecosystem services	Number of technical reports	1	1	1	1	4	3	4	
		Number of services rendered	0	0	2	2	0	2	4	

ARC OUTCOME 2: Output Indicators, Annual and Quarterly Targets

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
Crop Sciences RIS	Natural Resource Management	Number of technical reports	78	13	25	14	26
		Number of field trials	59	39	1	7	12
		Number of services rendered	559	139	140	139	141
		Number of biological control solutions developed	0	0	0	0	0
	Soil and Water Science	Number of samples analysed for soil health and water quality	144	38	40	20	46
		Number of scientific solutions	0	0	0	0	0
		Number of technical reports	19	3	4	3	9
		Number of services rendered	400	90	105	95	110
	Weed Science	Number of technical reports	12	0	6	0	6
		Number of services rendered	5	0	2	3	0
	Ecosystem services	Number of technical reports	4	1	1	1	1
		Number of services rendered	0	0	0	0	0

ARC OUTCOME 2: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The Outcome is aligned to ARC Vision 2050 through a focus on the research, development and dissemination of solutions, processes and technologies for the promotion of ecosystem sustainability.

For the 5-year period to 2025, the research and development priorities of Outcome 2 are:

- 1) Well-functioning natural assets and natural resources databases
- 2) Efficient utilisation of natural resources for improved agricultural productivity
- 3) Maintenance and management of genetic material databases and national collections
- 4) Developing techniques for appropriate value adding farm structures and infrastructure and related livestock facilities
- 5) Crop water productivity and efficiency at various planning and operational levels
- 6) Management of agricultural water and integrated management of catchments
- 7) Bio-fuel research and especially assessment of critical success factors
- 8) Mapping of existing and potential production areas
- 9) Developing equipment for conservation agriculture (CA)
- 10) Developing precision systems to minimise wastage when planting, fertiliser application, and spraying, harvesting and enhanced animal production systems

Key enablers to support delivery of the Outcome include:

- 1) Financial resources;
- 2) Human capital;
- 3) Equipment;
- 4) Internal policies and operating procedures;
- 5) Land and buildings;
- 6) Enabling policies and regulations from government;
- 7) Enabling support and facilitation by the shareholder;
- 8) Stakeholder mobilisation and partnerships, and
- 9) Industry buy-in (farmers).

ARC OUTCOME 2: RESOURCE CONSIDERATIONS

Financial Resources

DIVISION	AMOUNT IN R '000
Crop Sciences	165 771
RIS	86 232
Total expenses:	252 003

Human Capital

DIVISION	RESEARCHERS	RESEARCH SUPPORT	OTHER SUPPORT
Crop Sciences	305	616	111
RIS	92	26	13

5.3. ARC OUTCOME 3: IMPROVED NUTRITIONAL VALUE, QUALITY AND SAFETY OF AGRICULTURAL PRODUCTS

ARC OUTCOME 3: FOCUS AND PRIORITIES AND CONTRIBUTING DIVISIONS

The focus of Outcome 3 is to generate knowledge, solutions and technologies for food safety, quality and improved efficiencies in the agriculture value chain, with particular focus on agro-processing, pre- and post-harvest 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.

Outcome 3 is aligned to the 2019-2024 Medium Term Strategic Framework (MTSF) and the strategic priorities and outcomes of the DALRRD and DSI as follows:

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
<p>Priority 5: Spatial integration, human settlement and local government:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Rapid land and agrarian reform contributing to reduced asset 	<p>Outcome 8: Agrarian Transformation:</p> <ul style="list-style-type: none"> - Degraded land rehabilitated to production - Smallholder farmers supported for food production and commercial activities - Smallholder farmers supported with skills and infrastructure and financial support measures to increase productivity 	<p>Outcome 5: Increased market access and maintenance of existing markets:</p> <ul style="list-style-type: none"> - % Increase of domestic use (value added) of agricultural products <p>Outcome 6: Integrated and inclusive rural economy:</p> <ul style="list-style-type: none"> - Provide support to rural enterprises and industries in areas 	<p>Inclusive rural economy:</p> <ul style="list-style-type: none"> - Provision of applications and products for precision agriculture, human settlement and water bodies information layers - Demonstrations in partnership with the Department of Mineral Resources and Energy to assess the

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
inequality, equitable distribution of land and food security	<ul style="list-style-type: none"> - Agri-hubs and agro-processing facilities established <p>Outcome 9: Effective regulatory framework of agricultural produce and exports:</p> <ul style="list-style-type: none"> - Review the standards on SAGAP and Global GAP to enable small holder farmers' participation in the domestic and global GAP - Governance and operational review of the National Fresh Produce Markets, and Agency role in market access for smallholder farmers' participation 	with economic opportunities <ul style="list-style-type: none"> - Increase job opportunities and ensure skills development - Facilitate infrastructure development to support rural economic transformation 	appropriateness of new technologies such hydrogen fuel cells to improve service delivery

Outcome 3 is the focus of the following ARC Divisions:

- 1) Crop Sciences and
- 2) RIS.

ARC OUTCOME 3: OUTPUTS, OUTPUT INDICATORS AND TARGETS

In contributing towards the ARCs desired impact of “**sustainable agricultural systems for agrarian transformation, food and nutrition security**”, the 2022/23 Performance Plan for Outcome 3 is reflected in the log frame tables on the next pages:

ARC OUTCOME 3: Outputs, Output Indicators and Annual Targets

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
3. Improved nutritional value, quality and safety of agricultural products	Crop Sciences RIS	Broadening the food base	Number of cultivars registered	50	61	61	0	4	2	1
			Number of field trials	12	2	5	2	3	2	2
			Number of technical reports	162	125	112	98	69	52	51
			Number of cultivar evaluations	0	0	4	60	64	34	32
			Number of new products developed	0	0	1	0	6	6	5
			Number of services rendered	0	0	16	14	15	18	16
		Post-harvest handling and agro-processing	Number of cultivars developed with improved shelf life	0	1	6	1	0	0	0
			Number of solutions for controlled atmosphere	0	0	1	0	1	1	1
			Number of services rendered	0	0	15	47	33	33	31

ARC OUTCOME 3: Output Indicators, Annual and Quarterly Targets

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
Crop Sciences RIS	Broadening the food base	Number of cultivars registered*	4	0	2	0	2
		Number of field trials	3	0	0	2	1
		Number of technical reports	69	8	20	17	24
		Number of cultivar evaluations	64	30	30	4	0
		Number of new products developed	6	0	0	4	2
		Number of services rendered	15	3	4	5	3
	Post-harvest handling and agro-processing	Number of cultivars developed with improved shelf life	0	0	0	0	0
		Number of solutions for controlled atmosphere*	1	0	0	0	1
		Number of services rendered	33	6	9	8	10

ARC OUTCOME 3: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The Outcome is aligned to ARC Vision 2050 through a focus on the research, development, and dissemination of solutions, processes, and technologies for enhancing the agriculture value chain, and supporting inclusive market-orientated development for smallholder farmers, agri-businesses, and enterprises in the agriculture value chain.

For the 5-year period to 2025, the research and development priorities of Outcome 3 are:

- 1) Biotechnology and informatics processes to improve food safety, quality, and improved efficiencies in the agriculture value chain
- 2) Product development and value adding (storage, processing, and packaging)
- 3) 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
- 4) Animal agriculture research groups conduct research primarily investigating the various factors involved in producing good quality meat, meat products, milk and milk products (safe, appealing, nutritious, affordable and tasteful)
- 5) Research into the processes involved in maximising yield without forfeiting quality and adding value to a basic product to increase quality and/or yield

Key enablers to support delivery of the Outcome include:

- 1) Financial resources;
- 2) Human capital;
- 3) Equipment;
- 4) Internal policies and operating procedures;
- 5) Land and buildings;
- 6) Enabling policies and regulations from government;
- 7) Enabling support and facilitation by the shareholder;
- 8) Stakeholder mobilisation and partnerships, and
- 9) Industry buy-in (farmers).

ARC OUTCOME 3: RESOURCE CONSIDERATIONS

Financial Resources

DIVISION	AMOUNT IN R '000
Crop Sciences	38 059
RIS	1 208
Total expenses:	39 267

Human Capital

DIVISION	RESEARCHERS	RESEARCHER SUPPORT	OTHER SUPPORT
Crop Sciences	305	616	111
RIS	92	26	13

5.4. ARC OUTCOME 4: A SKILLED AND CAPABLE AGRICULTURE SECTOR

ARC OUTCOME 4: FOCUS AND PRIORITIES AND CONTRIBUTING DIVISIONS

The focus of Outcome 4 is to provide strategies, analysis and information to develop and grow a competitive, productive, and diverse agricultural sector, and provide a support service to identify and develop the commercial potential of agricultural research and development to address smallholder and commercial farmer constraints.

Agricultural excellence depends on the organisation's skilled human capital, and this is important for establishing sustainable growth in the South African agricultural economy. For the ARC to achieve this, specialist and postgraduate training of students and staff is crucial and underpins the diagnostic and research activities of the ARC. This knowledge enhancement will ensure that the ARC has a critical mass of scientists to contribute to the continuity of the research and development agenda of the organisation.

The Outcome further focuses on the implementation of initiatives to address smallholder farmer constraints in terms of access to resources (technology, information, etc.). This includes the packaging, exploitation and licencing of ARC research and development outcomes to enhance the capacity and skills of farmers, extension personnel, processors, and enterprises through facilitating the utilisation of ARC intellectual property.

The ARC provides unparalleled personalised education and training for the farming sector in addition to conveying management solutions to assist the wide spectrum of the veterinary and associated professions.

This will ensure that the ARC is better placed to disseminate and transfer the knowledge generated to farmers and extension agents for a sustainable agricultural sector and a food secure South Africa. The dissemination of the generated knowledge through scientific and other popular publications are a key output of the ARC, and will ensure an informed society, thereby enhancing the visibility of the organisation.

Outcome 4 is aligned to the 2019-2024 Medium Term Strategic Framework (MTSF) and the strategic priorities and outcomes of the DALRRD and DSI as follows:

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
<p>Priority 2: Economic transformation and job creation:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Unemployment reduced to 20%-24% ▪ 2 million new jobs especially for youth 	<p>Outcome 1: More decent jobs created and sustained, with youth, women and persons with disabilities prioritised:</p> <ul style="list-style-type: none"> - Create jobs through Job Summit Commitments, Operation Phakisa and other public sector employment programmes <p>Outcome 5: Reduce concentration and monopolies and expanded small business sector:</p> <ul style="list-style-type: none"> - Facilitate the increase in number of functional small businesses with a focus on township economies and rural development <p>Outcome 10: Increased economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities:</p> <ul style="list-style-type: none"> - Expand government spend on women, youth and persons with disabilities through preferential procurement 	<p>Outcome 3: Redress and equitable access to land and producer support:</p> <ul style="list-style-type: none"> - Number of smallholder producers commercialised - Skilled and employable youth in the agriculture sector <p>Outcome 5: Increased market access and maintenance of existing markets:</p> <ul style="list-style-type: none"> - % Increase of domestic use (value added) of agricultural products 	<p>Investing for inclusive economic growth:</p> <ul style="list-style-type: none"> - Skills Priority Plan developed by 2020 - led by DHET and supported by DSI <p>Improve competitiveness through ICT adoption:</p> <ul style="list-style-type: none"> - GERD of 1.1% as a percentage of GDP by 2024 - Commercialisation of intellectual property
<p>Priority 3: Education, Skills and Health:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ A skilled and capable workforce to support an inclusive growth path 	<p>Outcome 1: Expanded access to PSET opportunities:</p> <ul style="list-style-type: none"> - Implement enrolment plans for universities, TVET, CETCs and training (2020-2024) <p>Outcome 3: Improved quality of PSET provisioning:</p> <ul style="list-style-type: none"> - Develop standards for good governance in public TVET Colleges, CETCs, Universities and SETAs <p>Outcome 4: A responsive PSET system:</p> <ul style="list-style-type: none"> - Industry exposure for TVET College lecturers and students 	<p>Outcome 3: Redress and equitable access to land and producer support:</p> <ul style="list-style-type: none"> - Number of smallholder producers commercialised - Skilled and employable youth in the agriculture sector 	<p>Expanded access to PSET opportunities:</p> <ul style="list-style-type: none"> - # of PhD students awarded bursaries - # of pipeline postgraduate students awarded bursaries by NRF and DSI <p>Improved quality of PSET provisioning:</p> <ul style="list-style-type: none"> - # of emerging researcher grants to improve % of PhD qualified staff <p>A responsive PSET system:</p>

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
	<ul style="list-style-type: none"> - CET college skills programme piloted around community needs 		<ul style="list-style-type: none"> - # of users from the education and research sector supported through SANReN - # of graduates and students placed in DSI funded work opportunities - # of IP awareness sessions in TVET colleges - # of people reached through outreach, awareness and training programmes
<p>Priority 5: Spatial integration, human settlement and local government:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Rapid land and agrarian reform contributing to reduced asset inequality, equitable distribution of land and food security 	<p>Outcome 7: Sustainable land reform:</p> <ul style="list-style-type: none"> - Land reform projects provided with post-settlement support. <p>Outcome 8: Agrarian Transformation:</p> <ul style="list-style-type: none"> - Smallholder farmers supported for food production and commercial activities - Smallholder farmers supported with skills and infrastructure and financial support measures to increase productivity - Agri-hubs and agro-processing facilities established <p>Outcome 9: Effective regulatory framework of agricultural produce and exports:</p> <ul style="list-style-type: none"> - Review the standards on SAGAP and Global GAP to enable smallholder farmers' participation in the domestic and global GAP - Governance and operational review of the National Fresh Produce Markets, and Agency role in market access for small farm holders' participation 	<p>Outcome 6: Integrated and inclusive rural economy:</p> <ul style="list-style-type: none"> - Provide support to rural enterprises and industries in areas with economic opportunities - Increase job opportunities and ensure skills development - Facilitate infrastructure development to support rural economic transformation 	<p>Inclusive rural economy:</p> <ul style="list-style-type: none"> - Provision of applications and products for precision agriculture, human settlement and water bodies information layers - Demonstrations in partnership with the Department of Mineral Resources and Energy to assess the appropriateness of new technologies such hydrogen fuel cells to improve service delivery

Outcome 4 is the focus of the following ARC Divisions:

- 1) Crop Sciences;
- 2) Animal Sciences;
- 3) Research and Innovation Systems, and
- 4) Impact and Partnerships.

ARC OUTCOME 4: OUTPUTS, OUTPUT INDICATORS AND TARGETS

In contributing towards the ARCs desired impact of **“sustainable agricultural systems for agrarian transformation, food and nutrition security”**, the 2022/23 Performance Plan for Outcome 4 is reflected in the log frame tables on the next pages:

ARC OUTCOME 4: Outputs, Output Indicators and Annual Targets

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
4. A skilled and capable agriculture sector through innovation, knowledge and technologies	Crop Sciences Animal Sciences RIS Impact and Partnerships	Skills development	Number of people trained	712	525	417	328	497	491	620
			Number of Postgraduate students supported by ARC	42	30	38	23	46	52	58
		Technology Transfer	Number of technologies/IP registered/developed	6	6	9	3	3	3	6
			Number of enterprises supported	Not measured	Not measured	4	3	5	3	3
			Number of technologies transferred under license	0	0	30	30	30	30	30
		Smallholder farmer supported	Number of farmers trained	1 023	792	700	765	1 004	996	1016
			Number of technical assessments for commercial readiness	Not measured	Not measured	20	30	40	50	60
			Number of smallholder farmers participating in KyD	1 726	3 000	3 500	4000	4500	5000	5500
			Number of services rendered	110	125	132	129	54	64	74
			Number of farmer field days	30	28	2	3	6	7	7

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
4. A skilled and capable agriculture sector through innovation, knowledge and technologies	Crop Sciences Animal Sciences RIS	Farmer support	Number of farm assessments	Not measured	Not measured	53	30	25	30	35
			Number of farmers supported	2096	380	211	154	238	283	291
			Number of farmer field days	30	28	37	68	18	18	26
			Number of services rendered	8	5	20	85	103	72	77
	Impact and Partnerships	Knowledge generated and dissemination	Number of scientific publications	265	227	237	234	249	268	283
			Number of popular publications	175	171	203	204	187	202	220
			Number of public awareness events	Not measured	Not measured	169	72	80	83	87

ARC OUTCOME 4: Output Indicators, Annual and Quarterly Targets

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
Crop Sciences Animal Sciences RIS Impact and Partnerships	Skills development	Number of people trained:	497	74	123	148	152
		Number of Postgraduate students supported by ARC	46	11	3	9	23
	Technology Transfer	Number of technologies/IP registered/developed	3	0	0	0	3
		Number of enterprises supported	5	5	0	0	0
		Number of technologies transferred under license	30	0	15	10	5
	Smallholder farmer supported	Number of farmers trained	1 004	223	271	166	344
		Number of technical assessments for commercial readiness	40	10	10	10	10
		Number of smallholder farmers participating in KyD	4 500	1125	1125	1125	1125
		Number of services rendered	54	10	16	12	16
		Number of farmer field days	6	1	0	3	2
	Farmer support	Number of farm assessments	25	4	5	7	9
		Number of farmers supported	238	59	45	50	84
		Number of farmer field days	18	4	4	8	2
		Number of services rendered	103	21	27	22	33
	Knowledge generated and dissemination	Number of scientific publications	249	43	52	67	87
		Number of popular publications	187	37	49	48	53
		Number of public awareness events	80	18	26	20	16

ARC OUTCOME 4: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The Outcome is aligned to ARC Vision 2050 through a focus on supporting inclusive market-orientated development for smallholder farmers, agri-businesses and enterprises in the agriculture value chain.

For the 5-year period to 2025, the priorities and focus of Outcome 4 are to:

- 1) Address smallholder constraints in terms of access to resources such as technology, information and training;
- 2) Support the ARC priority focus on R&D output that deals specifically with smallholder and resource-poor farmer development, significantly increasing the ARC support to all smallholder farmers, including land reform beneficiaries and communal farmers;
- 3) Utilise the Farming Systems Research (FSR) approach, dealing in a holistic manner with the complex constraints of smallholder and resource poor farmers;
- 4) Protect and commercialise the IP generated by ARC R&D programmes, with a view to grow a competitive and diverse agricultural sector;
- 5) Provide customised solutions to specific farmer groups, supporting enterprise growth and development leading to food security, sustainable profitability and competitiveness;
- 6) Ensure a correct balance between technologies issued by the ARC under license for income and technologies issued under license royalty free, aimed at benefiting resource poor and marginalised farmers, and promoting socio-economic development;
- 7) Deliver training and information to farmers and extension personnel for skills development and better decision making, and to develop enhanced dissemination platforms for use by the ARC, and
- 8) Focus on capacity building, the transfer of technical skills through the provision of training courses and the development and dissemination of information resources to improve decision-making and risk mitigation by farmers.

Key enablers to support delivery of the Outcome include:

- 1) Financial resources;
- 2) Human capital;
- 3) Equipment;
- 4) Internal policies and operating procedures;
- 5) Land and buildings;
- 6) Enabling policies and regulations from government;
- 7) Enabling support and facilitation by the shareholder;
- 8) Stakeholder mobilisation and partnerships, and
- 9) Industry buy-in (farmers).

ARC OUTCOME 4: RESOURCE CONSIDERATIONS

Financial Resources

DIVISION	AMOUNT IN R '000
Crop Sciences	38 336
Animal Sciences	238 862
RIS	11 796
Impact & Partnerships	5 898
Total expenses:	294 892

Human Capital

DIVISION	RESEARCHERS	RESEARCH SUPPORT	OTHER SUPPORT
Crop Sciences	267	455	79
Animal Sciences	228	237	75
RIS	92	26	13
Impact & Partnerships	-	-	23

5.5. ARC OUTCOME 5: ENHANCED RESILIENCE OF AGRICULTURE

ARC OUTCOME 5: FOCUS AND PRIORITIES AND CONTRIBUTING DIVISIONS

The focus of Outcome 5 is to enhance the resilience of the agriculture sector to factors such as Climate Change. The weather variability and climate change have a direct impact on food security, especially in semi-arid and arid countries.

The Outcome focuses on climate monitoring for agriculture and the effective maintenance of an operational national agro-climate weather station network for effective provision of weather and climate related services.

In addition, infectious animal disease agents including bacteria, viruses and parasites, evolve in response to pressures that include immunologic and antimicrobial agents. The ARC provides effective and efficient diagnostic and analytical services and a wide range of applied research and consultancy services on livestock diseases at local, provincial, national, and regional levels. The excellent veterinary research focuses on the development and improvement of diagnostic and analytical services and applying the latest biological techniques. The development of vaccines to improve the health of the national herd through the prevention of key important diseases for the region is vitally important.

The rapidly changing climate and associated impact on rangelands has serious implication for livestock agriculture. Research in sustainable utilisation and conservation strategies to maintain biodiversity in the rangeland agro-ecological system is an area of both scientific, economic and environmental importance. Specifically, mitigation of emerging threats to rangeland biodiversity as manifested by unsustainable grazing strategies requires better understanding of the agro-ecological system for

sustainable utilisation of rangeland. Some of the strategic research in this area include use of encroaching woody plants (e.g., *Seriphium plumosum*, common name: Bankrupt bush) as feed ingredients for feed formulation.

Outcome 5 is aligned to the 2019-2024 Medium Term Strategic Framework (MTSF) and the strategic priorities and outcomes of the DALRRD and DSI as follows:

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
<p>Priority 5: Spatial integration, human settlement and local government:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Institutionalise spatial / territorial integration to fast track transformation and resilience of sub-national regions ▪ Natural Resources are managed and sectors and municipalities are able to respond to the impact of climate change 	<p>Outcome 2: Functional Sub-National Regional Development in Urban and Rural Spaces:</p> <ul style="list-style-type: none"> - Establish regional institutional collaboration structures through joint implementation protocols or related mechanisms <p>Outcome 4: Greenhouse Gas Emission Reduction (Mitigation):</p> <ul style="list-style-type: none"> - Implement 4 sectors Green House Gas emission reduction implementation plan (contribution from the largest emitters of GHG) - Transition plans for high carbon emitting sectors (energy, transport, agriculture and waste to low carbon economy), developed by 2024 <p>Outcome 6: State of ecological infrastructure improved:</p> <ul style="list-style-type: none"> - Rapidly and intensively rehabilitate and restore land - Water resource classes and Resource Quality Objectives (RQOs) by 2024 <p>Outcome 7: Sustainable land reform:</p> <ul style="list-style-type: none"> - Land reform projects provided with post-settlement support. <p>Outcome 8: Agrarian Transformation:</p> <ul style="list-style-type: none"> - Degraded land rehabilitated to production <p>Outcome 11: Effective water management system for the benefit of all:</p>	<p>Outcome 2: Spatial transformation and effective land administration:</p> <ul style="list-style-type: none"> - Effective application of spatial development planning and land use management - Legally secure tenure to all citizens - Integrated land administration system <p>Outcome 6: Integrated and inclusive rural economy:</p> <ul style="list-style-type: none"> - Provide support to rural enterprises and industries in areas with economic opportunities - Increase job opportunities and ensure skills development - Facilitate infrastructure development to support rural economic transformation 	<p>Inclusive rural economy:</p> <ul style="list-style-type: none"> - Provision of applications and products for precision agriculture, human settlement and water bodies information layers - Demonstrations in partnership with the Department of Mineral Resources and Energy to assess the appropriateness of new technologies such as hydrogen fuel cells to improve service delivery <p>Reduced Vulnerability of Key Sectors to Climate Change:</p> <ul style="list-style-type: none"> - Provide information for air quality information system, land cover and land use mapping, frequent information on weather patterns, and human activity on critical resources such as water, land and air - Provision of decision support tools, human settlements layer, water bodies information layer

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
	<ul style="list-style-type: none"> - Feasibility studies for rehabilitation vs new dams - Review current Water Legislations 		

Outcome 5 is the focus of the following ARC Divisions:

- 1) Crop Sciences;
- 2) Animal Sciences, and
- 3) Research and Innovation Systems.

ARC OUTCOME 5: OUTPUTS, OUTPUT INDICATORS AND TARGETS

In contributing towards the ARCs desired impact of “**sustainable agricultural systems for agrarian transformation, food and nutrition security**”, the 2022/23 Performance Plan for Outcome 5 is reflected in the log frame tables on the next pages:

ARC OUTCOME 5: Outputs, Output Indicators, and Annual Targets

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
5. Enhanced resilience of agriculture		Climate resilient solutions	Number of drought tolerant cultivars	0	0	3	1	2	2	0
			Number of services rendered	0	0	5	5	0	8	9
			Number of technical reports	14	9	10	10	10	11	13
			Number of field trials	0	0	105	95	105	104	110
		Number of tools for measuring climate change	Not measured	Not measured	401	281	400	320	330	
		Vaccine production	Number of blood vaccine doses produced	186 555	241 215	235 200	235 000	65 000	70 000	65 000
			Number of different types of vaccines developed	Not measured	Not measured	4	0	0	0	1
			Number of FMD vaccine doses produced	Not measured	Not measured	50 000	0	0	0	50 000
			Number of vaccine clinical trials	Not measured	Not measured	2	0	2	1	0
		Laboratory services	Number of tests reports issued for animal health	17 255	12 416	215 350	15 006	14 208	15 215	15 895
			Number of tests performed for food and feed	3 632	3 000	2 006	2 255	2 310	2 412	2 512
			Number of services rendered	0	0	0	150	150	200	200
			Number of technical reports	0	0	5	7	0	0	0

ARC OUTCOME 5: Output Indicators, Annual and Quarterly Targets

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
Crop Sciences	Climate resilient solutions	Number of drought tolerant cultivars	2	0	2	0	0
		Number of services rendered	0	0	0	0	0
		Number of technical reports	10	3	3	2	2
		Number of field trials	105	0	0	3	102
		Number of tools for measuring climate change	400	0	0	0	400
Animal Sciences	Vaccine production	Number of blood vaccine doses produced	65 000	40 000	0	25 000	0
		Number of different types of vaccines developed*	0	0	0	0	0
		Number of FMD vaccine doses produced*	0	0	0	0	0
		Number of vaccine clinical trials	2	0	0	0	2
RIS	Laboratory services	Number of tests reports issued for animal health	14 208	3 113	3 963	4 052	3 080
		Number of tests performed for food and feed	2 310	576	578	578	578
		Number of services rendered	150	40	30	40	40
		Number of technical reports	0	0	0	0	0

*Targets are for the outer years (2022/23, 2023/24)

ARC OUTCOME 5: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

The Outcome is aligned to ARC Vision 2050 through a focus on the research, development, and dissemination of solutions, processes, and technologies for the anticipation and mitigation of agricultural risks.

For the 5-year period to 2025, the research and development priorities of Outcome 5 are:

- 1) Climate variability and change adaptation;
- 2) Development of agricultural decision support tools and services;
- 3) Development of Agroclimate web and cellphone application;
- 4) Climate-based solutions for food security and mitigating extreme weather events;
- 5) Vaccine production and diagnostic and analytical services;
- 6) Development of crop suitability parameters, and
- 7) Development of early warning systems (drought, floods, pests & diseases, animal stress).

Key enablers to support delivery of the Outcome include:

- 1) Financial resources;
- 2) Human capital;
- 3) Equipment;
- 4) Internal policies and operating procedures;
- 5) Land and buildings;
- 6) Enabling policies and regulations from government;
- 7) Enabling support and facilitation by the shareholder;
- 8) Stakeholder mobilisation and partnerships, and
- 9) Industry buy-in (farmers).

ARC OUTCOME 5: RESOURCE CONSIDERATIONS

Financial Resources

DIVISION	AMOUNT IN R '000
Crop Sciences	1 393
Animal Sciences	438 531
RIS	2 151
Total expenses:	442 075

Human Capital

DIVISION	RESEARCHERS	RESEARCH SUPPORT	OTHER SUPPORT
Crop Sciences	170	423	73
Animal Sciences	228	237	75
RIS	72	18	8

5.6. ARC OUTCOME 6: A HIGH-PERFORMING AND SUSTAINABLE ORGANISATION

ARC OUTCOME 6: FOCUS AND PRIORITIES AND CONTRIBUTING DIVISIONS

Outcome 6 is the platform for delivery against the ARC mission and the realisation of the ARC impact. The focus of Outcome 6 is to ensure:

- 1) Addressing the current working capital gap and financial position through the implementation of the targeted and robust Sustainability and Turnaround Plan; and
- 2) Ensuring excellence in scientific research and development through enhanced capacity, capabilities and appropriate organisational technology and infrastructure.

The Outcome focuses on improving organisational effectiveness and efficiency towards a sustainable ARC. It includes promoting public accountability, achieving high standards of corporate governance and efficient resource utilisation, strengthened revenue generation and productivity, and good stakeholder engagement to ensure optimal organisational performance, visibility and service delivery.

While supporting delivery of the other five (5) ARC outcomes, the specific contribution of Outcome 6 to the 2019-2024 Medium Term Strategic Framework (MTSF) and the strategic priorities and outcomes of the DALRRD and DSI is as follows:

RELEVANT MTSF PRIORITY AND IMPACT	RELEVANT MTSF OUTCOMES AND INTERVENTIONS	DALRRD STRATEGIC PLAN RESPONSE	DSI STRATEGIC PLAN RESPONSE
<p>Priority 1: Building a capable, ethical and developmental State:</p> <p><u>2024 Impact:</u></p> <ul style="list-style-type: none"> ▪ Public value and trust ▪ Active citizenry and partnerships in society 	<p>Outcome 1: Improved governance and accountability:</p> <ul style="list-style-type: none"> - Strengthen the governance system of state owned entities <p>Outcome 2: Functional, efficient and integrated government:</p> <ul style="list-style-type: none"> - Enhance productivity and functionality of public sector institutions in supporting people-centered service delivery - Improve financial management capability in the public sector - Measures taken to reduce wasteful and fruitless expenditures; and irregular expenditure in the public sector <p>Outcome 3: Professional, meritocratic and ethical public administration:</p> <ul style="list-style-type: none"> - Programme for building a professional public administration <p>Outcome 4: Social compact and engagement with key stakeholders:</p> <ul style="list-style-type: none"> - Participatory governance mechanisms and citizen engagement <p>Outcome 5: Mainstreaming of gender, youth and disability, empowerment and development institutionalised:</p> <ul style="list-style-type: none"> - Implementation of gender, youth and disability responsive planning, budgeting, interventions, policies and legislations 	<p>Outcome 1: Improved governance and service excellence:</p> <ul style="list-style-type: none"> - Compliance with legal prescripts - Achievement of KPIs - Payment of suppliers in 30 days - Compliance to performance management framework 	<p>A Capable, Ethical and Developmental State:</p> <ul style="list-style-type: none"> - Capable and honest Government - Gender-responsive planning, budgeting and reporting framework - District- Metro Coordination Model to Improve the Coherence and Impact of Government Service Delivery and Development <p>Strengthened government capability to deliver on the developmental agenda:</p> <ul style="list-style-type: none"> - Provide timely, accurate and independent data and information for mega projects monitoring and evaluation

Outcome 6 is delivered by the Corporate Support Divisions of the ARC, namely:

- 1) Office of the CEO;
- 2) Human Capital Management, Marketing and Legal Services;
- 3) Impact and Partnerships;
- 4) Finance, and
- 5) ICT and Infrastructure.

The Outcome covers the full range of organisational management and support services and functions, including:

- 1) Corporate governance, financial management and internal controls;
- 2) Human capital management and development;
- 3) Supply chain management and targeted procurement;
- 4) ICT, facilities and assets management,
- 5) International and intergovernmental relations, and
- 6) Strategic marketing, stakeholder management and communications.

OUTCOME 6: OUTPUTS, OUTPUT INDICATORS AND TARGETS

In contributing towards the ARCs desired impact of “**sustainable agricultural systems for agrarian transformation, food and nutrition security**”, the 2022/23 Performance Plan for Outcome 6 is reflected in the log frame tables on the next pages:

ARC OUTCOME 6: Outputs, Output Indicators and Annual Targets

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
6.A high-performing and sustainable organisation	ICT & Infrastructure	Infrastructure Management	Number of business cases implemented for assets management	5	4	3	2	1	2	3
			Increase in Rand value of rental income	14.5%	3%	3%	3%	1%	2%	5%
		ICT Strategy Implementation	Number of digital transformation projects implemented	Not measured	Not measured	Not measured	4	3	3	3
			Number of stabilisation projects implemented	Not measured	Not measured	Not measured	3	2	2	1
			Number of optimisation projects implemented	Not measured	Not measured	Not measured	3	3	3	3
		Human Capital Management, Marketing & Legal Services	Human Capital Management	Vacancy rate	Not measured	Not measured	5.77%	5.50%	10%	10%
	Support employees as percentage of total staff			Not measured	Not measured	20.60%	18,50%	16,70%	16,00%	15,50%
	Percentage increase of employment equity ratio in the designated groups in core business, in respect of: -Women at Senior Management level			Not measured	Not measured	46%	46%	46%	50%	50%
	- People with Disabilities employed			Not measured	Not measured	1,55%	1,55%	1,55%	1,55%	1.55%

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
6. A high-performing and sustainable organisation	Human Capital Management, Marketing & Legal Services	Performance management	Improve the leadership dimensions of 360-degree results of Management, Senior and Executive Management	Not measured	Not measured	3.5	3.7	4	5	5
			Alignment of organisational values	Not measured	Not measured	100%	100%	100%	100%	100%
			Percentage implementation of change management strategies linked to culture survey and 360-degree leadership processes	Not measured	Not measured	Not measured	100%	100%	100%	100%
		Human Capital Development	Number of employees appointed with master's degrees	9	20	20	20	20	20	20
			Number of employees appointed with Doctoral degrees	12	10	10	10	10	10	10
			Number of employees with master's degrees	219	268	268	268	200	230	268
			Number of employees with Doctoral degrees	250	240	240	240	240	240	240
			Percentage staff turnover	2.65%	3.50%	3.5%	3.5%	3,5 %	3.5%	3.5%
			Total spend on PDP stipend and registration	R 15.7mil	R 21.1mil	R 21.1mil	R 10mil	R 21.1 mil	R21,1mil	R20mil
			Training spend as a % of salary bill	1.57%	2%	2%	2%	1%	1%	1%

OUTCOME	RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	AUDITED ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS			
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
6. A high-performing and sustainable organisation	Impact and Partnerships	Commercialisation of ARC solutions	Establishment of an ARC commercialisation entity	Not measured	Not measured	Entity approved	1	Entity Established	Entity formally registered	Entity operational	
		Exhibitions and sponsorships	Number of exhibitions, sponsorships	Not measured	Not measured	30	5	5	40	40	
		International partnerships	Number of new international partnerships	Not measured	Not measured	2	2	2	2	2	
	Finance	Governance	Audit opinion	Audit opinion	Qualified audit	Qualified audit	Qualified audit	Unqualified audit	Unqualified audit	Unqualified audit	Unqualified audit
		Funding and revenue generation	Zero Deficit	Zero Deficit	Not measured	Not measured	Zero deficit	Zero deficit	Zero deficit	Zero deficit	Zero deficit
			BBBEE rating	BBBEE rating	Level 8	Level 8	Non-Compliant	Level 5	Level 5	Level 4	Level 3
			External income as % of total revenue	External income as % of total revenue	Not measured	Not measured	20%	35%	35%	40%	45%
			Rand value of royalty income	Rand value of royalty income	R33mil	R27mil	R39 mil	R20 mil	R23 mil	R25 mil	R30 mil
		Cost efficiencies	Reduction in fixed cost	Reduction in fixed cost	Not measured	Not measured	5%	3%	5%	5%	5%
	Personnel costs as % of Operational PG		Personnel costs as % of Operational PG	Not measured	Not measured	89%	70%	75%	70%	65%	

ARC OUTCOME 6: Output Indicators, Annual and Quarterly Targets

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
ICT & Infrastructure	Infrastructure Management	Number of business cases developed for implementation of assets management plan	1	Annual Target			
		Increase in Rand value of rental income	1%	Annual Target			
	ICT Strategy Implementation	Number of digital transformation projects implemented	3	Annual Target			
		Number of Stabilisation projects implemented	2	Annual Target			
		Number of Optimisation projects implemented	3	Annual Target			
Human Capital Management, Marketing & Legal Services	Human Capital Management	Vacancy rate	10%	Annual Target			
		Support employees as percentage of total staff	16,70%	Annual Target			
		Percentage increase of Employment equity ratio in the designated groups in core business, in respect of: Women at Senior Management level	46%	Annual Target			
		- People with Disabilities Employed	1,55%	Annual Target			
	Performance management	Improve the leadership dimensions of 360-degree results of Management, Senior and Executive Management	4	Annual Target			
		Alignment of organisational values	100%	Annual Target			
		Percentage implementation of change management strategies linked to culture survey and 360-degree leadership processes	100%	Annual Target			
	Human Capital Development	Number of employees appointed with master's degrees	20	Annual Target			
		Number of employees appointed with Doctoral degrees	10	Annual Target			
		Number of employees with master's degrees	200	Annual Target			
		Number of employees with Doctoral degrees	240	Annual Target			
		Percentage staff turnover	3,5 %	Annual Target			
		Total spend on PDP stipend and registration	R 21.1 mil	Annual Target			
Training spend as a % of salary bill	1%	Annual Target					

ARC: Annual Performance Plan 2022/23

RESPONSIBLE BUSINESS DIVISION	OUTPUT	OUTPUT INDICATORS	2022/23 ANNUAL TARGET	QUARTERLY TARGETS			
				Q1 Apr - Jun 2022	Q2 Jul - Sep 2022	Q3 Oct - Dec 2022	Q4 Jan - Mar 2023
Impact and Partnerships	Commercialisation of ARC solutions	Establishment of an ARC commercialisation entity	Entity Established	Annual Target			
	Exhibitions and sponsorships	Number of exhibitions, sponsorships	5	1	2	1	1
	International partnerships	Number of new international partnerships	2	Annual Target			
Finance	Governance	Audit opinion	Unqualified audit	Annual Target			
		Zero Deficit	Zero deficit	Annual Target			
	Funding and revenue generation	BBBEE rating	Level 5	Annual Target			
		External income as % of total revenue	35%	Annual Target			
		Rand value of royalty income	R23 mil	Annual Target			
	Cost efficiencies	Reduction in fix cost	5%	Annual Target			
Personnel costs as % of Operational PG		75%	Annual Target				

ARC OUTCOME 6: EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

Linked to the support services component of ARC Vision 2050, for the 5-year period to 2025 the priorities of Outcome 6 are:

- 1) **Stabilisation:** changing our approach to designing and implementing new ICT solutions by adopting a holistic and long-term approach and prioritising selected capabilities and ensuring ongoing delivery of reliable ICT services;
- 2) **Optimisation / enabling innovation readiness:** preparing the organisation to take advantage of the latest technological advancements by developing strong expertise in facilitating rapid and iterative change, providing secure and flexible integration, and supporting efficient and effective automation;
- 3) **Digital Transformation:** to provide reliable platform for Agri-Tech solutions, we need to improve the way we manage our investment in ICT services by creating a more sustainable ICT services, improving our partnership with government, industry and service providers, and being smarter in the way we engage with business areas. This include adopting *bi-modal* approach, what is also known as *two-speed IT* towards adopting digital transformation;
- 4) **Human Capital:** the challenges facing the organisation, signals a significant change, in particular with the advent of the Fourth Industrial Revolution (4IR), to both the technical ecosystem and the way in which users consume ICT services;
- 5) Maximising income from our assets (i.e. market related leasing);
- 6) Effective management of capital and operational expenditure on maintenance of our assets;
- 7) Implementing an asset management system to effectively control and manage our assets;
- 8) Development of the overarching security plan to secure our strategic / key assets in a cost effective manner;
- 9) Strengthening strategic partnerships with third parties and our key stakeholders (i.e. Government departments and agencies, etc.), and
- 10) Disposing of non-strategic assets.

Key enablers to support delivery of the Outcome include:

- 1) Sound and up to date policies and procedures;
- 2) Sound labour relations and employee wellness;
- 3) Structure and capacitate the organisation as defined by the mandate and strategic framework;
- 4) Improve performance management system, and implementation thereof, to drive performance culture;
- 5) Business processes reengineering and steady roll-out of automated systems to enable core functions, and
- 6) Effective internal communication system is developed and implemented.

ARC OUTCOME 6: RESOURCE CONSIDERATIONS

Financial Resources

DIVISION	AMOUNT IN R '000
Human Capital	21 507
Finance	22 619
ICT and Infrastructure	66 043
Office of the CEO	44 458
Assurance Providers	11 347
Personnel and other related costs	166 524
Total expenses:	332 497

Human Capital

DIVISION	ADMINISTRATION & SUPPORT
Human Capital	60
Finance	109
ICT and Infrastructure	55
Impact and Partnerships	23

6. THE ARC FINANCIAL PLAN AND ANNUAL BUDGET FOR 2022/23 AND THE MTEF

The ARC mandate and funding sources have been static and remained unchanged over the past three decades (1990 to 2020) and as thus, it is outlined below:

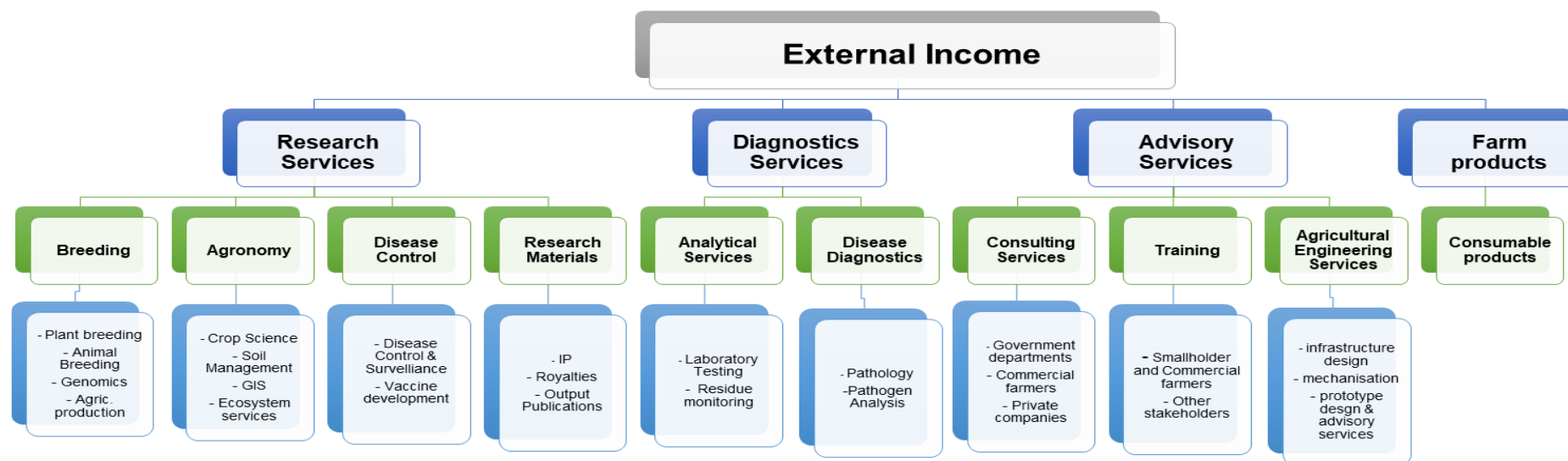
The Agricultural Research Council Act No 86 of 1990²⁷, provides wider options for the financing of the ARC which includes, inter alia, the following: (a) Money appropriated by Parliament to finance the functions of the ARC; (b) Money paid to the ARC arising from the sale on an end-product of research, development and technology transfer; (c) Money received by virtue of contracts and the functions performed by the ARC; (d) money borrowed by the ARC in terms of section 4(1)(m)(ii); (e) fees or royalties; (f) proceeds from sale of shares and dividends on shares; (g) donations or contributions; (h) interests on investments.

The South African businesses and the globe at large operated within the constraints presented by the coronavirus pandemic, which brought almost the world at large to a standstill. Organisations had to adapt to the new way of working with the introduction of work-from-home with new or upgraded technology. We continue to weather Covid-19 impact, which has affected the ARCs ability to generate income whilst introducing additional expenses, which is the cost of compliance to the regulations governing the various levels of lockdown within South Africa. The current economic climate has resulted in the reduction in the Parliamentary Grant funding of R21m implemented during FY2020/21, which was effected against the Personnel Costs. The ARC continues to operate in a 0% salary increase regime, which is applicable within the public sector.

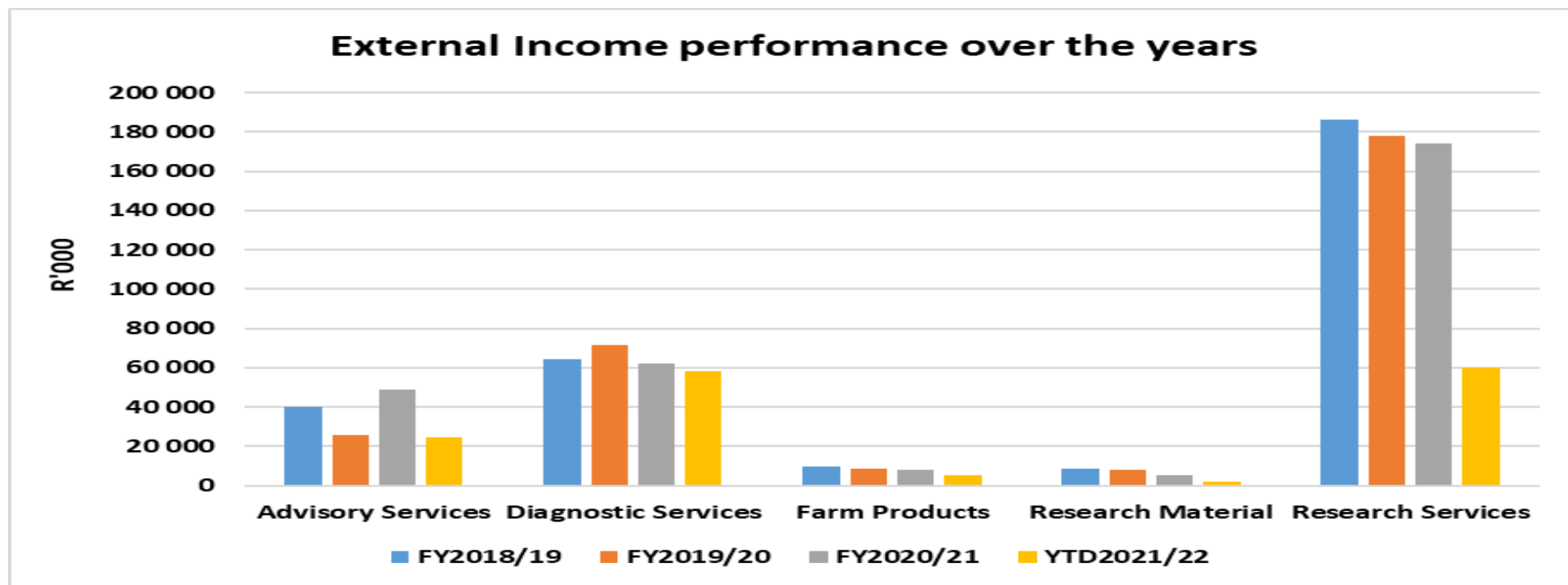
The ARC has prepared its financial plan based on a preliminary Allocation Letter received during December 2020, as the new allocation letter for the FY2022/23 remains outstanding from the DALRRD. The forecasted allocation for the FY2022/23 is R1.189m; R1.191m (FY2023/24) and R1.239m (FY2024/25). A 4% growth was estimated to arrive at the FY2024/25 parliamentary grant. The Operational Parliamentary Grant for the first year of the MTEF budget includes anticipated grants from DALRRD and DSI. The FY2021/22 represents the final year (MTEF) that the ARC will be receiving the conditional CAPEX Parliamentary Grant earmarked for the Foot and Mouth Disease (FMD) facility, as thus, no new / further funding for the FMD from the 2023 financial year onwards. The External Income has been budgeted at R426m (FY2022/23); R445m (FY2023/24), and R465m (FY2024/25) whilst Other Income is budgeted at an average of R84m per annum throughout the MTEF period.

²⁷ Available: <https://www.arc.agric.za/Documents/Agricultural%20Research%20Act%20%2086%20of%201990.pdf>

The External Income relates to revenue from contracts for services rendered and produce sold. The external income sources for the ARC are based on four activities or streams namely: Research Services; Diagnostics Services; Advisory Services and farm products:

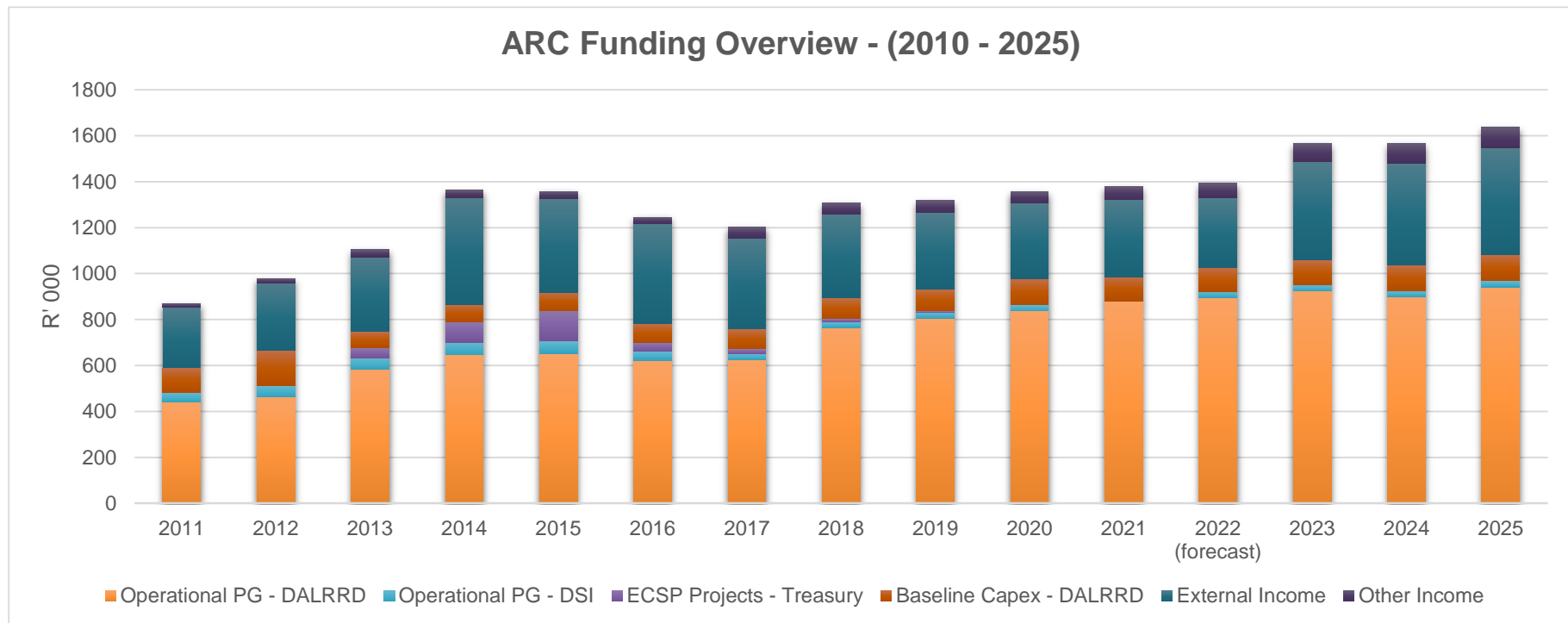


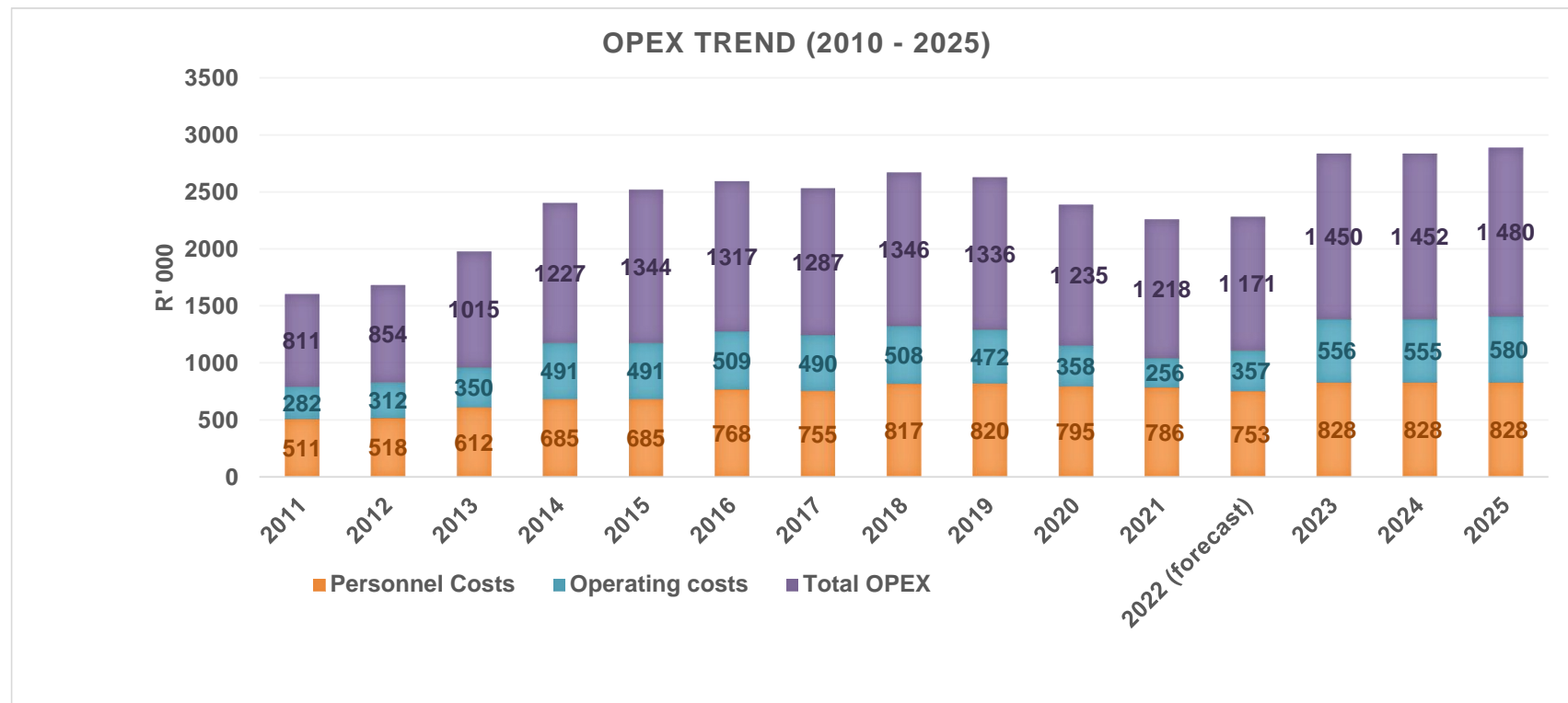
The leading External Income drivers are: (a) Revenue Services which contributes more than 50%; followed by Diagnostics and Advisory Services. The evolution of the External Income is outlined on a graph below²⁸.



²⁸ Source: Financial Results as at 31 December 2021.

The funding sources, historical and budgeted are outline below, wherein the parliamentary grant continues to be a significant and dominating revenue source:





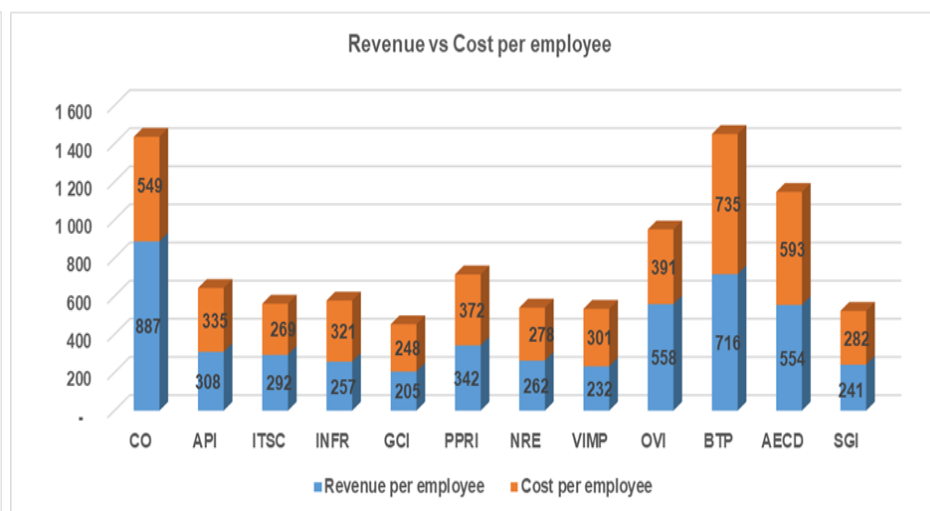
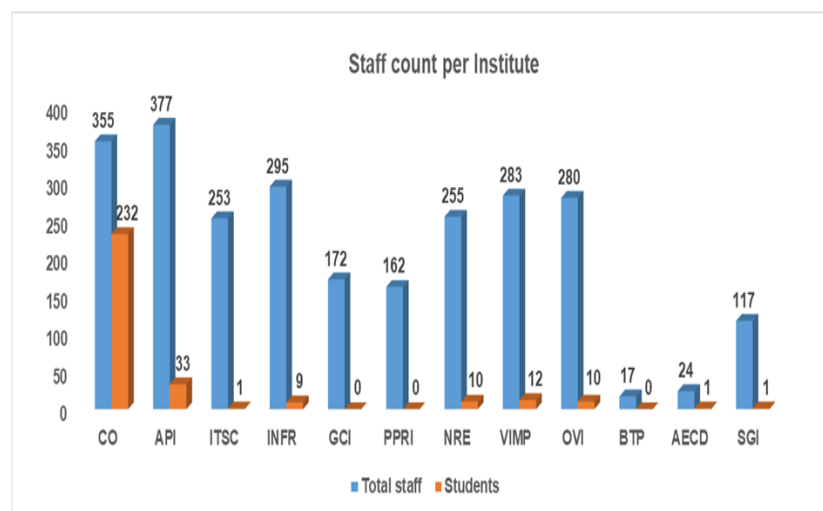
The ratio of personnel costs in relation to the Parliamentary Grant (PG) remains a concerning factor. Personnel costs continues to absorb a major portion of the operational PG (82%²⁹), although the absorption rate during this period is lower than the FY2020/21 absorption rate of 92%. There has been a significant improvement to date, as compared to the 98% absorption rate which prevailed as at FY2019/20. A target that we have set as the ARC is that the personnel costs should absorb 60% of the Operational PG, which is outlined and articulated in the ARCs Financial and Sustainability Turnaround Plan. The ARC based on its baseline Personnel Costs (FY2018/19), had a target to reduce its Personnel Costs by R325 million over an MTEF period. A budgeted R60 million has been included in the FY2022/23 financial plan to cater for the personnel costs optimisation initiatives that the ARC will be implementing during the financial year.

²⁹ Ratio based on December 2021 financial results

ARC: Annual Performance Plan 2022/23

The ARC' Staff Complement [FY2021/22 staff complement as at 15 December 2021³⁰] evolved over the years as outlined below:

STAFF COMPLEMENT				
STAFF COMPLEMENT	FY2018/19	FY2019/20	FY2020/21	FY2021/22
Permanent Employees	2 287	2 219	2 118	2 002
Students	229	154	237	271
Temporary Employees	119	258	82	89
Wages	313	134	213	144
Total	2 948	2 765	2 650	2 506



The ARC has non- personnel related cost-savings initiatives, which will focus on reducing the fixed costs that is dominating driver of the Operating Costs.

³⁰ As at 31 December 2021, the ARC had a total staff complement of 2 506³⁰, at an average cost of R350K per employee. Of the 2 506 staff, 79.9% are permanent employees and 10.8% are students.

The ARC has some funds in reserve to be able to move quickly to support key initiatives that are targeted in the ARCs Financial and Sustainability Turnaround Plan:

NO.	FOCUS AREA	INITIATIVES
1.	Governance and Financial Management	<ul style="list-style-type: none"> a. Improved governance, which will result in Clean Audit Outcome. b. Improved financial management, which will result in zero deficits. c. Ensure cash resources are preserved to timeously honour obligations; and advanced towards the ARCs strategy execution.
2.	Revenue sources composition and optimisation [Organic growth]	<ul style="list-style-type: none"> a. Less reliance on the Parliamentary Grant as the main source of funding for the ARC. b. Increase composition of External Income to Total Revenue to 60%. c. Review the Royalties to ensure the ARC earns the highest fees possible, whilst ensuring that the commercial provisions are on par with best practice. d. Agricultural products and services to be well marketed to boost the revenue levels. e. Letting and leasing of properties and accommodation to be concluded at market-related rates.
3.	Growth through acquisitions / partnerships	<ul style="list-style-type: none"> a. Explore potential equity acquisitions/ joint ventures / public private partnerships, which will enhance the ARCs strategic agenda whilst ensuring compliance with the Public Finance Management Act.
4.	Efficiencies	<ul style="list-style-type: none"> a. Optimisation of Personnel Costs to Operational Parliamentary Grant (60%); which is equivalent to approximately R320 million personnel cost reduction. b. Value for money (i.e. Return on investments) assessment for subscription / memberships (publications and/or library) vs Utilisation. Including an alternative approach, which may be demand – driven, or collaboration with universities/partners (for mutual benefits). c. Consider the disposal / leasing of unutilised and under-utilised land, and properties. This will result in the reduction on Maintenance Costs. d. Rationalisation of the Institutes / Campuses. This will result in reduction on fixed costs such as security, maintenance, electricity, etc. e. Energy saving projects, which will result in savings on electricity costs. f. Collaborate with ICT on the review of the ERP system, to ensure that all envisaged process efficiencies are achieved through this process. g. Procurement and Sourcing strategies to focus on consolidating the various commodities, whilst approaching the market as one ARC; and setting – up panel of service providers for repetitive / common commodities
5.	Utilisation of the Capital Parliamentary Grant	<ul style="list-style-type: none"> a. Prioritisation of the Capital PG, to align to the prioritised strategic projects within the ARC. b. Funding of the commercial farms, as an enabler to self-financial sustainability and less reliance on the Parliamentary Grant

GOVERNANCE - INITIATIVES TO IMPROVE THE AUDIT OUTCOME

The audit outcome over the years has been influenced by the following areas:

Basis for Qualified Opinion	FY2017	FY2018	FY2019	FY2020	FY2021
Property, Plant and Equipment					
Receivables					
Payables					
Inventories					
Prior - period disclosures					
Revenue					
Expenses					
Commitments					
Irregular Expenditure					
LEGEND					
Audit findings raised			No Audit findings raised		

The ARC has developed an Audit Improvement Plan (which is now called the “ARC Controls and Efficiencies Improvement Plan, herein referred to as ACE.IP) which has been approved by the Audit & Risk Committee during October 2021, which covers an 18 month period ending 30 September 2022.

The ACE.IP is monitored by the Audit and Risk Committee monthly, whereby management submits the progress report on the 5th of every month and the progress report is subjected to a review by Internal Audit. The report by Internal Audit is submitted to the Audit and Risk Committee on the 15th of every month.

The theme on the ACE. IP addresses the following:

NO.	THEME
1.	Culture and improving the work ethics and changing the ways of work / working
2.	Reorganisation of Finance and SCM to improve efficiencies, through change in operating model from decentralization to centralization. Review and revise the structure to support the aforementioned intent.
3.	Review of policies, processes and related delegations
4.	Training, capacity building and skills enhancements
5.	Improving the quality of the financial statements
6.	Property, Plant and Equipment
7.	Records management, digitization of finance (incl. SCM) records and electronic records management
8.	Supply Chain Management
9.	Facilities / infrastructure management
10.	ICT related initiatives
11.	ARC Sustainability and Financial Turnaround Plan, which includes inter alia, the Digitisation Strategy
12.	Compliance and Governance matters

The key initiatives identified per area are outlined on the table below:

NO	KEY INITIATIVE	INITIATIVES PER AREA
1.	Improve the overall Corporate Governance within the Agricultural Research Council, to ensure that the ARC performs positively and achieves the following governance outcomes: (a) Ethical culture; (b) Good performance; (c) Effective control; (d) Legitimacy with stakeholders (trust and good reputation)	3
2.	Finance and SCM reorganisation for operational efficiencies	5
3.	Training, capacity building and skills enhancements Interventions	8
4.	Improve the quality of the financial statements	3
5.	Finance Compliance and Stakeholder Management plan	5
6.	Property, Plant and Equipment	8
7.	Payments and Commitments	4
8.	Bank Accounts	1
9.	Business Processes review (Detailed system descriptions) and monthly reconciliations	3
10.	Digitisation of records and electronic records management (online filing)	8
11.	Supply Chain Management	5
12.	ARC Sustainability and Financial Turnaround Plan	5
13.	Facilities / Infrastructure	4
14.	ICT related initiatives	3
15.	Legal Non – Compliance	4
16.	The ARC Executive Management Committee (EMC) to submit detailed (unaudited) monthly ACE.IP implementation reports by not later the 5 th of the following month to: (a) Audit and Risk Committee; (b) Council; (c) AGSA	1

In addition to the fore mentioned, the ARCs three-year strategic rolling audit plan (risk-based) for the financial years ending 31 March 2022 to 2024 has carefully considered what it takes to develop and put together a plan that is formidable and befitting the stature of a world-class internal audit, a vision that ARCs Internal Audit function (IAF) thrives towards. We have considered these key attributes and endeavoured to the best of our capabilities to incorporate them in compiling this APP. ARCs Internal Audit function (IAF) has adapted an audit process to ensure value adding assurance and advisory reviews in identifying critical areas for audit. Furthermore, our priorities are defined in our operational plans (Annual Internal Audit Plans) which we believe will enhance the way in which we serve ARC. We believe that this is instrumental in establishing an internal audit service that will fundamentally enhance the quality of our assurance audits and value-add service we provide in line with our Internal Audit Charter. Amongst others, the plan deals with the internal audit process, risk assessment and, ongoing process, risk re-assessment which are critical to identify and specifically target the key business processes on which internal audit can focus the risk management process and identification of audit areas.

The risk-based audit plan focuses on high priority risks that are identified against the strategic objectives and key business processes in line with ARCs Enterprise Wide Risk Management and Strategy. The plan further, considers the combined assurance processes within the organisation and the various assurance providers as per the combined assurance framework, these include management, external auditors, Strategic Planning and Performance unit, Enterprise Risk Management, etc. An alignment to the assurance strategy is applied to minimise unnecessary duplication of effort. We recognise the ever-changing risk environment and aim to be agile to respond to ARCs changing risk profile.

As outlined in the external environmental analysis above, the agricultural landscape is likely to change significantly over the next few decades and the ARC needs to position itself appropriately to respond to the new requirements of the changing landscape. Mega trends experienced in the biophysical spaces will have significant impacts on agri-food research and the work of the ARC. Accordingly, the ARC has therefore developed its Vision 2050 to ensure that the organisation fulfils its obligations.

PROJECTED REVENUE FOR 2022/23 MTEF PERIOD

AGRICULTURAL RESEARCH COUNCIL				
BUDGET OVERVIEW FOR THE MTEF PERIOD				
CONSOLIDATED INCOME AND EXPENDITURE ESTIMATE				
		2022/23	2023/24	2024/25
		R'000	R'000	R'000
BASELINE FUNDING	Baseline Allocation - Operational	842 101	843 684	881 650
	Baseline Allocation - Capital	109 820	110 027	114 978
	Baseline Allocation - FMD Vaccine Facility	-	-	-
	Ncera	6 728	6 741	7 044
	Total Baseline Funding	958 649	960 451	1 003 672
PROVISION OF NATIONAL SERVICES	Climate Monitoring	2 330	2 334	2 439
	SADC Activities (Ring-fenced)	5 001	5 010	5 236
	Intergis	3 325	3 332	3 482
	Crop Forecasting	15 403	15 432	16 127
	Diagnostic Services	27 481	27 532	28 771
	Total Other Grants	53 540	53 641	56 055
MAINTENANCE OF NATIONAL ASSETS	Gene banks; National Collections; Inventories; Databanks; Surveys and Information Systems - DSI	26 087	-	-
	National Public Goods Assets- DALRRD	22 002	22 044	23 036
	Total Funding for National Assets	48 089	22 044	23 036
TOTAL GRANTS	PG Excluding VAT	1 060 279	1 036 136	1 082 762
	VAT	159 042	155 420	162 414
	PG Including VAT	1 219 320	1 191 556	1 245 176
BASELINE FUNDING ARC	Total Grants (excl. VAT)	1 060 279	1 036 136	1 082 762
	External Income (excl. VAT)	425 704	444 860	464 879
	Other Income (excl. VAT)	80 889	84 529	88 333
	Total Revenue	1 566 871	1 565 525	1 635 974

PROJECTED EXPENDITURE FOR 2022/23 MTEF PERIOD

AGRICULTURAL RESEARCH COUNCIL BUDGET OVERVIEW FOR THE MTEF PERIOD CONSOLIDATED INCOME AND EXPENDITURE ESTIMATE				
		Medium - Term Expenditure		
		2022/23	2023/24	2024/25
		R'000	R'000	R'000
Economic Classification	Compensation of employees	827 995	827 995	827 995
	Goods and Services	556 304	555 251	580 237
	Use of Infrastructure (Depreciation)	66 056	69 029	72 135
	<u>Payment of Capital Assets</u>			
	Acquisition	109 820	110 027	114 978
	FMD - Project related	169 131	178 696	186 738
	TOTAL	1 729 306	1 740 997	1 782 082
Standard Items of Expenditure	Current			
	Compensation of Employees - Core Research	703 795	703 795	703 795
	Compensation of Employees - Administrative Support	124 199	124 199	124 199
	Goods and Services	556 304	555 251	580 237
	Use of Infrastructure (Depreciation)	66 056	69 029	72 135
	Capital Assets	278 951	288 723	301 715
	TOTAL	1 729 306	1 740 997	1 782 082

CONSOLIDATED RESOURCES ALLOCATION

R'000	Audited Outcomes		Estimated Expenditure		MTEF Expenditure Estimates		
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Economic classification							
Compensation of employees	819	795	786	753	828	828	828
Goods and Services	520	440	432	418	622	624	652
Total expenses:	1 339	1 235	1 218	1 171	1 450	1 452	1 480
Staff complement (no.)	2 287	2 542	2 583	2 569	2 575	2 588	2 596

CONSOLIDATED FINANCIAL STATEMENTS OVERVIEW

AGRICULTURAL RESEARCH COUNCIL - THREE YEAR REVIEW					
Statement of Financial Performance					
	Audited	Forecast	Budget	Budget	Budget
	2021	2022	2023	2024	2025
	R'm	R'm	R'm	R'm	R'm
Total Income	1 379	1 393	1 567	1 566	1 636
Parliamentary Grant	986	1 028	1 060	1 036	1 083
Baseline - Operational	881	922	950	926	968
Baseline - Capital	104	106	110	110	115
External Income	337	301	426	445	465
Other Income	56	64	81	85	88
Total expenditure	1 218	1 171	1 450	1 452	1 480
Personnel Costs	786	753	828	828	828
Operating Expenditure	256	357	556	555	580
Depreciation	78	61	66	69	72
Interest Paid	97	0	0	0	0
Net Surplus/(Deficit)	162	222	117	113	156
Capital Expenditure	(104)	(106)	(110)	(110)	(115)
Net Operational Surplus/(Deficit)	57	116	7	3	41

Statement of Financial Position					
	Audited 2020/21	Forecast 2021/22	Budgeted 2022/23	2023/24	2024/25
	R'000	R'000	R'000	R'000	R'000
ASSETS					
Current Assets	662 160	669 224	621 475	461 462	338 332
Cash and cash equivalents	502 163	516 096	505 818	356 789	238 117
Receivables	138 963	136 909	102 681	92 995	89 705
Inventories	21 033	16 219	12 975	11 678	10 510
Non-current Assets	2 031 714	2 009 517	2 204 956	2 275 252	2 313 350
Investment property	3 069	5 000	5 000	5 000	5 000
Property, plant and equipment	2 012 914	1 984 061	2 178 590	2 241 549	2 277 385
Intangible assets	15 509	20 233	21 143	28 480	30 742
Heritage assets	223	223	223	223	223
Total Assets	2 693 874	2 678 740	2 826 432	2 736 714	2 651 682
LIABILITIES					
Current Liabilities	262 012	349 571	316 937	285 575	304 812
Payables	262 012	349 571	316 937	285 575	304 812
Provisions	-	-	-	-	-
Non-current Liabilities	383 760	448 013	511 833	401 184	285 020
Employee benefits	11 228	17 228	18 003	18 813	19 660
Deferred Income: Revenue Grants	372 532	430 786	493 830	382 371	265 361
Total Liabilities	645 773	797 585	828 769	686 759	589 833
Net Assets	2 048 101	1 881 156	1 997 662	2 049 955	2 061 850

Cash Flow Statement					
	Audited 2020/2021	Forecast 2021/22	Budgeted 2022/23	2023/24	2024/25
	R'000	R'000	R'000	R'000	R'000
Receipts	1 472 215	1 513 750	1 477 443	1 448 031	1 508 080
Sales of goods and services	363 636	353 010	397 993	400 374	418 391
Grants	1 086 887	1 141 419	1 060 279	1 036 136	1 082 762
Interest received	21 666	19 210	19 104	11 462	6 877
Dividend received	26	111	69	58	49
Payments	(1 172 686)	(1 246 465)	(1 287 296)	(1 307 965)	(1 329 563)
Employee Costs	(779 454)	(806 767)	(827 995)	(827 995)	(827 995)
Suppliers	(393 135)	(439 513)	(459 292)	(479 960)	(501 558)
Interest Paid	(97)	(184)	(10)	(10)	(11)
Net Cash flows from operating activities	299 529	267 285	190 147	140 066	178 517
Purchases of property, plant and equipment	(36 367)	(165 843)	(287 935)	(289 095)	(297 189)
Proceeds from sale of properties and equipment	(6 935)	0	0	0	0
Net Cash flows from investing activities	(43 302)	(165 843)	(287 935)	(289 095)	(297 189)
Net increase(decrease) in cash and cash equivalents	256 227	101 443	(97 787)	(149 029)	(118 672)
Cash and cash equivalents at the beginning of the period	245 936	502 163	603 606	505 818	356 789
Cash and cash equivalents at the end of the period	502 163	603 606	505 818	356 789	238 117

7. MATERIALITY FRAMEWORK

For the purposes of materiality defined in sections 50(1), 55(2) and 66(1) of the Public Finance Management Act³¹, the ARC has developed and agreed upon a framework of acceptable levels of materiality and significance with the relevant Executive Authority.

ARC MATERIALITY AND SIGNIFICANCE FRAMEWORK

PFMA SECTION	QUANTITATIVE (AMOUNT)	QUANTITATIVE (NATURE)
SECTION 50		
FIDUCIARY DUTIES OF ACCOUNTING AUTHORITIES		
(1) The accounting authority for a public entity must –(c) on request, disclose to the executive authority responsible for that public entity or other legislature to which the public entity is accountable, all material facts, including those reasonably discoverable, which in any way may influence the decisions or actions of the executive authority or that legislature.	Any fact discovered of which the amount exceeds the materiality figure (R10 million) used in the preparation of the Annual Financial Statements.	<ol style="list-style-type: none"> Any item or event of which specific disclosure is required by legislation/law, King Report IV or GRAP. Any fact discovered of which its omission or misstatement, in the Council's opinion, could influence the decisions or actions of the executive authority or legislature.
SECTION 55		
ANNUAL REPORT AND FINANCIAL STATEMENTS		
(2) The annual report and financial Statements referred to in subsection (1)(d) must- <ol style="list-style-type: none"> fairly present the state of affairs of the public entity, its business, its financial results, its performance against pre-determined objectives and its financial position as the end of the financial year concerned; include particulars of: <ol style="list-style-type: none"> Any material losses through criminal conduct and any irregular expenditure and fruitless and wasteful expenditure that occurred during the financial year. 	-	-
	<ol style="list-style-type: none"> Losses through criminal conduct – any loss identified. Losses through any expenditure - if the combined total exceeds the materiality figure used in the preparation of the Annual Financial Statements. Any irregular, fruitless, and wasteful expenditure, defined by the PFMA, will be reported. 	Any identified loss through criminal, reckless, or negligent conduct.

³¹ Available: <http://www.treasury.gov.za/legislation/PFMA/act.pdf>

PFMA SECTION	QUANTITATIVE (AMOUNT)	QUANTITATIVE (NATURE)
ii. any criminal or disciplinary steps taken as consequence of such losses or irregular expenditure or fruitless and wasteful expenditure; iii. any losses recovered or written off; iv. any financial assistance received from the state and commitments made by the state on its behalf; and v. any other matters that may be prescribed.	-	-
SECTION 54		
INFORMATION TO BE SUBMITTED BY ACCOUNTING AUTHORITIES		
(2) Before a public entity concludes any of the following transactions, the accounting authority for the public entity must promptly and in writing inform the relevant treasury of the transaction and submit relevant particulars of the transaction to its executive authority for approval of the transaction:		
(b) participation in a significant partnership, trust, unincorporated joint venture or similar arrangement;	Not applicable	Any participation, outside of the approved strategic plan and budget.
(c) acquisition or disposal of a significant shareholding in a company; (d) acquisition or disposal of a significant asset; and	The Significance level for the ARC is, based on the FY2022/23 budget is set at: Acquisition: More than R56 mil Disposal: Movable Assets the combined value of which exceeds R56 million.	Any acquisition or disposal, outside of the approved strategic plan and budget 1) Any asset that would increase or decrease the overall operation functions of the Council, outside of the approved strategic plan and budget. 2) Disposal of the major part of the assets of the Council.
e) Commencement or cessation of significant business activity.	Not applicable	Any business activity that would increase or decrease the overall operational functions of the Council, outside of the approved strategic plan and budget.
SECTION 66		
RESTRICTIONS ON BORROWING, GUARANTEES AND OTHER COMMITMENTS		
(1) An institution to which this Act applies may not borrow money or issue a guarantee, indemnity or security, or enter into any other transaction that binds or may bind that institution or the Revenue fund to any future financial commitment, unless such borrowing, guarantee, indemnity, security or other transaction – (a) Is authorised by this Act, and (b) In the case of public entities, is also authorised by other legislation not in conflict with this Act.	All borrowings contemplated by the Agricultural Research Council, has to be pre-authorized by the National Treasury regardless of the amount.	All borrowings contemplated by the Agricultural Research Council, has to be pre-authorized by the National Treasury regardless of the nature.

The Significance and Materiality calculation is based on the FY2022/23 budgeted figures and on the following parameters:

BASIS	ACCEPTABLE % RANGE	MINIMUM	MAXIMUM
Total Revenue	0.5% – 1%	7 834 356	15 668 713
Profit after tax	2% - 5%	133 721	334 303
Total assets	1% - 2%	28 264 315	56 528 631

8. UPDATED KEY RISKS

The table below reflects the key risks identified by the ARC as at January 2020, and aligned to the Strategic Plan for 2020-2025, including risk mitigation measures.

OUTCOME	KEY RISK	RISK MITIGATION
1. Increased agricultural production and productivity	• Natural disaster (e.g. drought)	• Drought mitigation strategies
	• Government continued funding	• Continue lobbying shareholder
	• Lack of interest by farmers to join Improvement Schemes	• Effective marketing of Improvement Schemes
	• Lack of regulations on testing of agricultural equipment's e.g. tractor	• Continue lobbying, • Enforcement of regulations
2. Sustainable ecosystems and natural resources	• Intentional drive from the industry to make ARC crop science irrelevant to the sector	• MoU's and agreements • Improved marketing of ARC capabilities, solutions and research results. • Joint projects • Sharing of strategic direction
	• Competition for agricultural land	• Supply data and information to decision support systems
	• Insufficient regulations to conserve/ protect valuable ecosystems	• Optimal enforcement of regulations
3. Improved nutritional value, quality and safety of agricultural products	• Lack of infrastructure e.g. Natural Resource Information System	• Continue lobbying • Additional funding
	• Shortage critical and scarce skills	• Succession planning • In-house training • Headhunting
4. A skilled and capable agriculture sector	• Accreditation of laboratories	• Obtain accreditation
	• Lack of focussed funding	• Liaise with key stakeholders/partners • Sourcing of external funding
	• Lack of funding	• Strategic partnerships • Continue lobbying departments
5. Enhanced resilience of agriculture	• Shortage of mentors	• In-house training of mentors / collaboration with universities
	• Availability of suitable research facilities	• Rehabilitate the research facilities
	• Lag time for patents in animal research	• Apply advance biotechnology
	• Policy / legislation restriction -	• Continue lobbying
	• Lack of competitive advantage in offering engineering and specialised solutions to the sector	• Talent management strategy • MoU's with relevant partner institutions
6. A high performing and sustainable organisation	• Lack of registration for GMP compliant vaccine	• Continue lobbying with relevant authorities • Construction of new vaccine factory
	• New generation vaccine on the market, reduce sales and production	• Production of new generation vaccines
	• Availability of reagents	• Availability of funds to procure reagents
	• Skilled and competent staff	• Staff training (Formal and Informal)
	• Disruption in power supply	• Procurement and maintenance of standby generators
6. A high performing and sustainable organisation	• Lack of government support for maintaining agricultural weather services	• Obtain funding • Continuous lobbying
	• Lack of structured succession planning process	• Succession planning policy • Succession plans from each campus • Skills transfer interventions (formal and informal) • Draft mentoring and coaching policy
	• Loss of highly skilled personnel (scarce and critical skills)	• Retention policy • Remuneration policy • Formal and informal training • Competency framework
	• Inability to perform optimally within the ARC procurement process	• Finance and supply chain management policies to be improved • Procurement procedures to be reviewed • Fraud and Prevention Plan/ Policy
	• Non-recognition of income across ARC Campuses	• Finance policies • Income contract register • Debtor age analysis per campus
6. A high performing and sustainable organisation	• Paralysis within core business as a result of constrained (inefficient/ inflexible/ dysfunctional/ ineffective) business support processes	• Improve policies and procedures guiding business processes

Aligned to the strategic outcomes of the ARC, the following annual top ten strategic risks have been developed, assessed, and ranked. Internal controls and actions to mitigate these risks will be formulated by management, with a view to improving the chances of the organisation meeting its commitments in the 2022/23 reporting period.

The detailed Agricultural Research Council Risk Register shall be reviewed and monitored quarterly before it is presented at the EMC and the Audit and Risk Committee meetings.

TOP 10 STRATEGIC RISK EXPOSURES

RANKING	STRATEGIC RISK EXPOSURES
1	Funding constraints to fully meet the ARC mandate, which incorporates aspects of: <ul style="list-style-type: none"> • Dwindling PG allocation (impact on human capital, in-sourcing and research outputs) • Lack of National Assets funding • Inability to generate adequate external income (e.g. coordinated revenue generated approach) or • Funding from commodity organisations at risk (i.e. withdrawn / not continuing)
2	Inability to deliver FMD vaccines in 2022/23 FY due to delays in the construction of the FMD Vaccine Facility
3	Ageing and obsolete equipment and infrastructure across the ARC which may lead to a compromised R&D output and reduce our competitive advantage in the sector
4	Challenges with respect to: <ul style="list-style-type: none"> • the recruitment and retention of suitably qualified and experienced personnel in critical and scarce skill areas • succession planning • the loss of high level qualified and experienced personnel • inability to replace essential support staff
5	Long turn-around times in respect of ARC business processes that are caused by delays in: <ul style="list-style-type: none"> • SCM process (e.g. Long outstanding Open Purchase Orders, turn-around times, ERP system improvements i.r.o good received, supplier registration - portal) • Conclusion of contracts (lengthy approval processes) • IP management process • Recruitment process
6	Sub-optimal leveraging of ARC assets, property and facilities, as outlined in the Asset Management Plan
7	Loss of credibility and revenue as a result of a unstandardised quality management system for ARC laboratories providing services
8	ARC IP infringement and loss
9	Non-compliance to key legislation: <ul style="list-style-type: none"> • Insufficient centralised process to co-ordinate legislative compliance, across the organisation. • environmental compliance as per assessment
10	Negative impact of the Coronavirus on ARC business across respective Campuses

9. PUBLIC ENTITIES

The Agricultural Research Council does not have any Public Entities.

10. INFRASTRUCTURE PROJECTS

FOOT AND MOUTH DISEASE (FMD) VACCINE PRODUCTION FACILITY

Due to a variety of reasons, South Africa's only Foot and Mouth Disease (FMD) vaccine production facility at the ARC Onderstepoort Campus ceased functioning in December 2005. Lack of FMD vaccine production at this strategic national facility has increased the risk for the effective management of potential disease outbreaks. In the interim, South Africa has relied on procurement of vaccine from the Botswana Vaccine Institute (BVI). Foot-and-Mouth disease ("FMD") is listed as a controlled disease in South Africa in terms of the Animal Disease Act 35 of 1984³². FMD is a highly contagious and acute viral affliction of domestic and wild cloven-hoofed animals. The cost of FMD is based on the stringent control measures needed to contain this highly infectious disease and the impact on production the disease has. The direct losses incurred due to an outbreak of the disease include the capital value of herds should culling processes be implemented as part of the control programme, loss of production and associated income and an increase in production costs as a result of additional on-farm quarantine restrictions. However, by far the greatest costs associated with FMD are the trade restrictions placed on an area with a confirmed outbreak, where the impact can go far beyond the livestock industry traditionally linked with FMD. Most recent estimates of the total loss in export revenue, including losses incurred by upstream and downstream sectors linked to livestock production, exceed R6.4 billion measured against the 2016 red meat export value.

To mitigate the risk, the ARC developed a Business Plan outlining its intentions to construct a new state-of-the-art FMD vaccine production facility. The business plan was presented to National Treasury on 01 March 2010, outlining the ARC's economic and business cases in terms of the National Treasury guidelines entitled: "2010 MTEF: Budgeting for Infrastructure and Capital Expenditure Guidelines". The document was endorsed by the Minister of Agriculture and funded by the National Treasury over the 2011/2012 financial year. In April 2019, the National Treasury allocated the shortfall of R 400 million of additional funding to the ARC in support of the FMD vaccine factory. The funds will be released over the current MTEF. This will allow the ARC to proceed with the construction of the facility.

For the project to be properly implemented and brought to its conclusion, the following processes have to be implemented:

- a. Construction related firms such as engineering, architectural, electrical, mechanical and construction to design plan and implement the construction of the new FMD factory will be contracted. A Project Manager to manage the construction has already been recruited. To comply with applicable legislation and regulations the ARC has to proceed with an open process to invite bids for the project from prospective construction and engineering service providers, which, because of the amounts involved, have to be approved by the Board
- b. A process engineer or expert to develop the design or layout of the infrastructure (piping, bioreactors, purifiers, centrifuges, etc.) that will be used in the manufacturing process must be appointed. A well designed production process is essential for optimisation of the factory design, particularly for obtaining qualifications for good manufacturing practice (GMP) which is required not only for export purposes but also by the South African Medicines Control Council to grant the manufacturing license for the factory.
- c. Obtain all the regulatory permits and approvals for the construction of the facility. These can be secured by the firm that get the contract to project manage the construction phase of the project.
- d. Start the construction phase of the factory. The building must have engineering features to ensure that the highest international standards are achieved and that a world-leading environment for both staff and animals is delivered.

³² Available: <https://www.gov.za/documents/animal-diseases-act-12-mar-2015-1128#>

The development of a modern FMD production facility would be an international showcase of SA's capabilities and foresight and the expected period to produce the first validated vaccines is:

PHASE	ACTIVITIES
Design phase (24 months – 2021/2022)	Appointment of process engineer Appointment of company with multidisciplinary team. Conduct an Environmental Impact Assessment (EIA) Design the process and plant layout Comply with municipal regulations and by-laws Comply with Health regulations (Act 36 ³³) Design the building with detail drawings Draw up the bill of quantities
Construction (24 months)	Ordering of specialised equipment Construction of building according to specifications Issue of certificates of completion (civil, electrical, fire, health, etc.) Commissioning
Validation (18 months)	Foot and mouth disease vaccine trials Inspection
Full commercial Production	The first commercially available vaccines will only be available in 4.5 to 5 years from the start of the process.

As this is a specialised building, highly skilled external consulting engineers and other specialists will need to be appointed to develop a concept layout and detailed design of the manufacturing process. They will consult with the Process Engineer and the Vaccine production team in preparation for the construction of the new facility, with accurate user specification requirements, detailed design diagrams, and cost estimates. A full-scale production facility could cost in the order of R600 000 000 - R700 000 000 (excluding VAT).

ICT RELATED PROJECTS

The Datacentre and Disaster Recovery site of the ARC provides critical services to the ARC in as far the capability to host critical applications, software and to ensure that critical information and data assets generated by the ARC is safeguarded. In 2012, ARC decided to upgrade the old storage HP hardware in its Data Centres to accommodate the deployment of modern applications and systems such as Microsoft operating system, SharePoint, Exchange, Active directory, Lync, Microsoft Dynamics and MS SQL. However, over the years, the infrastructure in these environments has become insufficient and outdated to handle growing information and data needs of the ARC. In addition, there are various issues identified that exposes the ARC to risks associated with business continuity and ability to remain competitive as a research institution. These includes amongst others:

- a) The current disaster recovery (DR) is non-functional due to the limitations on connectivity and the hardware equipment
- b) Most of the hardware used by the ARC has reached end of life (Obsolete)
- c) The ARC is running two infrastructure platforms (i.e. Hyper-V and VMware) and thus making operations of the data centre costly
- d) There is not enough storage to accommodate for a fully flashed DR and Production Environment
- e) Some of the equipment are not covered by the support contract nor warranty, which present a huge risk to the business (i.e. equipment for the Intergis systems)
- f) The current data centre environment is not built in line with the best practices, which renders the ICT department vulnerable to provide business continuity in case of disaster
- g) The current aging infrastructure prohibit the ICT department to cope with the current and growing business needs as the ICT infrastructure is not scalable

³³ Fertilizers, Farm Feeds, Seeds and Remedies Act 36 of 1947. Available: <https://www.gov.za/documents/fertilizers-farm-feeds-seeds-and-remedies-act-28-may-2015-1101>

- h) The current backup capacity is inadequate; and as a result, the backup turnaround time is prolonged and poses risk to the business

ICT decided to embark on process to refresh the ICT Infrastructure to mitigate the above issues.

The ICT Infrastructure refresh process will benefit ARC in the following way:

- a) Increase overall productivity by providing the appropriate platform to handle Corporate Applications (i.e. ERP solutions, SharePoint, Email and Intergis)
- b) Reduce costs for provisioning and supporting services
- c) Provide for a better customer experience
- d) Minimise the organisational risk of running end-of-life hardware
- e) Improve ARC capability to deal with risk associated with business continuity and information security

CONSOLIDATION OF ARC CAMPUSES

Increased efficient and optimal use of ARC land, buildings and infrastructure is key to ensure that operational costs are contained, and ARC income increasingly focused on core R&D activities. Consolidation of campuses will increase the optimal use of land, buildings and infrastructure, increase the success rate of shared services models for the ARC support services, decrease the fixed costs of the ARC associated with maintenance, security costs and other fixed costs associated with the various facilities.

In this regard the feasibility study to consolidate Pretoria based campuses was completed in 2021/22 financial year and the findings of the study was that it is indeed feasible to implement the model. The 2022/23 plans include finalisation of detailed business case and funding plan for the phased implementation of the plan as indicated in the ARC strategic and ARC turn around and financial sustainability plan.

11. PUBLIC-PRIVATE PARTNERSHIP

Not applicable to the Agricultural Research Council at this stage.

PART D: TECHNICAL INDICATOR DESCRIPTIONS

OUTCOME 1: INCREASED AGRICULTURAL PRODUCTION AND PRODUCTIVITY

Output	Crop technologies developed and information dissemination
Output Indicator 1.1.1	Number of cultivars registered
Definition	Makes reference to the number of plant cultivars registered by DALRRD Registrar, as per the Plant Breeders Rights Act and variety listings. This includes ARC cultivars that are registered globally as per international standards. A cultivar refers to a plant variety that has been produced in cultivation by breeding
Source of data	Certificate of Plant Breeders Right and/or signed letter for notifications of granting of varietal listings issued to the ARC
Method of Calculation / Assessment	Simple count of the Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listings issued to the ARC
Means of verification	Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listings issued to the ARC
Assumptions	The adoption of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Crop technologies developed and information dissemination
Output Indicator 1.1.2	Number of field trials
Definition	The ARC undertakes various R&D field trials in order to, amongst others; determine the yield potential under certain farming environments/conditions on various farms across South Africa. Field trials occur when the ARC plant cultivars to conduct and undertake research trials to determine the yield and nutritional potential among other things the climatic requirements under certain farming environments/conditions on various farms across South Africa
Source of data	All Global Positioning System (GPS) coordinates and/or a technical report (1 per site) for each of the field trials attributed to ARC. Difference in the form of verifiable evidence such as dates and time, type of variety, etc. is required for trials that have similar GPS coordinates but different trials
Method of Calculation / Assessment	Simple count of all GPS coordinates reflecting the exact location or number of reports of field trials attributed to ARC with verifiable evidence such as dates and time, type of variety for trials that have similar GPS coordinates but different trials
Means of verification	Global Positioning System (GPS) coordinates for each trial/s or a technical report with verifiable evidence such as dates and time, type of variety, photos etc. for trials that have similar GPS coordinates but different trials
Assumptions	The planting of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS

Output	Crop technologies developed and information dissemination
Output Indicator 1.1.3	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture commodity application, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research output report for distribution to

	stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/ or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS

Output	Crop technologies developed and information dissemination
Output Indicator 1.1.4	Number of cultivar evaluations
Definition	Evaluation of how different commercial cultivars perform in different agro-ecological zones
Source of data	Technical reports, ARC websites and Grain SA magazine including other commodity-based magazines such as CHIPS, Fruit-SA, Red Meat Producers Organisation, NuFarmer, Farmers weekly, SA Fruit Journal, Harvest SA, AgriAbout, Farmbiz (AgriOrbit), Agriring Bulletin, SAPPA, IWYP, SAMAC, SAAGA
Method of Calculation / Assessment	Number of crop/s cultivar evaluations for which ARC conducts national cultivar trials
Means of verification	Technical reports, ARC websites and or Grain SA magazine including other commodity based magazines such as CHIPS, Fruit-SA, Red Meat Producers Organisation, NuFarmer, Farmers weekly, SA Fruit Journal, Harvest SA, AgriAbout, Farmbiz (AgriOrbit), Agriring Bulletin, SAPPA, IWYP, SAMAC, SAAGA
Assumptions	Commercial cultivars are submitted by different seed companies for evaluation
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Animal improvement services
Output Indicator 1.2.1	Number of farmers participating in each of the animal improvement schemes
Definition	The ARC is the custodian of the National Animal Recording and Improvement Schemes (NARIS) for beef, dairy and smallstock, which aims to provide the livestock industry with professional and internationally recognised recording and genetic improvement services
Source of data	All farmers participating in NARIS, as captured in INTERGIS
Method of Calculation / Assessment	Simple count of all livestock farmers (beef, dairy, smallstock), participating in National Animal Improvement Scheme (dairy, beef and smallstock, e.g. Phase A, B, C, etc.) as captured in INTERGIS.
Means of verification	NARIS, as captured in INTERGIS report
Assumptions	The availability of farmers to register and participate in the improvement schemes and associated funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Animal improvement services
Output Indicator 1.2.2	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture commodity application, intended for distribution and use by farmers, extensions officers, commodity groups/organisations and other interested parties. The ARC employees writes various research outputs report for distribution to

	stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial, and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

OUTCOME 2: SUSTAINABLE ECOSYSTEMS AND NATURAL RESOURCES

Output	Natural Resource Management
Output Indicator 2.1.1	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture sustainability ecosystems and natural resources status intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research output report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports developed and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial, and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Natural Resource Management
Output Indicator 2.1.2	Number of field trials
Definition	The ARC undertakes various R&D field trials, in order to support agriculture production for optimal conservation and utilisation of natural resources. Field trials occur when the ARC plant cultivars to conduct and undertake research trials to determine the yield and nutritional potential among other things the climatic requirements under certain farming environments/conditions on various farms across South Africa
Source of data	All Global Positioning System (GPS) coordinates and/or a technical report (1 per site) for each of the field trials attributed to ARC. Difference in the form of verifiable evidence such as dates and time, type of variety etc. is required for trials that have similar GPS coordinates but different trials
Method of Calculation / Assessment	Simple count of all GPS coordinates reflecting the exact location or number of reports of field trials attributed to ARC with verifiable evidence such as dates and time, type of variety for trials that have similar GPS coordinates but different trials
Means of verification	Global Positioning System (GPS) coordinates for each trial/s or a technical report with verifiable evidence such as dates and time, type of variety, photos etc. for trials that have similar GPS coordinates but different trials

Assumptions	The planting of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Natural Resource Management
Output Indicator 2.1.3	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to natural resources management
Source of data	All invoices and/or job card numbers issued in respect of scientific services relating to natural resources management, i.e. diagnostic and analytical services, consultation services, rendered per batch of samples. The invoices and/or job card number vary across campuses. For some campuses, a general release permit is applicable
Method of Calculation / Assessment	Simple count of all invoices and/or job card numbers as well as general release permits correlating to scientific services rendered, i.e. diagnostic and analytical, consultations
Means of verification	All invoices and/or job card numbers issued in respect of scientific services relating to natural resources management, i.e. diagnostic and analytical, consultation services rendered including a report and or invoice of consultations services
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS

Output	Natural Resource Management
Output Indicator 2.1.4	Number of biological control solutions developed
Definition	Pest control products developed based on biological organisms
Source of data	Registration under the Fertilizers, Farm Feeds, Seeds and Remedies Act 36 of 1947 ³⁴ (L number)
Method of Calculation / Assessment	Counting the number of applications for registrations submitted
Means of verification	Acknowledgment of receipt of applications for Registration of product under the Fertilizers, Farm Feeds, Seeds and Remedies Act 36 of 1947
Assumptions	Availability of resources from the Registrar to complete the evaluation process
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Soil and Water Science
Output Indicator 2.2.1	Number of samples analysed for soil health and/or water quality
Definition	This refers to investigation of the presence of organisms in soil and plant material samples and water quality. Including number of samples and water quality analysis for the presence, absence, diversity, frequency, and/or distribution of target organisms in soil, plant material and water
Source of data	Client report of results indicating the number samples (soil, plant material and water) analysed
Method of Calculation / Assessment	Counting of number of reports of results of sample analysed. Each batch with number of samples per separate report. Counting the number of samples (soil, plant material, or water) submitted for various analyses as captured in the Client Report
Means of verification	Client report containing results of samples (soil, plant material, and water) analysed

³⁴ Available: <https://www.gov.za/documents/fertilizers-farm-feeds-seeds-and-remedies-act-28-may-2015-1101#>

Assumptions	The ability of participants to request/demand services from the ARC
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: Animal Sciences

Output	Soil and Water Science
Output Indicator 2.2.2	Number of scientific solutions
Definition	This refers to new solutions developed with the aim to commercialise. Including research products, services and processes aimed at solving problems faced by stakeholders within the sector such as farmers, commodity organisations, general public, etc.
Source of data	Registration number allocated by the registrar
Method of Calculation / Assessment	Counting number of solutions developed
Means of verification	Report in the form of certificate or other means such as a letter that is applicable to the registration authority
Assumptions	Quick turnaround time with respect to registration of solutions
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Soil and Water Science
Output Indicator 2.2.3	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture sustainability ecosystems and natural resources status, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research output report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS Group Executive: Animal Sciences

Output	Soil and Water Science
Output Indicator 2.2.4	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to soil and water science
Source of data	Report and/or invoice and/or job card numbers per each sample analysed and/or services rendered (submitted) for clients relating to soil and water science. The invoices and/or job card varies across campuses. For some campuses, a general release permit is applicable
Method of Calculation / Assessment	Counting number of reports and/or invoice and/or job card numbers per each samples analysed and/or services rendered as per request by clients

Means of verification	Report and/or invoice and/or job card numbers per each number of samples analysed and/or services rendered as per request by clients including a report and/or invoice of consultations services relating to soil and water science
Assumptions	Functional infrastructure and equipment
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year to Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Weed Science
Output Indicator 2.3.1	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture sustainability ecosystems and natural resources status, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research output report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Weed Science
Output Indicator 2.3.2	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to weed science
Source of data	Technical/client reports developed and/or invoice issued and/or job card numbers and/or general release permit relating to weed science
Method of Calculation / Assessment	Simple count of the technical/client reports developed and/or invoice issued and/or job card numbers and/or general released applications approved by DALRRD
Means of verification	Technical/client reports developed and/or invoice issued and/or job card numbers and/or general release permit including a report and/or invoice of consultations services relating to weed science
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Ecosystem Services
Output Indicator 2.4.1	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture sustainability ecosystems and natural resources status, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research output report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients.

	This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: RIS

Output	Ecosystem Services
Output Indicator 2.4.2	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to ecosystem services
Source of data	Report and/or invoice and/or job card numbers per each sample analysed and/or services rendered (submitted) for clients relating to ecosystem services. The invoices and/or job card varies across campuses. For some campuses, a general release permit is applicable
Method of Calculation / Assessment	Counting number of reports and/or invoice and/or job card numbers per each samples analysed and/or services rendered as per request by clients
Means of verification	Report and/or invoice and/or job card numbers per each number of samples analysed and/or services rendered as per request by clients including a report and/or invoice of consultations services relating to ecosystem services
Assumptions	Functional infrastructure and equipment
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year to Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: RIS

OUTCOME 3: IMPROVED NUTRITIONAL VALUE, QUALITY AND SAFETY OF AGRICULTURAL PRODUCTS

Output	Broadening the food base
Output Indicator 3.1.1	Number of cultivars registered
Definition	Makes reference to the number of plant cultivars registered by DALRRD Registrar, as per the Plant Breeders Rights Act and variety listing for canned peaches, dried fruit and orange-fleshed sweet potato. A cultivar refers to a plant variety that has been produced in cultivation by breeding
Source of data	Certificate of Plant Breeder's Right and/or signed letter for notifications of granting of varietal listings issued to the ARC
Method of Calculation / Assessment	Simple count of the Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listing issued to the ARC
Means of verification	Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listing issued to the ARC
Assumptions	The adoption of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY

Indicator Responsibility	Group Executive: Crop Sciences
Output	Broadening the food base
Output Indicator 3.1.2	Number of field trials
Definition	The ARC undertakes various R&D field trials in order to, amongst others; determine the yield potential under certain farming environments/conditions on various farms across South Africa. Field trials occur when the ARC plant cultivars to conduct and undertake research trials to determine the yield and nutritional potential among other things the climatic requirements under certain farming environments/conditions on various farms across South Africa
Source of data	All Global Positioning System (GPS) coordinates and/or a technical report (1 per site) for each of the field trials attributed to ARC. Difference in the form of verifiable evidence such as dates and time, type of variety etc. is required for trials that have similar GPS coordinates but different trials
Method of Calculation / Assessment	Simple count of all GPS coordinates reflecting the exact location or number of reports of field trials attributed to ARC with verifiable evidence such as dates and time, type of variety for trials that have similar GPS coordinates but different trials
Means of verification	Global Positioning System (GPS) coordinates for each trial/s or a technical report with verifiable evidence such as dates and time, type of variety, photos etc. for trials that have similar GPS coordinates but different trials
Assumptions	The planting of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Broadening the food base
Output Indicator 3.1.3	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture commodity application, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research outputs report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Broadening the food base
Output Indicator 3.1.4	Number of cultivar evaluations
Definition	Evaluation of how different commercial cultivars perform in different agro-ecological zones for improved nutritional value
Source of data	Technical reports, ARC websites and Grain SA magazine such as CHIPS, Fruit-SA, Red Meat Producers Organisation, NuFarmer, Farmers weekly, SA Fruit Journal, Harvest SA, AgriAbout, Farmbiz (AgriOrbit), Agriring Bulletin, SAPPA, IWYP, SAMAC, SAAGA
Method of Calculation / Assessment	Number of crops for which ARC conducts national cultivar trials

Means of verification	Technical reports, ARC websites and Grain SA magazine including other commodity based magazines such as CHIPS, Fruit-SA, Red Meat Producers Organisation, NuFarmer, Farmers weekly, SA Fruit Journal, Harvest SA, AgriAbout, Farmbiz (AgriOrbit), Agriring Bulletin, SAPPA, IWYP, SAMAC, SAAGA
Assumptions	Commercial cultivars are submitted by different seed companies for evaluation
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Broadening the food base
Output Indicator 3.1.5	Number of new products developed
Definition	This refers to new products developed for the sector and farming communities
Source of data	Report of new product developed
Method of Calculation / Assessment	Counting of reports
Means of verification	Report of new product developed
Assumptions	Functional infrastructure and equipment
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Broadening the food base
Output Indicator 3.1.6	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to broadening the food base
Source of data	Report and/or invoice and/or job card numbers per each sample analysed and/or services rendered (submitted) for clients relating to broadening the food base. The invoices and/or job card varies across campuses. For some campuses, a general release permit is applicable
Method of Calculation / Assessment	Counting number of reports and/or invoice and/or job card numbers per each samples analysed and/or services rendered as per request by clients
Means of verification	Report and/or invoice and/or job card numbers per each number of samples analysed and/or services rendered as per request by clients including a report and/or invoice of consultations services relating to broadening the food base
Assumptions	Functional infrastructure and equipment
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences

Output	Post-harvest handling and agro-processing
Output Indicator 3.2.1	Number of cultivars developed with improved shelf life
Definition	Makes reference to the number of nutrient dense plant cultivars registered by the DALRRD Registrar, as per the Plant Breeders Rights Act and variety listing. A cultivar refers to a plant variety that has been produced in cultivation by breeding. The registered commodity with changes with respect to the length of storage time without becoming unfit for use, consumption, or sale.
Source of data	Certificate of Plant Breeders Right and/or signed letter for notifications of granting of varietal listing issued to the ARC
Method of Calculation / Assessment	Simple count of the Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listing issued to the ARC
Means of verification	Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listing issued to the ARC

Assumptions	The adoption of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Post-harvest handling and agro-processing
Output Indicator 3.2.2	Number of new post-harvest solutions developed
Definition	Development of new technologies that would contribute to food safety, quality and improved efficiencies in the agriculture value chain
Source of data	Technology evaluation report registered in the ARC Commercialisation Office
Method of Calculation / Assessment	Simple count of the number of technologies developed
Means of verification	Technology evaluation report registered in the ARC Commercialisation Office
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Post-harvest handling and agro-processing
Output Indicator 3.2.3	Number of solutions for controlled atmosphere
Definition	Solutions for controlled atmosphere
Source of data	Report of solutions for controlled atmosphere
Method of Calculation / Assessment	Counting of solutions for controlled atmosphere
Means of verification	Report of solutions for controlled atmosphere
Assumptions	Availability of resources
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Post-harvest handling and agro-processing
Output Indicator 3.2.4	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to post-harvest handling and agro-processing
Source of data	All invoices and/or job card numbers issued in respect of scientific services relating to post-harvest handling and agro-processing, i.e. diagnostic and analytical services, rendered. To some extent results of samples analysed are applicable
Method of Calculation / Assessment	Simple count of all invoices and/or job card numbers correlating to all (diagnostic and analytical) scientific services rendered
Means of verification	Invoices, job card numbers, results of samples including a report and/or invoice of consultations services relating to post-harvest handling and agro-processing
Assumptions	The ability of participants to request/demand services from the ARC
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly

Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

OUTCOME 4: SKILLED AND CAPABLE AGRICULTURE SECTOR

Output	Skills development
Output Indicator 4.1.1	Number of people trained
Definition	People, including extension agents, interns, post-doctoral, experiential learners who have been trained or attended training/workshops in-person or online per each course offered by the ARC
Source of data	Signed attendance registers and/or attendance list indicating i.e. initials and surname, present, screenshots, calendar appointment, etc. as a confirmation of attendance for online training/workshops
Method of Calculation / Assessment	Simple count of the number of people trained/or who attend a workshop, as captured on attendance registers and/or electronic attendance list and/or screenshot of all attending online training/workshops
Means of verification	Signed attendance registers and/or attendance list indicating i.e. initials and surname, present, screenshots, calendar appointment, etc. as a confirmation of attendance for online training/workshops
Assumptions	Availability of people to be trained
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: RIS

Output	Skills development
Output Indicator 4.1.2	Number of postgraduate students supported by ARC
Definition	Total number of supported (supervised) students graduating with postgraduate degrees (Masters and Doctoral)
Source of data	Certificates/Letter of confirmation of degree from HEI/Front cover copy of dissertation or thesis
Method of Calculation / Assessment	Simple count of number of students eligible to graduate and/or who have completed Master's and Doctoral degree studies
Means of verification	Certificates and/or a Letter of confirmation of degree from HEI
Assumptions	Availability of students to be trained
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Impact & Partnerships Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: RIS

Output	Technology Transfer
Output Indicator 4.2.1	Number of technologies/IP developed/registered
Definition	Makes reference to the number of ARC technologies registered such as patents registered, plant breeder's rights registered, trademarks registered and gene constructs.. It also includes models and prototypes (including Decision Support Systems e.g. drought monitoring system, fire monitoring system, early warning system etc.) developed
Source of data	Report on agricultural intellectual property registered by the ARC, as well as prototypes/models developed or certificate/ proof of registration
Method of Calculation / Assessment	Simple count of the number of technologies registered
Means of verification	Report on agricultural intellectual property registered by the ARC and/or certificate of confirmation and/or proof of registration i.e. a letter
Assumptions	Assuming that financial and human capital will be available, suitable climatic conditions for farming, enabling policies and regulations and stakeholder mobilisation and partnerships

Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS

Output	Technology Transfer
Output Indicator 4.2.2	Number of enterprises supported
Definition	Support given to enterprises within the sector, public and/or farming communities
Source of data	Report of support given to enterprises within the sector, public and/or farming communities
Method of Calculation / Assessment	Counting the support given to enterprises as contained in the report
Means of verification	Report of support given to enterprises within the sector, public and/or farming communities
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Technology Transfer
Output Indicator 4.2.3	Number of technologies transferred under licence
Definition	Makes reference to the number of ARC developed technologies that have been transferred under licence agreements. To indicate the number of ARC developed technologies that have been transferred to third parties, under a licence agreement
Source of data	Number of technologies transferred under licence
Method of Calculation / Assessment	Simple count of the number of technologies transferred under licence agreements, entered into with third parties. Licence agreements may include sub-licences issued across territories
Means of verification	Licence agreements signed, Addendums signed
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Impact and Partnerships

Output	Smallholder farmer supported
Output Indicator 4.3.1	Number of farmers trained
Definition	Farmers who have been trained or attended training/workshops in-person per each module offered by the ARC
Source of data	Signed attendance registers and/or attendance list indicating, i.e. initials and surname, present, screenshots, calendar appointment, etc. as a confirmation of attendance for online trainings
Method of Calculation / Assessment	Simple count of the number of people trained/or who attend a workshop, as captured on attendance registers and/or electronic attendance list
Means of verification	Signed attendance registers and/or attendance list indicating, i.e. initials and surname, present, screenshots, calendar appointment, etc. as a confirmation of attendance for online trainings
Assumptions	Availability of people to be trained
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences

Output	Smallholder farmer supported
Output Indicator 4.3.2	Number of technical assessments for commercial readiness
Definition	Assessment of farmers for commercial readiness with respect to each commodity
Source of data	Commercial readiness report
Method of Calculation / Assessment	Counting number of technical assessment
Means of verification	Commercial readiness report
Assumptions	Willingness of farmers to undergo the process
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Smallholder farmer supported
Output Indicator 4.3.3	Number of smallholder farmers participating in KyD
Definition	The ARC is the custodian of the KyD (Kaonafatso ya Dikgomo) animal improvement scheme, which aims to develop rural communities by accelerating the participation of smallholder livestock farmers into mainstream industries. A smallholder farmer refers to an individual or a business entity undertaking farming for the purpose of household consumption and deriving a source of income from agriculture, forestry and activities along the value chain
Source of data	All smallholder farmers participating in the KyD scheme, as captured in INTERGIS
Method of Calculation / Assessment	Simple count of smallholder farmers, participating in KyD scheme, as captured in INTERGIS
Means of verification	INTERGIS report
Assumptions	Farmers willingness to participate in the scheme
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Smallholder farmer supported
Output Indicator 4.3.4	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to smallholder farmer support services
Source of data	Report per each services rendered (submitted) relating to smallholder farmer support
Method of Calculation / Assessment	Counting number of test reports for services rendered including advisory services, analytical, consultation services issued
Means of verification	Report per each number of test / samples for services rendered including a report and/or invoice of consultations services relating to smallholder farmer support
Assumptions	Functional infrastructure and equipment
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Smallholder farmer supported
Output Indicator 4.3.5	Number of farmer field days
Definition	The number of farmer field (knowledge exchange) days held or involving the ARC.
Source of data	Front page of field day report, attendance registers and a copy of programme of the event
Method of Calculation / Assessment	Simple count of the number of farmer field days held
Means of verification	Front page of field day report, attendance registers and a copy of programme of the event
Assumptions	Functional infrastructure and equipment and availability of funding

Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: RIS
Output	Farmer support
Output Indicator 4.4.1	Number of farm assessments
Definition	Assessment of the status of farms and capacity of farmer with respect to each commodity
Source of data	Farm assessment report
Method of Calculation / Assessment	Counting number of farm assessment
Means of verification	Farm assessment report
Assumptions	Data will be made available
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: Impact and Partnerships

Output	Farmer support
Output Indicator 4.4.2	Number of farmers supported
Definition	The number of farmers supported through the rendering of scientific services
Source of data	All invoices issued/site visit sheets or reports/job card numbers linked to services rendered at National, Provincial and Local level farmer projects
Method of Calculation / Assessment	Simple count of all invoices issued/number of farmers engaged, as contained on site visit sheets or reports/job numbers linked to services rendered at National, Provincial and Local level farmer projects
Means of verification	All invoices issued/site visit sheets or reports/job card numbers linked to services rendered at National, Provincial and Local level farmer projects
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS

Output	Farmer support
Output Indicator 4.4.3	Number of farmer field days
Definition	The number of farmer field days (knowledge exchanges) held or involving the ARC
Source of data	Field day report, attendance registers and a copy of programme of the event
Method of Calculation / Assessment	Simple count of the number of farmer field days held
Means of verification	Copy of front page of field day report, attendance registers and a copy of programme of the event
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: Impact and Partnerships

Output	Farmer support
Output Indicator 4.4.4	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered relating to farmer support services
Source of data	Report and/or invoice and/or job card numbers per each sample analysed and/or services rendered (submitted) relating to farmer support services. The invoices and/or job card varies across campuses. For some campuses, a general release permit is applicable
Method of Calculation / Assessment	Counting number of reports and/or invoice and/or job card per each number of test reports for services rendered including advisory services, analytical services issued
Means of verification	Report and/or invoice and/or job card per each number of test / samples issued for services rendered including a report and/or invoice of consultations services relating to farmer support services
Assumptions	Functional infrastructure and equipment
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: RIS

Output	Knowledge generated and dissemination
Output Indicator 4.5.1	Number of scientific publications
Definition	ARC research and development (R&D) outputs, i.e. scientific publications that are contained in refereed journals, chapters in books, full-length conference proceedings and theses
Source of data	All research published in reference to articles in refereed journals, chapters in books, full-length conference proceedings, and theses
Method of Calculation / Assessment	Simple count of scientific publications appearing in the defined sources
Means of verification	A copy of the front/title page of articles in refereed journals, chapters in books, full-length papers in conference proceedings and theses. Chapters in books also require a copy of the cover/title page and table of contents of the book, whilst theses also require a copy of the award letter or degree certificate
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: RIS Group Executive: Impact and Partnerships

Output	Knowledge generated and dissemination
Output Indicator 4.5.2	Number of popular publications
Definition	Number of popular publications developed, e.g. magazines, newspaper or trade publications like articles in Farmer's Weekly, etc.
Source of data	Copy of a popular publication, with date of publication
Method of Calculation / Assessment	Simple count of the number of popular publications developed (quantitative)
Means of verification	A copy of the front/ title page and/or cover of the popular article as well as the cover page of the journal issue in which it appears, with date of publication
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences

	Group Executive: RIS Group Executive: Impact and Partnerships
Output	Knowledge generated and dissemination
Output Indicator 4.5.3	Number of public awareness events
Definition	This refers to public awareness events/activities where ARC officials are participating in or contributing to in relation to agriculture and/or any other events/session affecting the agricultural sector. These include webinars, news clippings, TV and radio interviews, Forum presentations, conferences, congresses, symposia, exhibitions, e.g. NAMPO, etc.
Source of data	Report per each awareness event/activity/session ARC official participating in the form of a dialogue and discussion forum or keynote speech or oral/poster presentation or exhibition
Method of Calculation / Assessment	Simple count per each awareness event/activity/session ARC official participating in the form of a dialogue and discussion forum or keynote speech or oral/poster presentation or exhibition
Means of verification	Report per each awareness event/activity/session ARC official participating in the form of a dialogue and discussion forum or keynote speech or oral/poster presentation or exhibition
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: Crop Sciences Group Executive: RIS Group Executive: Impact and Partnerships

OUTCOME 5: ENHANCED RESILIENCE OF AGRICULTURE

Output	Climate resilient solutions
Output Indicator 5.1.1	Number of drought tolerant cultivars
Definition	Makes reference to the number of plant cultivars registered by DALRRD Registrar, as per the Plant Breeders Rights Act and variety listings for drought tolerant cultivars. A cultivar refers to a plant variety that has been produced in cultivation by breeding
Source of data	Certificate of Plant Breeders Right and/or signed letter for notifications of granting of varietal listing issued to the ARC
Method of Calculation / Assessment	Simple count of the Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listing issued to the ARC
Means of verification	Plant Breeders Right certificates and/or signed letter for notifications of granting of varietal listing issued to the ARC
Assumptions	The adoption of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Climate resilient solutions
Output Indicator 5.1.2	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered linked to climate related services
Source of data	All invoices and/or job card numbers issued in respect of scientific services, i.e. diagnostic and analytical, consultation services, rendered linked to climate related services. The invoices and job card varies across campuses. For some campuses, a general release permit is applicable
Method of Calculation / Assessment	Simple count of all invoices and/or job card numbers as well as general release permits correlating to all (diagnostic and analytical, including consultations) scientific services rendered

Means of verification	All invoices and/or job card numbers issued in respect of scientific services, i.e. diagnostic and analytical services, rendered including a report and/or invoice of consultations services linked to climate related services
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: RIS

Output	Climate resilient solutions
Output Indicator 5.1.3	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture commodity resilience, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research outputs report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	Depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences Group Executive: RIS

Output	Climate resilient solutions
Output Indicator 5.1.4	Number of field trials
Definition	The ARC undertakes various R&D field trials in order to, amongst others; determine the climatic resilience under certain farming environments/conditions on various farms across South Africa. Field trials occur when the ARC plant cultivars to conduct and undertake research trials to determine the yield and nutritional potential among other things the climatic requirements under certain farming environments/conditions on various farms across South Africa
Source of data	Simple count of all GPS coordinates reflecting the exact location or number of reports of field trials attributed to ARC with verifiable evidence such as dates and time, type of variety for trials that have similar GPS coordinates but different trials
Method of Calculation / Assessment	Global Positioning System (GPS) coordinates for each trial/s or a technical report with verifiable evidence such as dates and time, type of variety or trials that have similar GPS coordinates but different trials
Means of verification	Global Positioning System (GPS) coordinates for each trial/s or a technical report with verifiable evidence such as dates and time, type of variety, photos etc. for trials that have similar GPS coordinates but different trials
Assumptions	The planting of ARC cultivars depends on community acceptance, favourable planting climate condition, availability of financial and human capital, enabling policies and regulations as well as stakeholder mobilisation and partnerships
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output	Climate resilient solutions
Output Indicator 5.1.5	Number of tools for measuring climate change
Definition	Refers to tools for measuring climate change including weather stations, calculation methods, new apps
Source of data	Report on the tools for measuring climate change
Method of Calculation / Assessment	Simple count of number of tools for measuring climate change
Means of verification	Report on the tools for measuring climate change
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences Group Executive: RIS

Output	Vaccine production
Output Indicator 5.2.1	Number of blood vaccine doses produced
Definition	This refers to the number of tick borne disease vaccine produced for the agricultural sector to protect the livestock population to enhanced resilience. These vaccines include Heart-water, African Redwater, Asiatic Redwater and Anaplasmosis
Source of data	Number of vaccine doses produced and supplied to the client
Method of Calculation / Assessment	Simple count of the number of vaccine doses suitable for distribution to the client
Means of verification	A Quality Assurance Report from the Quality Officer
Assumptions	That the client will order these vaccines
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Vaccine production
Output Indicator 5.2.2	Number of different types of vaccines developed
Definition	This refers to the number of vaccine types produced for the agricultural sector to protect the livestock population to enhance food security
Source of data	Report of number of vaccine types produced and supplied to the client
Method of Calculation / Assessment	Simple count of the number of vaccine types suitable for distribution to the client as contained in the report
Means of verification	Report indicating number of vaccine types produced and supplied to the client
Assumptions	That the client will order these vaccines
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Vaccine production
Output Indicator 5.2.3	Number of FMD vaccine doses produced
Definition	This refers to the number of FMD (Foot and Mouth Disease) vaccines produced for the livestock sector for prevention and control
Source of data	Number of vaccine doses produced
Method of Calculation / Assessment	Simple count of the number of vaccine doses produced
Means of verification	A Quality Assurance Report from the Quality Officer
Assumptions	That the client will order the vaccine
Disaggregation of Beneficiaries	Not applicable

Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Science

Output	Vaccine production
Output Indicator 5.2.4	Number of vaccine clinical trials
Definition	This refers to the number of vaccines trials conducted for improved prevention and control
Source of data	Number of vaccine trials conducted
Method of Calculation / Assessment	Simple count of the number of vaccine trials conducted
Means of verification	Report of number of vaccine trials conducted
Assumptions	That researchers will conduct the vaccine trials
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Science

Output	Laboratory services
Output Indicator 5.3.1	Number of tests reports issued for animal health
Definition	This refers to the total number of signed tests reports (typed or handwritten) issued to clients (per disease or condition) by the different diagnostic and analytical laboratories of the Animal Health Campus of the ARC
Source of data	Number of signed test reports (typed or handwritten) issued to client (per disease or condition) by the different diagnostic and analytical laboratories of the ARC
Method of Calculation / Assessment	Simple count of the number of signed test reports (typed or handwritten) (per disease or condition) issued by the different diagnostic and analytical laboratories of the ARC
Means of verification	Copy of the signed test report (typed or handwritten) (per disease or condition) issued to a client by the diagnostic and analytical laboratories of the ARC
Assumptions	Continued need of diagnostic and analytical tests by clients
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Laboratory services
Output Indicator 5.3.2	Number of tests performed for food and feed
Definition	This refers to the number of quality diagnostic and analytical tests performed by the ARC relating to food and feed analysis related to laboratory services
Source of data	Number of diagnostic and analytical test reports issued to client related to laboratory services
Method of Calculation / Assessment	Simple count of number of test reports issued to clients
Means of verification	Copy of the test report issued to the client related to laboratory services
Assumptions	Continued need of diagnostic and analytical tests by clients
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

Output	Laboratory services
Output Indicator 5.3.3	Number of services rendered
Definition	The amount of analytical, diagnostic and advisory services rendered related to laboratory services
Source of data	Report and/or invoice and/or job card numbers issued to clients as per each number of diagnostic and analytical test including a report and/or invoice of consultations services related to laboratory services

Method of Calculation / Assessment	Simple count of number of reports and/or invoice and/or job card per each service rendered as per report and/or invoice issued to clients
Means of verification	Report and/or invoice and/or job card issued to clients as per each number of diagnostic and analytical test including a report and/or invoice of consultations services related to laboratory services
Assumptions	Continued need of diagnostic and analytical tests by clients
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Crop Sciences

Output Indicator 5.3.4	Number of technical reports
Definition	Key to the outputs of the ARC R&D activities is the development of various technical/client reports. These technical/client reports and/or manuals/guides offer a broad agriculture commodity resilience, intended for distribution and use by farmers, extensions officers, commodity groups/organisations, and other interested parties. The ARC employees writes various research outputs report for distribution to stakeholders/clients ranging from farmers and or public on various products, services and process. The format of reports may differ with respect to difference in intended recipients. This official reports contains results of services issued by the ARC to farmers participating in schemes such as animal improvement as well as reports to other stakeholders
Source of data	Technical/client reports and/or manuals/guides
Method of Calculation / Assessment	Simple count of the technical/client reports and/or manuals/guides developed
Means of verification	Front cover of technical/client reports and/or manuals/guides
Assumptions	The researchers will produce the technical reports
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Animal Sciences

OUTCOME 6: A HIGH PERFORMING AND SUSTAINABLE ORGANISATION

Output	Infrastructure Management
Output Indicator 6.1.1	Number of business cases implemented for assets management
Definition	This refers to disposal / transfer of assets that do not form part of the ARC strategy
Source of data	Cost savings on maintenance and operation expenditures
Method of Calculation / Assessment	Count of business cases implemented for assets transferred back to Public Works and other state institutions
Means of verification	Business case report of cost savings on maintenance and operation expenditures
Assumptions	Assets will be utilised by stakeholders
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Information Systems

Output	Infrastructure Management
Output Indicator 6.1.2	Increase in rand value of rental income
Definition	Increase in rental income
Source of data	New signed leases entered into
Method of Calculation / Assessment	3% year on year
Means of verification	Number of new signed leases entered into

Assumptions	Lease agreements on rental will be signed
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Information Systems

Output	ICT Strategy Implementation
Output Indicator 6.2.1	Number of digital transformation projects implemented
Definition	Digital transformation initiatives implementation projects
Source of data	Projects sign-off documents
Method of Calculation / Assessment	Counting number of digital transformation projects
Means of verification	Sign-offs documents towards digital transformation initiatives or screen dumps of implemented solutions
Assumptions	Utilisation of digitalised solutions
Disaggregation of Beneficiaries	Not Applicable
Spatial Transformation	Not Applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Information Systems

Output	ICT Strategy Implementation
Output Indicator 6.2.2	Number of stabilisation projects implemented
Definition	The purpose of the indicator is to track the stabilisation of current solutions
Source of data	Report of number of stabilisation projects implemented
Method of Calculation / Assessment	Counting number of stabilisation projects
Means of verification	Sign-off documents
Assumptions	Stabilisation of current solutions
Disaggregation of Beneficiaries	Not Applicable
Spatial Transformation	Not Applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Information Systems

Output	ICT Strategy Implementation
Output Indicator 6.2.3	Number of optimisation projects implemented
Definition	Optimisation of current solutions
Source of data	Number of optimisation projects implemented
Method of Calculation / Assessment	Counting number of optimisation projects
Means of verification	Sign off documents
Assumptions	Optimised solutions
Disaggregation of Beneficiaries	Not Applicable
Spatial Transformation	Not Applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Information Systems

Output	Human Capital Management
Output Indicator 6.3.1.1	Vacancy rate
Definition	The number of funded vacant positions, divided by the total number of funded positions within the whole organisation, multiplied by 100 equals your vacancy rate
Source of data	Vacancy and Positions Report

Method of Calculation / Assessment	The number of funded vacancies for the specific financial year calculate as a percentage of the total funded positions
Means of verification	Vacancy and Positions Report
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Management
Output Indicator 6.3.1.2	Support employees as percentage of total staff
Definition	Total number of support staff as a percentage of total staff. (Support staff excludes Research Support, Labourers, Artisans, and Farm personnel)
Source of data	Headcount report
Method of Calculation / Assessment	Simple calculation of support staff as a percentage of total staff compliment
Means of verification	Headcount report
Assumptions	Availability of resources
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Management
Output Indicator 6.3.1.3	Percentage increase of Employment equity ratio in the designated groups in core business, in respect of: - Women at Senior Management level - People with Disabilities Employed
Definition	An increase in percentage of employees in designated areas (Women and People with disabilities) as a proportion of total staff
Source of data	Report on employment equity
Method of Calculation / Assessment	Simple calculation of support staff as a percentage of total staff compliment
Means of verification	Report on employment equity
Assumptions	Recruitment process
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Performance management
Output Indicator 6.3.2.1	Improve the leadership dimensions of 360 degree results for Senior and Executive Management
Definition	The purpose of the indicator is to track an increase in the overall performance of Senior and Executive Managers on leadership dimensions of 360 degree framework
Source of data	Report on 360 leadership dimension
Method of Calculation / Assessment	Increase in scores within report containing the results on 360 degree leadership dimensions
Means of verification	Report of 360 leadership dimensions
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual

Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Performance management
Output Indicator 6.3.2.2	Alignment of organisational values of ARC
Definition	The purpose of the indicator is to track the alignment of ARC values in the overall performance of Senior and Executive Managers on the 360 degree assessment
Source of data	Report on 360 degree leadership assessment highlighting the ARC value alignment scores
Method of Calculation / Assessment	Increase in the scores pertaining to the ARC value alignment as contained in the 360 leadership assessment report
Means of verification	Report on the 360 leadership assessment
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Performance management
Output Indicator 6.3.2.3	Percentage implementation of change management strategies linked to Culture Survey and 360 degree assessment
Definition	The purpose of the indicator is to track implementation of the change management strategies, which resulted from the Culture Survey and 360 degree assessment
Source of data	Reports indicating completed implementation plans, linked to change management strategies
Method of Calculation / Assessment	Simple calculation of the percentage completion of the implementation plans linked to change management strategies
Means of verification	Reports on the number of completed implementation plans, linked to change management strategies
Assumptions	Implementation plans will be developed and actioned
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.1	Number of employees appointed with: Masters degrees
Definition	Total number of new employees appointed with Masters degrees
Source of data	Copies of proof of qualification
Method of Calculation / Assessment	Simple count of number of new employees who have completed Master's degree studies
Means of verification	Copies of proof of qualification
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.2	Number of employees appointed with: Doctoral degrees
Definition	To indicate new staff employed with Doctoral degrees
Source of data	Copies of proof of qualification
Method of Calculation / Assessment	Simple count of number of new employees who have completed Doctoral degree studies
Means of verification	Copies of proof of qualification
Assumptions	Availability of funding

Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.3	Number of employees with: Masters degrees
Definition	Total number of SET employees with Masters degrees
Source of data	Copies of proof of qualification
Method of Calculation / Assessment	Simple number of employees with masters certificates and/or qualification as the highest qualification
Means of verification	Copies of proof of qualification
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.4	Number of employees with: Doctoral degrees
Definition	Total number of SET employees with Doctoral degrees
Source of data	Copies of proof of qualification
Method of Calculation / Assessment	Simple number of employees with doctoral certificates and/or qualification as the highest qualification
Means of verification	Copies of proof of qualification
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.5	Percentage staff turnover
Definition	Total number of employees who were terminated
Source of data	VIP Variance report on appointments and terminations
Method of Calculation / Assessment	Counting number of terminations (Voluntary resignations and Early retirements) divided by the total number of total staff over the period, as a percentage
Means of verification	VIP Variance report on appointments and terminations
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.6	Total spend on PDP stipend and registration
Definition	Total rand value spend on stipends of PDP students tuition and stipends
Source of data	Variance Report
Method of Calculation / Assessment	Rand Value of PDP spend

Means of verification	Variance Report
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Human Capital Development
Output Indicator 6.3.4.7	Training spent as a % of salary bill
Definition	The total percentage of amount spent on training as a percentage of total salary bill
Source of data	Invoiced rand value of training spent
Method of Calculation / Assessment	The amount of money spent on training divided by salary bill as a percentage
Means of verification	Invoiced rand value of training spent
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	Commercialisation of ARC solutions
Output Indicator 6.4.1	Establishment of an ARC commercialisation entity
Definition	ARC commercialisation entity established
Source of data	Proof of established entity
Method of Calculation / Assessment	Counting of established entity
Means of verification	Proof of established entity
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-end)
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Impact and Partnerships

Output	Exhibitions and sponsorships
Output Indicator 6.4.2	Number of exhibitions and sponsorships
Definition	Refers to number of ARC and sectoral events participated in
Source of data	Reporting and budget spent
Method of Calculation / Assessment	Counting of events
Means of verification	Reporting and budget spent
Assumptions	Availability of funding
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: HR, Marketing and Legal Services

Output	International partnerships
Output Indicator 6.4.3	Number of new international partnerships
Definition	Report on the number of new ARC institutional international partnerships

Source of data	Partnership / cooperation agreements and/or letters of intent to cooperation/note verbale to confirm the cooperation
Method of Calculation / Assessment	Counting of partnership agreements
Means of verification	Partnership / cooperation agreements and/or letters of intent to cooperation/note verbale to confirm the cooperation
Assumptions	Availability of resources
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Group Executive: Impact and Partnerships

Output	Governance
Output Indicator 6.5.1	Audit opinion
Definition	The audit opinion issued by the External Auditors on the Financial statements of the ARC, including compliance to laws and legislation. This includes Statement of Financial Performance, Statement of Financial Position, Statement of Changes in Equity or Net Assets, Cash Flow statements and Notes to the Financial Statements
Source of data	Annual Financial Statements and supporting documentation submitted to the auditors
Method of Calculation / Assessment	Annual Financial Statements prepared in accordance with GRAP. Compliance tested against the prevailing legislation (e.g. PFMA; AR Act, etc.)
Means of verification	Annual Financial Statements and supporting documentation submitted to the auditors
Assumptions	Assumptions will be as per the accounting policy
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-end)
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer

Output	Funding and revenue generation
Output Indicator 6.6.1	Zero Deficit
Definition	The ARCs Financial Performance must at minimum report the Operating surplus / (deficit) of Zero, (i.e. the Opex should not be greater than the Revenue). This includes Parliamentary Grant, External Income, Other Income, Personnel Costs, Operating Expenses, and Depreciation
Source of data	Financial results (Statement of Financial Performance) prepared from the data from the AX system
Method of Calculation / Assessment	Revenue less Total Operating Expenditure
Means of verification	Financial results (Statement of Financial Performance) prepared from the data from the AX system
Assumptions	None
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer

Output	Funding and revenue generation
Output Indicator 6.7.1	BBBEE rating
Definition	The Broad Based Black Economic Empowerment as defined by the BBBEE Act for management control, skills development, enterprise and supplier development and socio-economic development
Source of data	BBBEE Certificate
Method of Calculation / Assessment	Assessment done by the Accredited BBBEE verification agent
Means of verification	BBBEE Certificate
Assumptions	None
Disaggregation of Beneficiaries	Not applicable

Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer

Output	Funding and revenue generation
Output Indicator 6.8.1	External income as % of total revenue
Definition	The external income's contribution to the total revenue of the ARC made from advisory services, diagnostic services, farm products, research material and research services
Source of data	Monthly Financial Results prepared from the AX
Method of Calculation / Assessment	External Income / Total revenue
Means of verification	Monthly Financial Results prepared from the AX
Assumptions	None
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer

Output	Funding and revenue generation
Output Indicator 6.10.1	Rand value of royalty income
Definition	Income received from royalty agreements signed
Source of data	Finance report on royalties
Method of Calculation / Assessment	Based on the IP contracts and actual income generated/collected
Means of verification	Finance report on royalties
Assumptions	Willingness of parties to enter into agreement with ARC
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Cumulative (Year-to-Date)
Reporting Cycle	Quarterly
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer GE: Impact and Partnerships

Output	Cost efficiencies
Output Indicator 6.11.1	Reduction in fixed cost
Definition	To measure the reduction in fixed costs as compared to the base / prior year in the form of Personnel costs, Electricity / Water/ Services, Maintenance and Security Services
Source of data	Monthly Financial Results prepared from the AX
Method of Calculation / Assessment	Actual Fixed costs vs Base Fixed Costs
Means of verification	Monthly Financial Results prepared from the AX
Assumptions	None
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer

Output	Cost efficiencies
Output Indicator 6.11.2	Personnel costs as % of Operational PG
Definition	To measure the personnel costs in relation to the operational parliamentary grant
Source of data	Monthly Financial Results prepared from the AX

Method of Calculation / Assessment	Personnel costs / operational parliamentary grant
Means of verification	Monthly Financial Results prepared from the AX
Assumptions	None
Disaggregation of Beneficiaries	Not applicable
Spatial Transformation	Not applicable
Calculation Type	Non-Cumulative
Reporting Cycle	Annual
Desired Performance	Meeting targets set for the 2022/23 FY
Indicator Responsibility	Chief Financial Officer Group Executive: HR, Marketing and Legal Services

ANNEXURES TO THE ANNUAL PERFORMANCE PLAN

ANNEXURE A: AMENDMENTS TO THE STRATEGIC PLAN

Not applicable for 2022/23, as the third year of the 2020/21–2024/25 Strategic Plan.

ANNEXURE B: CONDITIONAL GRANTS

Not applicable to the Agricultural Research Council.

ANNEXURE C: CONSOLIDATED INDICATORS

Not applicable to Agricultural Research Council.

ANNEXURE D: DISTRICT DEVELOPMENT MODEL

The Agricultural Research Council will respond to requests by Government in respect of projects dedicated to the District Delivery Model.

ANNEXURE E: BOARD AND SUB-COMMITTEE CHARTERS

It is hereby affirmed that the Agricultural Research Council has approved Board and Sub-Committee charters in place, which are available.

ANNEXURE F: SWOT, PESTEL and STAKEHOLDER ANALYSIS

UPDATED SWOT ANALYSIS – INFORMING 2022/23 PLANNING

INTERNAL ENVIRONMENT – STRENGTHS			
No.	Strength	What about the strength must be leveraged for the remainder of 2021/22?	What about the strength must be leveraged in 2022/23?
1	Local and internationally recognised expertise.	<ul style="list-style-type: none"> ▪ Identify relevant expertise. ▪ Attract high level scientific skills ▪ Reposition our programmes in which we have an advantage. ▪ Identify the key thematic areas/competencies where we have an advantage/can become centres of excellence ▪ Identify champions for those areas and develop a work plan and strategy for next five years. ▪ Align to the international relations strategy (e.g. BRICS forum for agriculture research). ▪ Foster local and international collaboration. ▪ Develop centres of collaboration with universities and revive the previous centres of excellence and expand to include international universities from all over the world 	<ul style="list-style-type: none"> ▪ Implement aligned strategy. ▪ Establish and maintain international collaboration agreements. ▪ Collaborative fundraising. ▪ Participate in multinational, multi-stakeholder consortiums. ▪ Profile ARC experts. ▪ Change remuneration scales to attract and retain expertise and scarce skills
2	Capacity to train post-graduate students.	<ul style="list-style-type: none"> ▪ Engage with DSI and NRF on ARC capability ▪ Resuscitate engagements with SAASTA for student training ▪ Engage with the Chinese embassy to understand their current surge in funding ARC employees and students. ▪ Engage other international embassies to develop key partnerships with range of Institutions 	<ul style="list-style-type: none"> ▪ Pursue a relationship with Agrinatura to explore areas of cooperation and capacity development using ARC infrastructure. ▪ Establish an agricultural university that can award degrees and post graduate qualifications or at least revive and develop new centres of collaboration as a first stepping stone towards this.... ▪ Explore option of ARC scientists serving as guest lecturers
3	Research offers relevant, practical, and responsive solutions in the national interest.	<ul style="list-style-type: none"> ▪ We need to develop our expertise before we try to sell ARC ▪ Deliberate, aggressive marketing of ARC at conferences, stakeholder meetings – use research reports from campuses. ▪ Market ARC programmes to the drivers of national programmes. 	<ul style="list-style-type: none"> ▪ Market ARC capabilities at all possible platforms, using constantly updated research reports. ▪ Improve visibility of ARC programmes in provinces and national departments. ▪ Align our research priorities to the emerging small holder farmers ▪ Quantum of PBR to be commercialised ▪ Identify research products that can be scaled up, ready for uptake 'low hanging fruits'
4	Assets and infrastructure availability.	<ul style="list-style-type: none"> ▪ Use available unused land and buildings to generate income. ▪ Use ARC website and social media resources to advertise products and services. ▪ Maintain current existing infrastructure 	<ul style="list-style-type: none"> ▪ Implement the asset management plan and sell assets that are not required.
5	Ability to predict, identify and prevent pests and disease outbreaks.	<ul style="list-style-type: none"> ▪ Develop emergency response plans. ▪ Communicate the response plans nationally. ▪ Revive regular meetings with DALRRD on pests and diseases. ▪ Maintain and develop National Public Good Assets 	<ul style="list-style-type: none"> ▪ Reassess and implement the strategy.
6	Develop Resilience models and technologies/ knowledge that can be applied, to the country, region and continent in relation to climate and other agriculture risks.	<ul style="list-style-type: none"> ▪ Identify, recommend, and participate in national, regional, and international forums promoting resilience. ▪ Develop an ARC wide programme on resilience 	<ul style="list-style-type: none"> ▪ Build our capacity to become the partner of choice and to access funding.
7	Clear strategic mandate.	<ul style="list-style-type: none"> ▪ Communicate ARC mandate to ARC staff, stakeholders and the public. 	<ul style="list-style-type: none"> ▪ Position ARC as the 'go to' organisation for Government regarding funded Agri-R&D

INTERNAL ENVIRONMENT – WEAKNESSES			
No.	Weakness	What about the weakness must be managed for the remainder of 2021/22?	What about the weakness must be managed in 2022/23?
1	Insufficient commercial acumen and marketing and sales skills in proposal responses	<ul style="list-style-type: none"> Review commercialisation strategy and develop database of technologies to be commercialised. Comprehensive review of proposals/business plans before implementation. Involve all role players (finance and commercialisation) in the planning process. Expand commercialisation capacity of the ARC to fully exploit commercialisation opportunities. 	<ul style="list-style-type: none"> Capacitate commercialisation and marketing pipeline within the ARC. Increase the commercialisation capacity in ARC. Establish financial viability of commercialisation of technologies. Appoint people with business acumen that understand how businesses must operate and who can instil and lead the business culture within the organisation Train and reskill researchers and all managers in the ARC in the art of business brokering. <ul style="list-style-type: none"> Develop change management programmes to ensure ARC functions as a business.
2	Inadequate marketing management.	<ul style="list-style-type: none"> Appoint dedicated marketing and stakeholder relations resource. Prioritise high level engagements with key stakeholders. Immediately engage with the Commodity Trusts (Maize Trust, Winter Cereal Trust, Hortgro, Winetech, PRF, PSA, RPO, Milk SA, NERPO, Cotton SA etc.). Engage with DALRRD and other Government departments (e.g., DSI, DEA, DTI, PDA's, IDC, ECDC, AfricaBio, etc.) considering ARCs financial situation. 	<ul style="list-style-type: none"> Establish marketing strategy and stakeholder management plan. Rebranding of the ARC and its products. Have succession plans that are actively monitored and link to an internal promotion strategy. Implement the post retirement and mentoring strategy.
3	Inadequate stakeholder management.	<ul style="list-style-type: none"> Immediately engage with the Commodity Trusts (Maize Trust, Winter Cereal Trust, Hortgro, Winetech, PRF, OPOT, etc.). Engage with DALRRD and other Government departments (e.g., DSI, DEA, DTI, PDA's, IDC, ECDC, AfricaBio, etc.) considering ARCs financial situation. 	<ul style="list-style-type: none"> Continuation of engagements with DALRRD and other Government departments (e.g., DSI, DEA, DTI, PDA's, IDC, ECDC, AfricaBio, etc.) considering ARCs financial situation. Link ARC as essential partner to Government's land-reform initiatives for optimal training of new farmers for sustainable agricultural production Continuation of engagements with the Commodity Trusts (Maize Trust, Winter Cereal Trust, Hortgro, Winetech, PRF, OPOT, PSA, Cotton SA, Tobacco Industry etc.) Increased and active identification of private partners who might want to partner with ARC, e.g., pharmaceutical companies, food and beverages companies, etc.
4	Aging work force, inadequate succession planning and lack of critical mass.	<ul style="list-style-type: none"> Finalise Skills Roadmap, consolidation of operational structures. Develop backup plans for all strategic/critical positions in the ARC (facilitated by HR). Prioritise the implementation of the equity and transformation committee at Campuses. Communicate the importance of succession planning to all ARC staff. Targeted recruitment of skilled and capable workforce. Redeployment/reskilling existing personnel where relevant. 	<ul style="list-style-type: none"> Roll out the identified actions and measure impact on business. Develop a policy for integrating PDPs into vacant positions. Establish internal and external collaborations. Implement the ARC succession plan Long term succession planning Implement new ways of recruiting RTMs from within.
5	Ageing infrastructure.	<ul style="list-style-type: none"> Identify reliable equipment that can be shared. 	<ul style="list-style-type: none"> Prioritisation of CAPEX at an organisational level. Dispose of obsolete equipment. Conduct infrastructure audit Strategic and economic cost-benefit analysis of all infrastructure assets. Appoint competent maintenance service providers on contracts to stop the chaotic SCM rotation of sub-standard contractors

INTERNAL ENVIRONMENT – WEAKNESSES			
No.	Weakness	What about the weakness must be managed for the remainder of 2021/22?	What about the weakness must be managed in 2022/23?
6	Limited synergy between business units/working in silos.	<ul style="list-style-type: none"> Establish a multidisciplinary team to develop a project rationalisation matrix. Consolidate programmes/discontinue unjustifiable projects. Identify excess capacity and skills that can be shared/reassigned across the organisation. 	<ul style="list-style-type: none"> Adopt a multidisciplinary research team approach. Create a skills data base that can be regularly updated. Institute and incentivise a programme approach. Joint project development
7	ARC processes are not technologically advanced.	<ul style="list-style-type: none"> Identify areas for automation of internal processes. 	<ul style="list-style-type: none"> Automate and streamline critical internal processes.
8	Lack of operational agility within the support systems	<ul style="list-style-type: none"> Streamline the functions of support systems and get them ready for 2022/23 	<ul style="list-style-type: none"> Establish commercial entity for the ARC as the weaknesses are attributed largely to PFMA

EXTERNAL ENVIRONMENT – THREATS			
No.	Threat	What about the threat must be mitigated for the remainder of 2021/22?	What about the threat can be mitigated in 2022/23?
1	Inadequate/ Reduction of Parliamentary Grant	<ul style="list-style-type: none"> Focus on project completion as much as possible, specifically where the Covid-19 pandemic caused delays Expedite collection of external income Establish a multidisciplinary team to develop a project rationalisation matrix Cost containment measures as presented per campus, including operating expenses, rationalising of research areas and staff. This to be expanded to ARC wide approach as campuses have cut what they could Discontinue unfunded projects/reprioritise programmes ARC wide Intercept last minute demand for services by provincial departments of agriculture Explore alternative funding sources Engage National Treasury, DALRRD and DSI. Implement campus rationalisation and amalgamation processes Develop and implement a robust commercialisation pipeline based on sound financial business cases Launch a national appeal based on the importance of publicly funded agricultural R&D – benchmark the ARCs public funding with countries that have a similarly competitive agricultural sector 	<ul style="list-style-type: none"> Implement staff and research rationalisation programme. Develop strategies for growth. Grow research and commercialisation and ensure support is more effective efficient and turnaround times are improved. Reprioritise research programmes and discontinue projects that are 100% funded by PG. ARC to find a way to strike a balance here. ARC need to invest in seed projects for future business and a different funding model should be developed to allow for these type of business interventions for future value creation, but this must be an organisational wide drive. E.g. if ARC wants to develop increased agro-processing capacity and value chains dedicated funding must be available for this to ensure IP and commercialisation will be created in future for increased revenue and value. Identify new sources of contract research funding, this is critical to ensure ARC IP is protected and value is derived from it through licencing agreements, spin-off and spinout companies, etc. Engage provincial departments of agriculture to provide services. Engage National Treasury and explore alternative funding sources, initiate right-sizing, rationalisation of projects. Discontinue all unfunded research mandates Increased commercialisation processes and fast tracking of commercialisation initiatives in the ARC but be competitive and streamline business processes to facilitate this. Business must run as a business. Implement relocation of campuses on fewer campuses in Pretoria to create significant cost saving which can be used for staff retention, performance management, incentives for performance, and seed funding for new initiatives, etc. Sell/lease fixed assets that do not create value for the ARC and absorb money that could be used elsewhere and use the income generated from sales/leases to recapitalise other areas of growth. Leverage increased public-private partnerships for ARC ventures Be a more agile Institution, which can make good decisions much quicker and can act on business opportunities through a properly

EXTERNAL ENVIRONMENT – THREATS			
No.	Threat	What about the threat must be mitigated for the remainder of 2021/22?	What about the threat can be mitigated in 2022/23?
			defined delegations of authority and much shorter decision turnaround times. <ul style="list-style-type: none"> Actively pursue international funding opportunities
2	Loss of external income	<ul style="list-style-type: none"> High-level intervention of CEO, GE and SM with relevant stakeholders (Commodity trusts and Departments (DALRRD, DFFE) Create professional brochures of ARC expertise and services on offer 	<ul style="list-style-type: none"> Implement relationship improvement plan with Commodity Trust partners. DALRRD and ARC to work more closely to enable combined planning. Increase international collaboration to broaden the ARC income base Leverage increased public private partnerships for ARC ventures. Identify these ventures and allocate resources to drive them. Create an Agriculture University in partnership with one/several universities in SA. Focus on postgraduate qualifications and develop this university with a business model that will ensure that the ARC benefits from incentives for graduates and publications and can leverage the investment in the PDP in an income generation model for the ARC. E.g., ARC invests x millions in student bursaries, how do we engage the Department of Higher Education to develop a model that incentivise the ARC further. Lease or sell unused properties/farms, etc. and recapitalise others for future growth. The income generated will be reduced when benefit sharing is implemented Establish Projects Office for grants scoping and vigorous fundraising
3	Increased competition for funding	<ul style="list-style-type: none"> Identify top five competitors in all research or commodity categories. Review project-costing model of the ARC (personnel costs). Improve turnaround time by bringing forward project initiation. Collaboration and partnerships 	<ul style="list-style-type: none"> Exploit the weaknesses of the competitors. Target research funds allocated to provincial departments of agriculture. Institutionalise proposal coordination capability. Diversify products and services. Recruitment of high-end skills. Increase investment in modern technologies and infrastructure. Work collectively as ARC and consolidate programs. Coordinate through grants office to create one-stop-shop. Knowledge packaging, management and dissemination for economic gain. Be more agile and create environment where business opportunities can be agreed to much quicker. Increase decision timelines and shorten the decision-making chain by appropriate delegations. Give more responsibilities downstream and keep people accountable. Decrease red tape without compromising quality and compliance, it is possible. ARC need to start to work, react, and function as a business. Develop pricing strategy for training services Establish Projects Office for grants scoping and vigorous fundraising
4	Climate change – water shortage for research functions (elevated temperatures)	<ul style="list-style-type: none"> Review mitigation strategy planning. Develop water-harvesting projects. Investigate agro-ecology and conservation agriculture approaches Request disaster relief funds. Establish a circular agriculture think tank and align with similar approaches globally 	<ul style="list-style-type: none"> Establish international collaboration on climate change research, initiate data collection for long term modelling. Implement water-harvesting projects. Prioritise Climate Change research mitigation and adaptation. Forecast and align research toward future trends i.e., breeding for resilience to climatic factors. Establish a research centre of excellence for climate smart agriculture in the ARC, demonstrate the ARC technologies in this

EXTERNAL ENVIRONMENT – THREATS			
No.	Threat	What about the threat must be mitigated for the remainder of 2021/22?	What about the threat can be mitigated in 2022/23?
			regard, and market the ARC competencies more actively. <ul style="list-style-type: none"> ARC wide plan driven by all is required.
5	Reduced industry support for ARC programmes/ARC losing impact	<ul style="list-style-type: none"> Identify the negative perceptions at the Commodity Trusts. Engage with the Commodity Trusts (Maize Trust, Winter Cereal Trust, Hortgro, Winetech, PRF, OPOT, PSA, etc.). Stakeholder engagement, develop institute research reports. 	<ul style="list-style-type: none"> Work collectively as ARC and consolidate programs. Stakeholder engagement at SM, GE and CEO level. Define internal R&D priorities. Continuous engagement with Industries and specific role ARC can play for them. Delivery of excellent research services to industries to increase and restore industry confidence in ARC. Engage on funding models that are a win-win for all, e.g., Leverage industry funding to support ARC Centres of Excellence and leverage this partnership to increase university funding into the collaboration centres.
7	Rising input costs in the research environment (consumables, electricity, travel, etc.)	<ul style="list-style-type: none"> Immediately analyse and correct pricing category (e.g. industrial or agriculture rates). Identify and optimise occupation of buildings. Implement contract procurement when appropriate Engage input suppliers (e.g. travel agents, KAPAgri etc.) to understand their pricing structures. Develop in-house chemistries and protocols to lower costs of generating data Support local technology providers rather than source from international providers 	<ul style="list-style-type: none"> Commission a study to develop an energy saving strategy for the ARC. Implement a plan to get the ARC off the electricity grid and fund it, it will require capital expenditure, but will realise a significant amount of savings for other operations. Implement the coordinated bulk-buying project for research consumables. Exploit ICT for virtual delivery of scientific services where possible
8	COVID-19	<ul style="list-style-type: none"> Implement the ARC Pandemic Management Plan Increase awareness about the pandemic Inability of ARC researchers to travel internationally on funded projects. 	<ul style="list-style-type: none"> Implement the ARC Pandemic Management Plan. Increase awareness about the pandemic. Use remote working arrangement where possible. Implement vaccine education programme, as part of wellness
9	Land-grabs	<ul style="list-style-type: none"> Title deeds to be properly managed-Indicate the importance of keeping the land, e.g. food security. Increase awareness about possible land grabs Develop an action plan to address such incidents 	<ul style="list-style-type: none"> ARC to utilise the land in a way that we can demonstrate to our government the importance of keeping the land. So that we can defend ownership should the need arise Increase awareness about possible land grabs Develop an action plan to address such incidents

EXTERNAL ENVIRONMENT – OPPORTUNITIES			
No.	Opportunities	What about the opportunities must be exploited for the remainder of 2021/22?	What about the opportunities can be exploited in 2022/23?
1	Exploitation, marketing and commercialisation of products, services and marketing of our IP.	<ul style="list-style-type: none"> Develop aggressive branding and marketing plan for existing services and 	<ul style="list-style-type: none"> Existing products and services for new SADC markets. Implement commercialisation plan of processed (vegetables, medicinal plants, fruit and wine) products. Expand Winetech initiative to other commodity groups. Growing the external revenue through improved stakeholder relations. Include animal products as well. Marketing and commercialisation plans that will drive the ARC towards the future

EXTERNAL ENVIRONMENT – OPPORTUNITIES			
No.	Opportunities	What about the opportunities must be exploited for the remainder of 2021/22?	What about the opportunities can be exploited in 2022/23?
		<p>products through print and electronic media and social platforms.</p> <ul style="list-style-type: none"> ▪ Sell breeder and certified seed, diagnostic and analytical services. ▪ Plan full commercialisation of processed (vegetables, medicinal plants, fruit and wine) products. ▪ Finalise an agreement with Winetech on climate change research. ▪ Engage DBSA on green climate fund. ▪ Finalise all pending license agreements. ▪ Identify, develop and finalise projects that can be spun off in 2022/22 ▪ Identify key products that can be sold, service products and infrastructure ▪ Develop manuals and research reports for dissemination in the country and region. 	
2	Focussed revenue generation strategies using physical assets.	<ul style="list-style-type: none"> ▪ Finalise the review and revenue generation strategies and plans. ▪ Consolidation of the physical assets of the ARC. ▪ Finalise the consolidation of operational structure consolidation. ▪ All available land to be put in production. ▪ Dispose surplus stock/assets and produce. ▪ Investigate active revenue generation methods. ▪ Diversify product portfolio to attract new funders and identify new niche markets to offer services i.e. food industry for pathogen profiling and quality assurance. 	<ul style="list-style-type: none"> ▪ Implement strategy and consolidation plans. ▪ Full comprehensive roll out of the operational plans. ▪ Review business models for services and laboratories.
3	Diagnostic services to added disease outbreaks.	<ul style="list-style-type: none"> ▪ Resolve billing issues at OVR. ▪ Aggressively market the ARC to increase its visibility. ▪ Articulate ARC capabilities. Generate revenue from analyses and diagnostics. 	<ul style="list-style-type: none"> ▪ Consolidate all diagnostic competencies virtually. ▪ Articulate ARC capabilities. ▪ Generate revenue from analyses and diagnostics. ▪ Initiate sensitisation and marketing of FMD vaccine to be produced from new factory
4	Exploit local and international opportunities and expand on leadership footprint in advanced sciences to become the partner of choice.	<ul style="list-style-type: none"> ▪ Identify the key thematic areas where we have an advantage. ▪ Identify champions for those areas and develop a work plan and strategy for next five years. ▪ Identify areas where we can become centres of excellence. ▪ Align to the international relations strategy. 	<ul style="list-style-type: none"> ▪ Implement the plan. ▪ International relations strategy. ▪ Marketing strategy. ▪ Exploitation of international markets for commercialisation; ▪ Develop Seed Fund for technology advancement ▪ Create an Agriculture University in partnership with one/several universities in SA. Focus on postgraduate qualifications and develop this university with a business model that will ensure ARC benefit from incentives for graduates and publications and can leverage the investment in the PDP in an income generation model for the ARC. E.g., ARC invests x millions in student bursaries, how do we engage the Department of Higher Education to develop a model that incentivise the ARC further.
5	Potential to become regional agricultural hub. (Part of International opportunity)	<ul style="list-style-type: none"> ▪ Identify regional collaborative partners. ▪ Establish broader centres of collaboration 	<ul style="list-style-type: none"> ▪ Establish regional bilateral and collaborations. ▪ Exploitation of reference laboratories. ▪ Establish an agricultural innovation hub in the Roodeplaats campus of the ARC. ▪ Develop a strategy and implementation plan to establish an agricultural research, innovation and incubation centre.

EXTERNAL ENVIRONMENT – OPPORTUNITIES			
No.	Opportunities	What about the opportunities must be exploited for the remainder of 2021/22?	What about the opportunities can be exploited in 2022/23?
6	Capacity development with local and continental partners.	<ul style="list-style-type: none"> ▪ Coordinate an agricultural planning service. Concentrate on distressed farms and new black entrants. 	<ul style="list-style-type: none"> ▪ Pursue a relationship with Agrinatura to explore areas of cooperation and capacity development using ARC infrastructure. ▪ Become a regional training centre of choice. ▪ Enter into strategic partnership with institutions involved in capacity building in the agricultural sector. ▪ Establish agricultural University in the ARC. Refer to comments made above.
7	High demand for agricultural services.	<ul style="list-style-type: none"> ▪ Deliberate, aggressive marketing of ARC at conferences, stakeholder meetings – using research reports from campuses. ▪ Urgently review pricing and operational structures. ▪ Professional brochures that describe the ARCs services and value 	<ul style="list-style-type: none"> ▪ Dedicated marketing showcasing capabilities. ▪ Establish coordinated sample receiving/testing one-stop centres. ▪ Become centre of choice for diagnostic and analytical services. ▪ Establish coordinated sample receiving/testing one-stop centres. Part of coordinated diagnostic services. ▪ Accreditation of the ARC laboratories with SANAS

UPDATED PESTEL ANALYSIS – INFORMING 2022/23 PLANNING

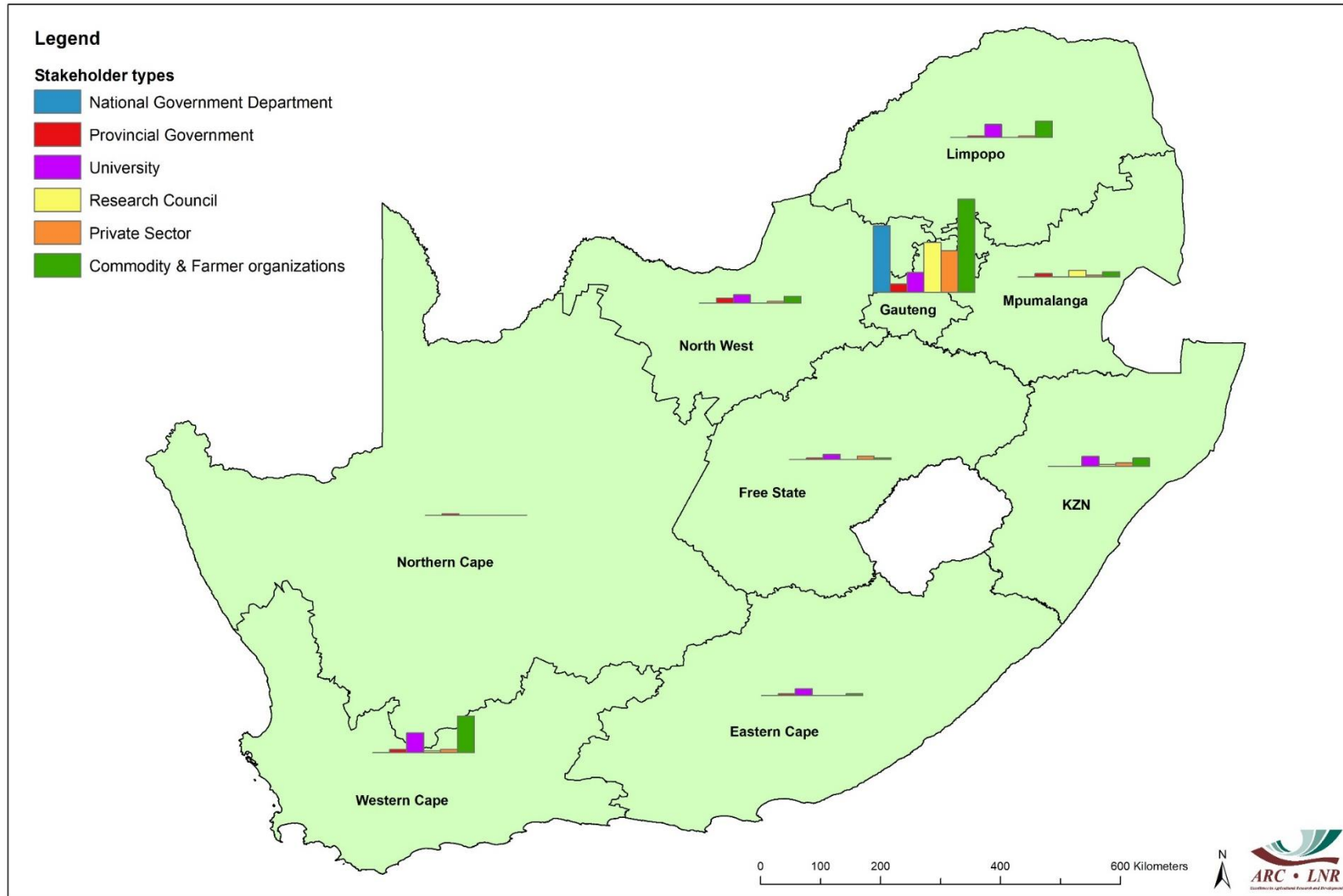
POLITICAL ANALYSIS
<ul style="list-style-type: none"> • Stalled Land reform dynamic. • Changes in national political context, growing coalition politics • Increased political tensions in the country. • Changes in SADC countries. • National Development Plan and other government programmes. • Departments with overlapping mandates (e.g., DEFF) and the need for alignment and cooperation. • Foreign trade relations uncertainty (trade dynamics with EU, AU, USA, China etc.). • BRICS and the realignment of agricultural institutes within BRICS. • Social grants dynamics, including special pandemic relief grants. • Changes in international geo-politics and the impact on trade and scientific collaboration. • Increased levels of unrest in South Africa based which are politically inspired. • Impact of Covid-19 on global and local politics, controversial interventions (state of emergency, travel restrictions, employment and business rescue challenges globally and nationally). • International trends on competitiveness for funding for R & D • International transboundary Water issues • Increasing isolation and stigma against South Africa due to discovery of new variants of Covid-19. • Radicalisation of politics due to deprivation.
ECONOMIC ANALYSIS
<ul style="list-style-type: none"> • Capability of SHF to participate in commercial agriculture. • Market access for SHF • Decline of SHF agricultural production due to increasing levels of pests and diseases. • Infrastructure development. • Competitiveness of commercial agriculture. • Global economic fluctuations including price fluctuation of commodities. • The exchange rate and its impact on trade. • Tariff and non-tariff trade barriers. • African Continental Free Trade Agreement. • ARC access to funding. • Global free trade agreements • National strategies and imperatives. • Energy, food and water security. • Changing international investment in energy generation capacity • Public health implications from pests and diseases (e.g., Covid-19, zoonotic diseases). • Fourth, fifth and sixth industrial revolution. • Depreciating rand exchange rate and unaffordability of new imported technologies. • Corporatisation – vertical integration. • Credit rating downgrade. • Social grant bill increases. • Economic recession/stagnation • Impact of Covid-19 on the global, regional and national economies. • Increased competitiveness of the agricultural sector. • Lack of prioritisation of agricultural R&D, despite agricultural sector being a key driver of the SA economy. Immediate impact not be visible, long term impact will be detrimental • Implementation of circular economic development initiatives
SOCIAL ANALYSIS
<ul style="list-style-type: none"> • Social inequalities, including gender, race and ethnic disparities increasing due to the continued COVID-19 pandemic. • Levels of skills and education in society. • National standards of living. • Accelerating loss of expertise and skills from the ARC and other SOEs. • Chronic levels of unemployment, especially amongst the youth. • Extent of reliance on social grants. • Food and nutritional safety and security. • Urbanisation. • Population dynamics. • Social capital cohesion and resilience. • Health and safety dynamics - especially in the light of the Covid-19 pandemic. • Interest in and support to agriculture as a profession. • Farm consolidation and concentration. • Impact of agricultural pests on homestead food security and social cohesion in SHF communities. • Radicalisation of youth and unemployed due to social deprivation. • Political unrest interfering with research activities. • Changing consumer preferences. • Impact of Covid-19 on the social stability of countries worldwide • Increased poverty and unemployment resulting in increased hunger and malnutrition. • Increasing migration of people to South Africa due to economic stagnation, climate change and political unrest.

TECHNOLOGICAL ANALYSIS
<ul style="list-style-type: none"> • Increased multidisciplinary nature of science and technology. • Increased importance of circular agriculture, Agroecology, conservation agriculture, low input agriculture • Increased importance of lifestyle changes – veganism, etc • Impact of social media platforms. • New technology applications in agriculture, e.g., drones, gene editing, automated hydroponics infrastructure. • Rate of technology adoption (diffusion curves). • 5th Wave (move from knowledge to conceptual era). • S-curves (analysis of skills, knowledge, and technology). • Emergence of artificial intelligence. • Cost of technology becoming unaffordable due to depreciating rand exchange rate. • Big data analytics in agriculture. • Smart agriculture. • 4th Industrial Revolution (4IR). • Interactive software applications based on smart devices. • Covid-19 resulted in the increased use of virtual platforms for many business processes, stakeholder management; research; diagnostics; training; advisory services, etc. • New technologies such as the use of drones and satellite imaging for monitoring of research trials, commercial plantings, and data capturing can increase research outputs.
ENVIRONMENTAL ANALYSIS
<ul style="list-style-type: none"> • Impacts of climate change and climate variability on agricultural production. Shifting production regions. • Competing land use priorities (mining activities, urban development, etc.). • Increased incidences of natural disasters due to climate change e.g., veld fires, heat waves and drought. • Availability of arable land. • Ability to regenerate degraded land for agricultural production. • Halting and active reversing of desertification of marginal lands. • Energy mix and availability with emphasis on renewables. • Waste management and its implications for agriculture. • Environmental pollution and biomagnification e.g. neonicotinoids. • Sustainable use of natural resources. • Access to clean water. • Pest and disease outbreaks may intensify due to climate change • New exotic pests and diseases invade South Africa and threaten agricultural production. • Threats to bio-diversity, from climate change, land use threats and invasive alien species. • Threats to biosecurity • Greenhouse gases because of population growth in people, animals, etc. • Issuing of landowner carbon credits • High levels of atmospheric and water pollution in South Africa, acid rain, acid ground water, effluent discharge, pesticides. • Resilience in agriculture production is under threat. • Covid-19 effects on the environment due to slowdown of social and economic activities
LEGAL/REGULATORY ANALYSIS
<ul style="list-style-type: none"> • Changes to legislative mandate. • Biodiversity regulatory system. • Regulatory permits system (e.g., GMO Act and release of biological control agents, Cannabis). • Intellectual property regulations and new national IP policy. • Phytosanitary and public health (e.g., zoonotic disease) regulations. • Scientific and technical support for effective regulatory compliance. • Competition regulation. • Property rights (immovable) regulations and implications for asset values and for new investment. • Changes in labour legislation. • Impacts of other national policies/statutes/treaties (e.g., Medicines Control Act, etc.). • Impact of PFMA on efficiency, long-term competitiveness, and sustainability of SOEs. • International trade laws and regulations. • Land reform regulations. • Lack of regulations in testing and evaluation of agricultural machinery and equipment's. • Unchartered territory in terms of animal disease investigation and regulatory activities that require physical inspection for certification of disease status. • Carbon Tax • Water use licences and accounting • Distribution of statutory levy from NAMC and its availability for public R&D

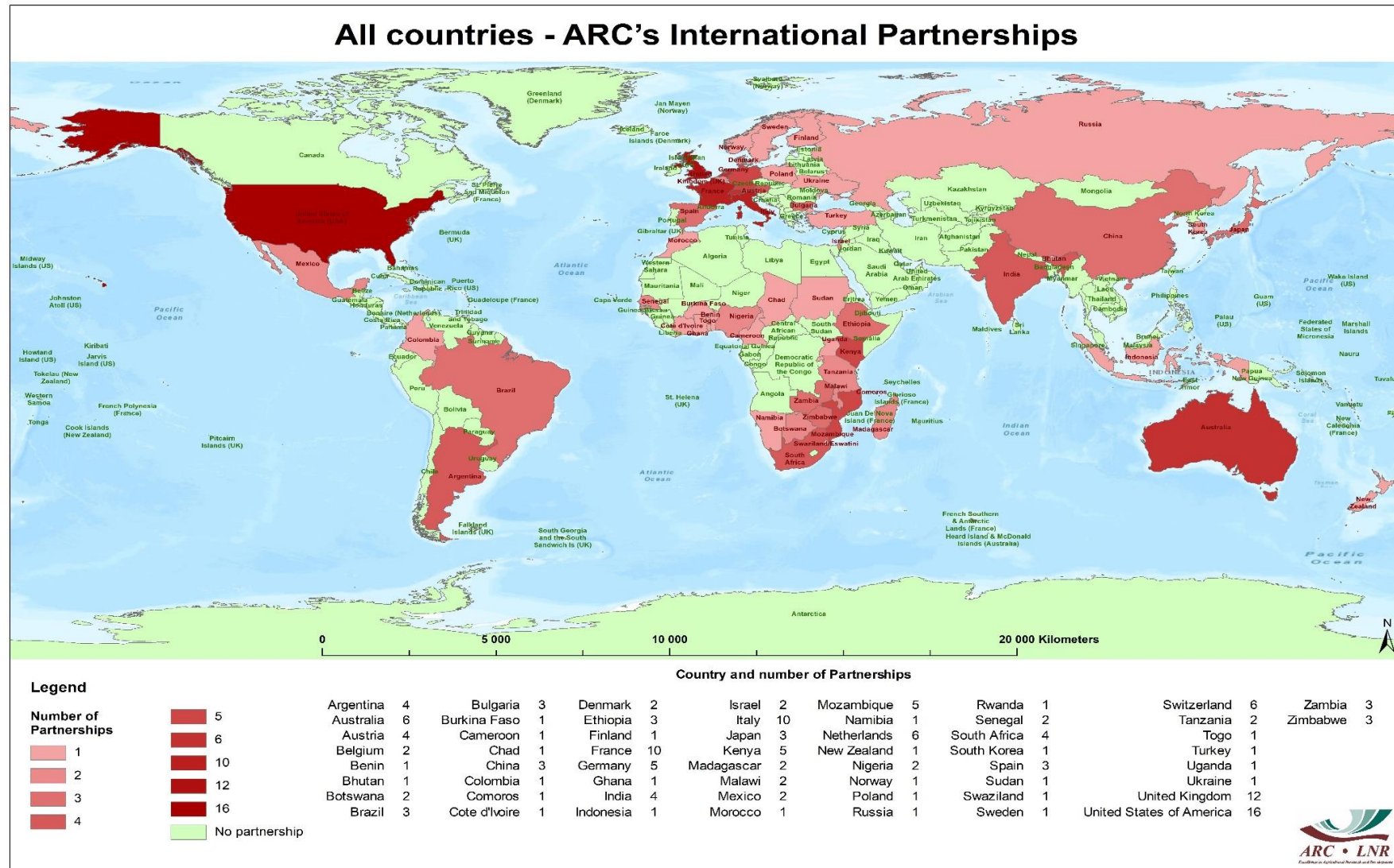
UPDATED STAKEHOLDER ANALYSIS – INFORMING 2022/23 PLANNING


The ARC has a broad range of stakeholders that it interacts with to enable delivery of its mandate. These local and international stakeholders include but are not limited to national and farmers, provincial government departments, commodity associations, funders, Universities, and other research Organisations. The stakeholders benefit from ARC R&D services or enable the ARC to translate its R&D outputs into desired outcomes for long-term impact on sector growth and productivity, poverty alleviation and food security. Understanding the range of stakeholders and the ARCs relationships with these stakeholders is important for strategic decision-making and to enable continuous improvement of these relationships. The stakeholder mapping shows the extent of ARCs reach and visibility in South Africa and beyond.

ARC - Stakeholder types per Province



All countries - ARC's International Partnerships





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AGRICULTURAL RESEARCH COUNCIL

