



AGRICULTURAL RESEARCH COUNCIL

ANNUAL REPORT 2009/2010



VISION

“Excellence in Research and Development”

MISSION

“The Agriculture Research Council is a premier science institution that conducts research with partners, develops human capital and fosters innovation in support of the agricultural sector”

CONTENTS

MESSAGE FROM THE ARC COUNCIL	2
ARC COUNCIL	3
ARC STRUCTURE	4
MESSAGE FROM THE CEO AND PRESIDENT	5
EXECUTIVE REPORT	11
RESEARCH AND DEVELOPMENT	14
<i>LIVESTOCK</i>	18
<i>ARC-Animal Production Institute</i>	18
<i>ARC-Onderstepoort Veterinary Institute</i>	19
<i>GRAIN AND INDUSTRIAL CROPS</i>	26
<i>ARC-Small Grains Institute</i>	26
<i>ARC-Institute for Industrial Crops</i>	27
<i>ARC-Grain Crops Institute</i>	28
<i>HORTICULTURE</i>	35
<i>ARC-Vegetable and Ornamental Plant Institute</i>	35
<i>ARC-Infruitec-Nietvoorbij</i>	35
<i>ARC-Institute for Tropical and Subtropical Crops</i>	37
<i>NATURAL RESOURCES AND ENGINEERING</i>	50
<i>ARC-Institute for Soil, Climate and Water</i>	50
<i>ARC-Plant Protection Research Institute</i>	51
<i>ARC-Agricultural Engineering Institute</i>	52
TECHNOLOGY TRANSFER	57
FINANCE	65
<i>CHIEF FINANCIAL OFFICER'S REVIEW</i>	65
HUMAN CAPITAL AND SUPPORT SERVICES	72
PUBLICATIONS 2009/10	85
GOVERNANCE	102
<i>REPORT OF THE AUDIT COMMITTEE</i>	103
<i>GOVERNANCE OF THE ARC</i>	106
<i>CORPORATE GOVERNANCE</i>	108
ANNUAL FINANCIAL STATEMENTS AND PERFORMANCE REPORT	112
<i>APPROVAL OF ANNUAL FINANCIAL STATEMENTS</i>	114
<i>AUDITOR-GENERAL'S REPORT</i>	115
<i>ARC PERFORMANCE REPORT FOR 2009/10</i>	120
<i>STATEMENT OF RESPONSIBILITY</i>	138
<i>STATEMENT OF FINANCIAL PERFORMANCE</i>	139
<i>STATEMENT OF FINANCIAL POSITION</i>	140
<i>STATEMENT OF CHANGES IN NET ASSETS</i>	141
<i>CASH FLOW STATEMENT</i>	142
<i>NOTES TO THE ANNUAL FINANCIAL STATEMENTS</i>	143

MESSAGE

from the ARC Council

The ARC was established in 1990 through the Agricultural Research Act, 1990 (Act no.86 of 1990) (the ARC Act). Through the years it proved itself to be the principal agricultural research institution in South Africa. The mandate of the ARC in terms of the ARC Act is as follows:

- Promote Agriculture and Industry;
- Contribute to a better quality of life; and
- Facilitate/ensure natural resource conservation.

The ARC Council's term of Office expired on 30 November 2009 after a term of more than three years.

During the year under review the Council approved the Budget and Business Plan for the ARC for implementation by Management. The Business Plan focused on 6(six) Measurable Performance Outputs, which the following:

- Strategic Objective 1 (Generate, develop and apply new knowledge and technology);
- Strategic Objective 2 (Sustainable use and management of natural resources);
- Strategic Objective 3 (Enhance Nutrition, food security and safety);
- Strategic Objective 4 (Enhance the ability of the agricultural sector to manage and mitigate agricultural risks);
- Strategic Objective 5 (Technology Transfer and commercialisation);and
- Strategic Objective 6 (Achieve Organisational growth and sustainability).

The Performance outputs along with the implementation of the Budget were monitored by Council on a quarterly basis in order to ensure that Management complies with the targets set by Council. Coupled to this, the ARC Council also approved during the latter part of 2009, a Performance Reporting Policy to assist the ARC in compiling information and reporting on the ARC's performance as against set objectives. The ARC is also in the process of implementing the new requirements from the Auditor General with regards to the Audit of Performance Information. Such audits will become mandatory going forward.

In conclusion, a word of gratitude goes towards the Minister of Agriculture, Forestry & Fisheries for her support to the ARC, to the Audit Committee, the Committees of Council, ARC President & CEO, Management and staff.

Our best wishes go to the incoming ARC Council

The ARC Council



Ms. J N Davidson
Chairperson of the
ARC Council

September 2006 to
November 2009



Ms. N Mlonzi

September 2006 to
August 2009



Dr. S R Moephuli
President & CEO



Mr. JH McBain

September 2006 to
November 2009



Dr. M S Liphadzi

September 2006 to
November 2009



Prof. P Kuzwayo

September 2006 to
November 2009



Prof. M Sibara

September 2006 to
November 2009



Ms. M A Pyoos

September 2006 to
November 2009



Dr. M Madikizela

September 2006 to
November 2009



Mr. A Young

September 2006 to
November 2009



Prof. MJ Kahn

September 2006 to
November 2009



Ms. I Wilken

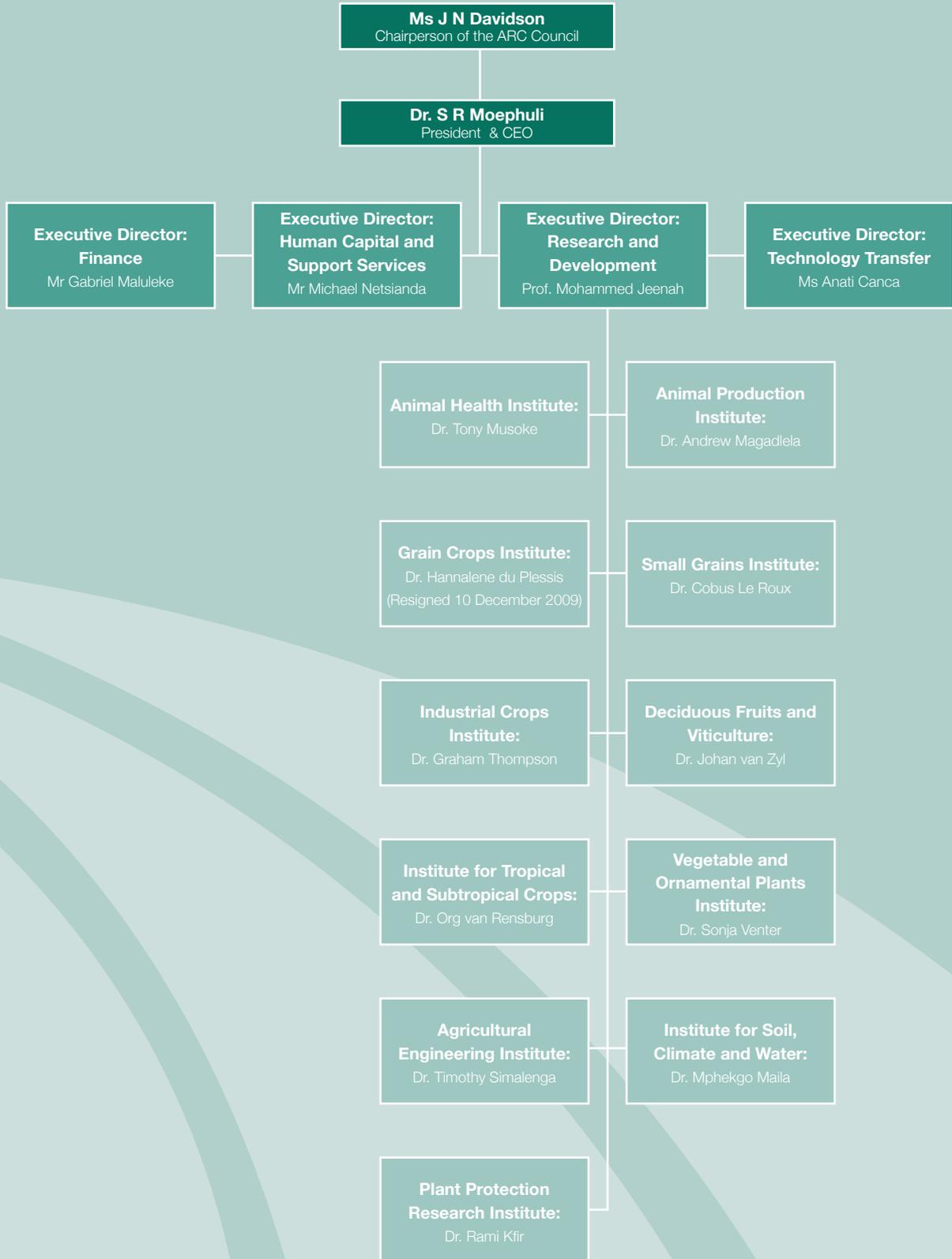
September 2006 to
November 2009



Ms. A Geldenhuys

September 2006 to
November 2009

The ARC Structure





MESSAGE

from the President and CEO of the ARC

Dr. S R Moephuli
President & CEO

On behalf of management and people, it gives me pleasure to present the Annual Report of the Agricultural Research Council (ARC) for the financial year 2009 to 2010 that ended on 31 March 2010.

This annual report reflects the business results of the ARC for the financial year 2009/10 in accordance with the approved business plan for the same period to deliver on the organisation's mandate as stipulated in the Agricultural Research Act, 1990 (Act no. 86 of 1990 as amended), and as required in terms of the Public Finance Management Act, 1999 (Act no. 1 of 1999, as amended).

During the financial year the ARC was affected by two significant changes in governance. First were the elections that ushered in political changes, a new parliament and minister responsible for agriculture, the Honourable Minister of Agriculture, Forestry and Fisheries, Ms Tina Joemat – Pettersson. This resulted in a paradigm shift in the manner in which Council regularly interacted with its shareholder, in particular expectations on priorities. Second, Council's (Board) term of office ended in November 2009.

Management and staff hereby express their appreciation for the oversight and stewardship of the previous Council and its Audit Committee.

This annual report marks the third consecutive year of implementation of the Strategic Plan for the financial years 2007/08 to 2011/12. Secondly, the report provides the first evidence of the organisation delivering upon the strategic mandate provided by Council in December 2008. In general, the ARC has succeeded in its performance to achieve the desired targets for the strategic objectives outlined in the Business Plan for the financial year 2009/10.

In spite of the economic downturn in 2009 the ARC continued to deliver practical, need based solutions that have contributed to the competitiveness and sustainability of the agriculture sector. In some instances, the organisation has contributed to agricultural growth, mainly through generation and dissemination of new technologies, information, technical know-how, general knowledge, diagnostic and analytical services, and the provision of decision support systems. This has impacted upon a broad range of stakeholders throughout the value chain across the spectrum of commodities in agriculture, including the resource poor subsistence farmers.

The ARC's contributions in science and technology innovations transcend the agricultural sector. For example, the organisation has developed standards and guidelines for water use efficiency from dam wall release to root zone application. This information was shared with the Water Research

Commission, and will be useful towards economic planning and decision making. The organisation has worked together with the National Institute for Communicable Diseases to identify and analyse the Rift Valley fever virus for effective management of infections in humans. Additional examples are contained in the detailed sections of this annual report. Needless, this provides a good indication of the importance of ARC to the National System of Innovation.

RESEARCH AND DEVELOPMENT

This reporting period marks the third year in which the organisation has focused its research and development initiatives towards similar strategic objectives and performance indicators. As the outcomes of research and development, particularly in agriculture are often realised in the medium to long term, a consistent strategic focus is critical. Such a consistent approach is essential for attaining the desired impacts on the performance of the agricultural sector, which in turn will enable effective measurement of the investments into research and development.

In spite of the economic downturn that adversely impacted on the realisation of research contracts, the organisation has excelled in its performance as measured against several key performance indicators linked to the strategic objectives of the Business Plan for financial year 2009/10.

The ARC has exceeded its target of 185 by attaining 229 (124 %) scientific publications and presentations. The majority of the scientific publications are in peer reviewed and ISI rated articles/chapters in books. An increasing number of publications were in journals with impact factors greater than 0.5; suggesting improvements in the quality of output. Further, the number of peer reviewed publications exceeds the total number of employees with PhD degrees.

The ARC's performance in scientific publications and presentations is balanced across the first four strategic objectives. Analysis indicates that 19 % of the total scientific publications and presentations were the ARC's contribution towards generating,

developing and applying new knowledge and technology. On sustainable use and management of natural resources the ARC contributed 24 % of the total scientific publications and presentations. Approximately 32 % of total scientific publications and presentations achieved were on strategic objective 3: enhancing nutrition food security and safety; while 23.6 % were on enhancing the ability of the agricultural sector to manage and mitigate agricultural risks. Overall, the pattern of performance is in accordance with the business plan specific strategic objectives.

High level performance could be attributed to a focus on highly skilled scientists. In this regard, the ARC has been successful in recruiting highly trained and experienced scientists for its research and development efforts. The same applies for retention of its world class scientists.

The organisation's scientific leadership is important for effective support to the successful performance of the agricultural sector. Our diagnostic and analytical laboratories have spearheaded their scientific innovation for effective residue monitoring to enhance food safety and market access. For example, they have developed and validated two new ELISA screening methods for Clenbuterol and Salbutamol in animal feed. This will enable the laboratory to detect residues of Clenbuterol and Salbutamol in samples from animals that received these growth promoting agents; which in turn, will ensure compliance by meat exporters for market access.

The future of the newly released blushed pear of the ARC, Cheeky™ is looking very significant and will play a huge role in the establishment of early blush pears for the South African Pear Industry in Europe and other export countries. The confirmed tree orders for 2010 is 206 813 (in the order of 165ha) and for next year an additional 180 490 trees (total hectares for 2010/11 is 310ha) will be planted. This shows the importance of this new cultivar as the total number of hectares under production of early blushed pear cultivars, Rosemarie & Flamingo, is currently about 527 ha. The prediction is that by the end of 2012, the total number of hectares under the cultivation of Cheeky™ will be 37% of the total early blushed pears in South Africa.

It is expected that Cheeky™ will dominate the market of early ripening blush pears and that it will have the same impact as Forelle which ranks second (25 % of the production area) among pear varieties produced in South Africa. Based on this scenario, Cheeky™ has the potential to earn the South African Pear Industry about R354 million per annum, and to secure jobs for 3611 farm workers.

Sustainable use of natural resources forms the basis upon which agriculture could contribute towards the growth and development of our society. The ARC has continued to excel in its contribution towards conservation and sustainable use of natural resources. This entails improving our understanding of climate change, particularly as it pertains to agriculture and related industries. For this reason, the ARC has continued to gather data and information on weather patterns aimed at developing prediction maps for decision makers, particularly the agricultural sector. Such information was crucial in improving our understanding distribution patterns of alien invasive species and their management.

Researchers have continued to generate soil data and information towards decision support for policy makers and the agricultural sector. For example, direct mapping of certain soil features from multi – spectral satellite imagery was utilised to reduce dependency on land type data; thus enabling the use of Multilayer Decision Support System. Such information is vital for planning and land utilisation, particularly by national and local authorities.

Water conservation is important for natural resource management and agricultural productivity. In this regard, the ARC has contributed towards the development of norms and standards such as pressure, flow measurements, and distribution tests for use by the Limpopo Department of Agriculture in nine irrigation schemes.

During the reporting period the ARC conducted a number of research projects aimed at enhancing nutrition, food security and food safety. Sweet potato cultivar recommendations were developed for resource poor and commercial farmers in a number of areas, Elsenburg (Western Cape), Fort Cox (Eastern Cape) and Roodeplaat (Gauteng). These were varieties with improved yield (5 to 10

tons/hectare) and higher dry matter content as well as acceptable taste. It's expected that this outcome will enable communities to consume higher amounts of these orange fleshed sweet potatoes; which in turn, will lead to reduction in malnutrition.

The agricultural sector is often faced with a number of challenges that require innovative and creative mitigating strategies. The ARC has been successful at a number of initiatives to develop and transfer technological solutions that increase the ability of the agricultural sector to mitigate the effects of risks and threats to production. A new time saving and cheaper method for screening and detecting Avian Influenza Virus (AIV) and Newcastle Disease Virus, was developed and approved by regulatory authorities. Use of this method will reduce costs to livestock producers and facilitate disease infection within a shorter time.

In collaboration with regulatory authorities, the ARC has provided diagnostic services to confirm the outbreak of Rift Valley Fever virus in a number of areas in different provinces, Free State, Gauteng, Eastern Cape, Western Cape and KwaZulu – Natal. This service also enabled the organisation to study the disease pattern and advise regulatory authorities on mitigation strategies. Some of the information gathered during this outbreak has been integrated into the project to develop a new vaccine against the disease.

A significant achievement for disease control was made through the development of a lumpy skin disease virus. This is significant because this vaccine is stable under hot dry conditions and offers long term protection. These attributes are important for managing diseases in the hot conditions of South Africa and the continent. As the vaccine offers long term protection, this will enable farmers to save on the cost of vaccination and realise higher livestock productivity.

TECHNOLOGY TRANSFER

In the year under review the ARC has successfully managed its intellectual property portfolio. The researcher's innovations have generated intellectual property for the ARC. This achievement facilitates the release of new cultivars that are important for

agricultural production and competitiveness of the sector. In addition, the organisation has filed an application for a patent for a vaccine in the United States.

Research and development initiatives have been integrated with the technology transfer approaches applied by the organisation. For example, 300 emerging, resource poor farmers were trained through one of the Animal Improvement Schemes, Kaonafatso ya Dikgomo. This scheme empowered participating farmers with confidence to sell part of their herd. This was done through ensuring good practices (e.g animal recording and performance testing). Some farmers have raised their cattle off – take (saleability) above 20 %, which is within the norm for commercial enterprises. The Scheme appears to have raised the wealth of farmers 8 fold.

As part of an integrated approach to food security and good nutrition, the ARC trained farmers on the production of vitamin A rich vegetables. This training programme involved the establishment of nurseries for the orange fleshed sweet potato in five regions.

The ARC has continued to expand on a project that was initiated several years ago on fruit and nut trees in the OR Tambo district. High value crops including fruit trees (e.g. citrus, mango, guava, litchi, banana, avocado, and essential oils) have been introduced to 52 villages that comprise more than 2500 households and over 90 000 tree crops. Some villagers have now harvested the crops and processed them into jams for selling in their localities and at schools. The major outcome of this training initiative has been on good agricultural practices and post – harvest handling of the fruit. In the near future thirty of the 52 villages will be assisted to form primary production cooperative to enable efficient processing, marketing and economies of scale.

Training was presented in five schools representing 5 regions of North West to promote production of the orange fleshed sweet potato in Mafikeng, Kenneth Kaunda region, Rustenburg, Hammanskraal and Vryburg. Further, 500 cuttings of the orange fleshed sweet potato were distributed among 50 schools in each region. To supplement the training provided, demonstration plots were established at the different primary schools in the North West province.

HUMAN RESOURCES

As a Science Council, human resources are the most important asset of the organisation. A number of initiatives aimed at ensuring that the organisation provides the best environment to harness all the potential of its people were implemented.

In order to encourage good performance and retain the best individuals in the organisation we embarked on a new performance management and development system. Training to implement the system was provided and to date, this appears to have improved the morale among the personnel.

Management has continued to place a premium on good employee relations. This has been reflected by the successful conclusion of wage negotiations with organised labour without disturbances. Further, the number of labour disputes and disciplinary cases continued to decline. Such an atmosphere has enabled management to focus on individual performance that is reflected in the organisation's research and development results.

Although the turnover rate for ARC has been relatively low, at 4,9 %, when compared with other similar organisations, challenges within this sphere remain a concern. Any resignation of a few highly skilled and experienced scientists tends to adversely impact upon ARC and the sector. Recruitment of skilled and experienced scientist has been difficult. This is exacerbated by the limited pool of human resources available within the country for recruitment.

To mitigate the scarce skills the ARC has continued its human resource development initiatives. In the year under review the ARC received R2.6 million from the National Research Foundation for capacity building initiatives aimed at improving the skills of 19 doctoral students. Some of the doctoral students are employed within the organisation. Funds were received from other sources for various training initiatives, including R1,9 million from the AgriSETA.

The Professional Development Programme (PDP) remains a key instrument for capacity building within the ARC. During the year under review approximately 90 students were enrolled within the PDP and DST Professional Research Development Programme,

and attached to mentors. Given the needs of the ARC and the sector, it's imperative that additional resources are obtained to increase the number of participants in this programme. The PDP has served as the best source for recruitment of young scientists and transforming the demographics of ARC.

To successfully generate scientific innovations that respond to the needs of the sector, the organisation seeks to continually improve the skills of its personnel. Informal training initiatives were provided to 795 employees in the reporting period.

OUR FINANCES

Effective management of finances remains one of the key performance indicators of the organisation in all areas. Our aim is to ensure an organisation that derives optimal value from all resources that are deployed for excellent performance.

A 10 year review of finances has revealed that the main sources of revenue for the ARC have been the parliamentary grant received through the Minister for Agriculture, Forestry and Fisheries; and, a smaller amount from the Department of Science and Technology. When combined these transfer payments constitute 64 % of ARC's total income. In the early years, 1999 to 2003 this grant remained relatively constant. However, in the last 5 years these transfer payments were increased by an average of 5 % per annum; which has been below the average annual inflation rate for the same period. Approximately 92 % of the parliamentary grant received is utilised for personnel costs; which forces the ARC to finance other operating costs through contract income. This clearly reflects under – investment by all stakeholders, public and private, in agricultural research at the ARC.

Such under – investments in agricultural research have adversely impacted upon the sustainable leadership performance of the ARC. The net effect has been the inability to retain and recruit skilled personnel. Although the quality of publications has improved, the target number of publications had to be lowered due to lack of critical mass of experienced scientists. In some instances projects had to be curtailed in order to ensure delivery within

allocated human and financial resources. Further, the organisation could not generate additional external income due to the limited parliamentary grant allocations. If this trend continues, it will exacerbate the long – term risk of the inability of the ARC to fulfil its mandate.

During the reporting period the organisation continued to implement improvements in internal controls, including through the revised Supply Chain Management Policy, the Income Recognition Policy, and the Performance Information Policy. Management further implemented improvements in response to the Auditor General's report for financial year 2008/09, including training of personnel and recruitment of suitably qualified finance individuals.

The ARC would like to congratulate South Africans on the hosting of the 2010 Soccer World Cup. As this activity falls outside the mandate of the ARC, the organisation has not incurred expenditure related to the 2010 Soccer World Cup. To encourage participation at the event, personnel were allowed to seek authorised leave of absence for purposes of being absent from duty during working hours.

This reporting period marks the first time during which the Auditor General would make detailed comment on the performance information. Management has therefore taken particular attention to providing detailed reports as contained in this annual report on the Performance Information Report. This provides a direct link between the strategic objectives, key performance indicators, targets and the actual performance of the organisation. Where targets have not been met reasons for such variances have been provided. It should be noted that there appears to be a direct correlation between the available resources, particularly financial, and the performance of ARC. It's expected that the Auditor General would provide meaningful comment on the performance report to enable the organisation to improve on its reporting in future years.

Other matters of non – compliance continue to be monitored and identified through our internal controls. Internal audit services have continuously provided meaningful and timeous information on any non – compliance, including advice on how improvements could be made. Other mechanisms include the risk management tools and processes

as monitored by management and the chief risk officer. Where incidents of fraud/theft have been identified appropriate corrective actions were taken, including disciplinary measures, prosecutions and recovery of lost funds. The Audit Committee has been informed at all times regarding the compliance assurance of the organisation.

The internal audit service providers have delivered good quality that ensured the integrity of our internal controls. Therefore, on behalf of the ARC we thank them for this quality assurance system.

The ARC hereby thanks the Auditor General for providing and external audit service of good quality in a professional manner.

CLIENTS AND STAKEHOLDERS

To our most valued customers, partners, beneficiaries, suppliers and stakeholders, we the people at ARC would like to extend our utmost gratitude for your support during the last financial year. We trust and hope that you will continue to work with us and support the ARC in various ways (financial and otherwise) to ensure that we achieve our common goal of excellence in agricultural research and development for economic growth and prosperity.

A special message of thanks for support, advice and commitment for the success of the ARC is extended to the government Departments of Agriculture, Science and Technology.

On behalf of all who are employed at ARC, Executive Management hereby thanks Council and the Audit Committee for exercising their fiduciary duties with

utmost care and vision for excellence. In particular, management appreciates the support, guidance and effort you have all devoted to the ARC.

Further, on behalf of all at ARC, Executive Management hereby thanks the Executive Authority, the Minister of Agriculture, Forestry and Fisheries, the Honourable Minister Tina Joemat – Paterson, the Portfolio Committee for Agriculture, Forestry and Fisheries for the contribution and support towards the success of ARC.

Re a leboha, le ka moso

Re a leboga, le kamoso

Re a leboga, le gosasa

Siyabulela, nangamso

Siyabonga, nakusasa

Siyathokoza, nangamoso

Ha khensa, aswive tano na mudzuku

Ria livhuwa, khazwiralo na matshele

Baie dankie

Thank you



Dr. Shadrack Ralekeno Moephuli
President and Chief Executive Officer

Executive Report

SUBMISSION OF THE ANNUAL REPORT TO THE EXECUTIVE AUTHORITY

On behalf of the Council of the Agricultural Research Council (ARC), we hereby submit to Parliament, through the Minister for Agriculture, Forestry and Fisheries (DAFF), this report and the audited financial statements of the ARC for the financial year ending 31 March 2010

STATUTORY BASIS

The ARC is a public entity established under the Agricultural Research Act, 1990 (Act no. 86 of 1990, as amended). It is a schedule 3A public entity in terms of the Public Finance Management Act, 1999 (Act no. 1 of 1999, as amended by Act No. 29 of 1999).

PRIMARY MANDATE

In terms of the Act, the objectives of the ARC are to conduct research, drive research and development, drive technology development and transfer (dissemination) in order to:

- promote agriculture and related industries;
- contribute to better quality of life; and
- facilitate/ ensure natural resource conservation
- alleviate poverty

MAIN FUNCTIONS

The ARC's main functions as provided for in the Act are to:

- Undertake and promote research, technology development and technology transfer;
- Utilise the technological expertise in its possession and make it generally available;
- Publish information concerning its objectives and functions, and establish facilities for the collection and dissemination of information in connection with research and development;
- Publish the results of research;
- Establish and control facilities in fields of research, technology development and technology transfer that the Council may determine from time to time;
- Cooperate with departments of state, institutions, persons and other authorities for the promotion and conduct of research, technology development and technology transfer;
- Promote the training of research workers by means of bursaries or grants in aid of research, technology development and technology transfer, and contribute financially to research, development and technology transfer programmes;
- Hire or let facilities; and
- Cooperate with persons and authorities in other countries conducting or promoting research, technology development and technology transfer in agriculture.

STRATEGIC OBJECTIVES

As part of its strategic review and business planning process for 2009/10, the ARC refined its strategic objectives for the financial year in light of key external and internal circumstance changes. While clearly identifiable with the strategic objectives set out in the ARC's five year strategic plan for 2007/8 to 2011/12, the strategic objectives were reviewed to ensure alignment between ARC business and national priorities, particularly as formulated by the Department of Agriculture, Forestry and Fisheries and the Department of Science and Technology. The ARC's strategic objectives for 2009/10 were:

1. Generate, develop and apply new knowledge and technology;
2. Sustainable use and management of natural resources;
3. Enhance nutrition, food security and safety;
4. Enhance the ability of the agricultural sector to manage and mitigate agricultural risks;
5. Technology transfer; and
6. Achieve organisational growth and sustainability.

AGENCY MANDATES

In addition to its primary mandate and functions in terms of the ARC Act, the organisation undertakes investigations, research, development and technology transfer whenever assigned by the Minister, or on contractual agreement with clients in the industry. To this effect, the ARC is responsible for maintaining a range of National Assets and providing a set of what is commonly termed National Services. These are critical elements of the ARC's daily operations which are maintained and provided as per mandates. Their delivery and quality is monitored and evaluated as an ongoing part of overall ARC quality management systems. This means they do not appear as a specific strategic objective.

All the ARC institutes either maintain or manage at least one or a combination of the classes in alignment with their mandate:

Utility of the National Assets

It is important in the national interest to maintain a national reference collection. The concept "public good" is defined as "that good, the benefit (including financial) of which does not entirely accrue to an individual or group, but to the public at large and where the government acts on behalf of the country". It also relates to on-going research and the delivery of essential services. They provide a wide range of functions amongst which are:

- a) To support public functions of government and obligations under international agreements
 - International obligations that compel it to keep reference collections of all agricultural specimens with respect to the import and export of agricultural produce
 - Provide critical diagnostic support to the government phyto-sanitary services.
 - Strategic national and international diagnostic and animal disease control capacity
 - Strategic national and international diagnostic and plant disease control capacity
- b) Research
 - Natural resource inventories such as soil, water, climate and vegetation data banks and includes weather stations for climate inventories and collection of data.
 - They make an important contribution to scientific studies, biodiversity replenishment, sustainable development and production, food security and the invader pest identification.

ORGANISATION AND FACILITIES

The ARC conducts its business at Head Office and on 11 main research campuses – at Bethlehem, Nelspruit, Potchefstroom, Pretoria, Rustenburg and Stellenbosch – and a number of laboratories, office buildings and research farms throughout the country. The ARC's research and development capability is organised as follows:

- Animals (livestock):
 - Animal Health (Onderstepoort Veterinary Institute);
 - Animal Production Institute;
- Grain and Industrial Crops:
 - Institute for Industrial Crops;
 - Small Grain Institute;
 - Grain Crops Institute;
- Horticulture:
 - Institute for Tropical and Subtropical Crops;
 - Infruitec-Nietvoorbij;
 - Vegetable and Ornamental Plants Institute;
- Natural Resources and Engineering:
 - Institute for Agricultural Engineering;
 - Institute for Soil, Climate and Water;
 - Plant Protection Research Institute.

The ARC additionally has cross-cutting Technology Transfer, Human Resources and Support Services, and Financial Management groups that operate from its main office in Pretoria.

Research and Development

LIVESTOCK	18
ARC-Animal Production Institute	18
ARC-Onderstepoort Veterinary Institute	19
GRAIN AND INDUSTRIAL CROPS	26
ARC-Small Grain Institute	26
ARC-Industrial Crops Institute	27
ARC-Grain Crops Institute	28
HORTICULTURE	35
ARC Vegetable and Ornamental Plant Institute	35
ARC Infruitec-Nietvoorbij	36
ARC-Institute for Tropical and Subtropical Crops	37
NATURAL RESOURCES AND ENGINEERING	50
ARC-Institute for Soil, Climate and Water	50
ARC-Plant Protection Research Institute	51
ARC-Institute For Agricultural Engineering	52



Research and Development



Dr. M Jeenah
Executive Director: Research & Development

SUMMARY

In this past year the ARC's research community like the rest of South Africa has experienced a year of change. The year has seen a new government being installed with a strong emphasis on re-establishing a strong agricultural sector, to an economic climate that has seen the country and most of the globe slipping into a recession and subsequently emerging from the recession. The prediction of below normal rainfall, because of the El-Nino effect, was replaced by one of above normal rainfall. Internally the research community also ushered in a new executive director for research and development and a revised research strategy.

The revised research strategy has 4 broad thrusts that aims to build on the success of the past years as well as ensure that the ARC takes its rightful place on the national and international stage.

- Development of a research agenda that will allow the ARC to focus on national needs.
- Ensure that a critical mass of researchers engage in the research agenda either through bringing in high quality researchers or collaborating with partners at universities and science councils.
- Developing partnerships with public and private sector both in country as well as internationally to ensure that the ARC has a sustainable source of funding.
- The fourth thrust relates to developing collaborative relationships with all the role players in the country to ensure the ARC fully utilises the limited resources in the country and plays a leadership role.

In developing the research agenda a number of multi-disciplinary projects have been initiated and now form the core of the 10/11 business plan. Two of the cross cutting themes are climate change

and conservation agriculture. The research agenda has been developed with the objective of ensuring that the critical challenges facing the agricultural sector is addressed in a holistic manner and that multi-disciplinary teams address factors such as increasing productivity and yields, developing disease resistance, addressing the challenges raised by abiotic stresses such as drought and ultimately ensuring food security. The highlights are presented in the section that deals with the strategic objectives which illustrate the multi-disciplinary nature of the research.

The development of communities of practices that bring together researchers from a particular discipline ensures that there is effective sharing of experiences and that problems are addressed by developing innovative approaches that might have been utilised within other crops or animals. An effective example of this is highlighted in detail elsewhere in the report. The ARC in conjunction with a private company have developed and patented a process to synthesise heavy metal-free fulvic acid, which was named carbohydrate-derived fulvic acid (CHD-FA). The CHD-FA has been shown to be effective as a sterilising agent in the veterinary field against Avian Influenza Virus and Feline Herpes Virus. The researchers intend to expand the testing of their product against important fungal, bacterial and viral diseases of potatoes and tomatoes. Researchers within the crops division have already shown its effectiveness against diseases affecting grains.

The process of developing the research agenda has also provided the rationale for more effective utilisation of infrastructure through the development of technology platforms. International best practice has shown that for an agricultural research organisation to develop novel solutions in the shortest possible time it will have to develop capabilities in biotechnology. The challenges faced in developing this capacity lie in the cost of the equipment and in the rapid development of newer technologies. This necessitates that expensive equipment has to be fully utilised and is amortised in the shortest possible time. A platform that brings together the range of biotechnology has been initiated in this financial year.

The development of a critical mass of researchers in an era of transformation and an aging population of researchers is challenging in that many experienced researchers that can mentor the next generation have reached retirement age. The ARC is developing strategies to retain them at a time of declining funding for personnel cost. We are however committed to producing the next generation of researchers. This year we have produced 29 Masters and Doctorate graduates against a target of 17. This is reflective of the drive to develop human capacity as well as ensure that they graduate in the shortest possible time.

Another strategy to address the issue of critical mass and declining resources is to develop collaborations. The ARC has ensured that it delivers on its mandate through partnerships. The table on page 122 shows that the ARC continued to work with researchers at other institutions. The target for the 09/10 year was to publish 47 publications with external authors and 83 papers were published with researchers externally. The large number of collaborative projects has been necessary to optimise human capital and to develop a research agenda that is integrated in to the national agenda. The ARC has also established collaborative arrangements with international partners. Examples of the collaboration in the livestock division deal with developing more effective vaccines for Foot and Mouth Disease (FMD) and Rift Valley Fever. The work is funded by Wellcome Trust and Galvmed respectively.

CIMMYT, an international centre for maize research has funded a multi-million rand project involving researchers on three continents working on improved maize for African Soils. The addressing of critical issues in South Africa with international partners and funding is a critical component of the Research Strategy. The programme has been structured so that resource poor farmers in Africa can access the varieties at no additional cost.

Despite the changes or because of the changes the Institutes continued to achieve excellence and have had a highly successful year, as measured against the key performance indicators stated in the ARC Business Plan 2009/10.

In this financial year the ARC has published more than 220 peer reviewed publications against a target of 139. This has been achieved through a constant rate of publication over all the quarters. The institution places a high premium on quality of publications and uses an international benchmark of measuring the impact factor of a journal. The ARC had classified its targets into 4 categories. This was to ensure that researchers do publish in high quality journals. The overachievement has been achieved in journals of those with impact factor between 0.5 and 2 and those above 2. The overachievement in the higher categories has however been at the expense of the targets for publications in lower impact factor journals. This is highly encouraging in that researchers are not just publishing for the sake of publishing but are striving for quality research.

The targets for books were also exceeding with 150 chapters being written against a target of 50. These books form part of authoritative text for researchers and farmers in the field and are an important route to ensure that the findings of the research that is conducted reaches the intended audiences.

In ensuring that the council plays a leadership role scientifically it is important that the leading researchers are invited to scientific meetings. As a reflection of the ARC standing in the scientific community 15 researchers were invited to present keynote addresses both locally and internationally.

A number of researchers also delivered presentations at Conferences. The ARC had made more than 378 presentations against a target of 95. The majority of these presentations took place in the 2nd and the 4th quarter.

Unfortunately the long term goal of increasing the number of publications is being jeopardised by the loss of experienced researchers. Whilst the ARC continues to develop young researchers it is an international norm that the scientific output both in quantity and quality is compromised. This is a danger that the ARC is aware of and its drive to increase collaborations is a strategy to counter this phenomenon.

More than a hundred and fifty major findings that speak to the ARC strategic objectives and key result areas are detailed within the reports of the different divisions and institutes. In my report I have highlighted below the significant role the ARC has played through the utilisation of its expertise and provision of diagnostic services in assisting the South African agricultural industry to mitigate against agricultural risk. This year of change has seen a number of disease outbreaks that the ARC has identified and actively assisted the Department of Agriculture both nationally and provincially in managing the risk. The details of the outbreaks and the ARC's role in mitigating the risk are highlighted in the following sections:



Livestock



ARC-ANIMAL PRODUCTION INSTITUTE



Dr. Andrew Magadela
Research Institute Manager

MANDATE

The ARC-Animal Production Institute (ARC-API) is based in Irene, with several satellite stations strategically positioned throughout the country, and is one of eleven R & D institutes of the ARC.

API carries out primary and secondary research, development and technology transfer with respect to Animal Breeding and Improvement, Rangelands and Nutrition and Food Science and Technology to improve productivity and sustainable resource utilisation. In addition, API serves as the custodian of national assets such as the conservation of animal, forage and bacterial culture collection genetic

resources, including databases and DNA banks associated with them. The country's Livestock Recording and Improvement Schemes and associated database, the Integrated Recording and Information Systems (INTERGIS) are also managed by the Institute on behalf of the Department of Agriculture, Forestry and Fisheries.

API strategic focus for research and service delivery is guided by the strategic goals of the ARC and national priorities (e.g. The Agriculture Plan of Action, The National Livestock Strategy, The Land and Agriculture Reform Programme, The National Research and Development Strategy).



ARC-ONDERSTEPSPOORT VETERINARY INSTITUTE



Prof. Tony Musoke
Research Institute Manager

MANDATE

The Mandate of Onderstepoort Veterinary Institute (ARC-OVI) is to conduct research in order to improve and develop new technologies such as vaccine technologies and diagnostic tools and to provide

service for enhanced veterinary services diseases control and surveillance and to transfer relevant/appropriate technologies to the resource-poor farmers. The ARC-OVI has a secondary mandate to provide an analytical service for National Residue Monitoring Programme in support of the export of red meat.

STRATEGIC OBJECTIVE 1: GENERATE, DEVELOP & APPLY NEW KNOWLEDGE AND TECHNOLOGY

KRA 1.2: Increased agricultural productivity

Programme A: Agricultural Biotechnology

Despite the restricted distribution of foot-and-mouth disease (FMD) in the world, it remains a compulsory notifiable disease. The situation in Africa is complicated by genetic and antigenic variability of the South African Territories (SAT) types, infrequent reports of outbreaks and uncertainty surrounding vaccine efficacy. In an attempt to develop an improved vaccine against Foot-and-Mouth Disease, ARC-OVI has embarked on defining the neutralizing epitopes expressed on the virus. By combining the predictive power of bioinformatics techniques and conventional molecular approaches, a neutralising epitope was identified and shown to play an important role in antigenicity in most FMDV serotypes. This will assist in formulating a sub-unit vaccine based on broad-spectrum neutralising epitopes.

The ARC formally joined the Global Foot and Mouth Disease Research Alliance (GFRA) as a collaborating institution. Launched in 2003, GFRA is a worldwide association of animal research organisations that are involved in combating FMD. Through its association with GFRA the ARC aims to expand FMD research

collaborations worldwide and maximise the use of resources and expertise.

African swine fever (ASF) is an acute haemorrhagic fever of domestic pigs which causes mortality approaching 100%. It causes large economic losses to the rural and peri-urban poor pig farmers as well as commercial farmers. In areas where ASF is endemic the disease impacts negatively on the sustainability of these practices thereby limiting the availability of cheap, high-quality proteins and steady income streams for rural communities. The development of vaccines against ASF has received international attention in recent years. The ARC-OVI has conducted research to identify candidate strains from southern Africa that could potentially be used in the development of an attenuated vaccine for ASF. Results of controlled infection experiments suggest that some field strains of the virus have reduced virulence in domestic pigs, which could potentially be used to develop an attenuated vaccine for application in southern Africa. Phenotypic characterisation of the isolate in vitro revealed that it has lost the ability to bind red blood cells, a trait that has previously been linked to natural attenuation of ASFV.

The past year's outbreak of Rift Valley fever has once again highlighted the impact of animal diseases on society. The New Generation Vaccine programme has been involved for some years in researching and developing a new generation vaccine for this important and potentially lethal zoonosis. The

approach being taken is to incorporate genes from the pathogenic Rift Valley Fever Virus (RVFV) into an attenuated poxvirus which then serves as the delivery system. This results in a dual vaccine which can protect animals not only against RVFV, but against other poxviruses which may threaten the country's livestock. An experimental version of this vaccine is now ready for phase II trials. Funding for this final stage of the project has been acquired from the Bill and Melinda Gates Foundation via an international intermediary. Notwithstanding this promising development, the research team continues to work at improving this vaccine delivery system further by removing immunomodulatory genes from the poxvirus with the aim of improving immune responses in the vaccinated animal. Moreover, proteins produced early in the virus's replicative cycle stimulate cellular immune responses, whereas late proteins stimulate humoral responses. Future work will target the promoters responsible for switching on these genes so as to be able to preferentially stimulate one or the other response.

The poxvirus vector was also used to deliver antigens of the organism which causes contagious bovine pleuropneumonia (CBPP) in an experimental vaccine trial which was carried out in Mali late last year. Although this disease is of no immediate relevance to South Africa, this project has extended the programme's capacity identifying, expressing and purifying bacterial antigens. Some of the vaccine targets identified earlier in this study by means of phage display will now be investigated for their usefulness as diagnostic targets for early disease detection in a project which is to be funded by the Biotechnology and Biological Sciences Research Council of the United Kingdom.

The control of many diseases affecting the livestock industry in South Africa are complicated by the lack of appropriate laboratory diagnostic tools capable of accurately identifying the causative agents. As such the development of new diagnostic tools forms a significant part of the research activities within the ARC.

In the past few years, both Newcastle disease and avian influenza have had a severe impact in the ostrich industry. In order to address such

problems in future and to develop effective vaccines and diagnostic reagents for ostriches it is necessary to understand how its immune system interacts with the pathogen. While much research has been carried out on the chicken immune system, virtually nothing is known about ostrich immunoglobulins or their genes. For instance, it was only recently confirmed that their predominant immunoglobulins do not cross-react serologically. To help address this knowledge gap, the N-terminal amino acid sequences of ostrich H and L chains were determined. In addition mRNA was isolated from an ostrich spleen and a cDNA bacteriophage lambda library constructed. The amino acid sequence data will be used to identify clones that contain immunoglobulin genes sequences.

A gene coding for a protein with the potential to be used to detect antibodies to Alcelaphine herpes virus in infected animals identified and expressed using recombinant protein technologies. This has enabled researchers to develop an ELISA to detect antibodies elicited by the virus. This is a significant step towards determination of efficacy of immunisation of susceptible animals.

Fusarium isolates were identified using genus and species-specific primers. This is the first time that Marker Assisted techniques were used to identify Fusarium isolates to species level as an alternative to traditional mycology taxonomy techniques. The newly developed method ensures an increase in accuracy and reduction of turn-around time compared to conventional methods.

KRA 1.3: Improved food quality

Programme A: Diagnostics for agricultural products and contaminants

Monitoring chemical residues in food has become a major focus of public health programs globally. The ARC is actively involved in ensuring safety and quality of agricultural product in South Africa by providing a diagnostic service to DAFF and industry for the detection of residual compounds.

Analytical services have successfully completed the first National Residue Monitoring Programme during

the past year. This included monitoring bovine, ovine, porcine and poultry meat as well as eggs, milk and honey. The National Residue Control Programme, focusing on exports of red meat to the EU was completed on time and was considered to be extremely successful by Department of Agriculture Forestry and Fisheries (DAFF). Several new methods both for screening and confirmation of growth stimulants and veterinary drugs were developed and successfully integrated in both programmes as well as utilised for external income. The laboratory was also successful in maintaining its ISO 17025 accreditation status.

Two HPLC methods for the detection of Resorantel and Niclosamide in ostrich liver were developed. This was done to ensure that all listed anthelmintics used in the ostrich industry is analysed before exports to the EU. In addition, methods for levamisole and avermectins in milk were also validated and are now included under the technique accreditation umbrella.

A new extraction procedure for tetracyclines in milk, honey and tissue samples were evaluated and validated at ARC-PPRI. These methods will strengthen the laboratories ability to comply with all necessary requirements to ensure food safety and to facilitate international trade.

A unique multi-residue method for determining 21 pesticide residues in mother's milk has reached finalisation. This complex method was developed by senior analysts at ARC-PPRI. This unique method of determining pesticide residues in mother's milk is one of a kind in the world and places the Pesticide Residue Analytical Laboratory in a really strong position in the market place.

A new PCR-based assay was developed and confirmed to amplify a 372 bp fragment at the 5'-end of genome segment 7 of all nine serotypes of African horse sickness virus (AHSV). This will enable the use of probe hybridisation to identify AHSV more specifically than what is possible when using conventional RT-PCR in a real-time format.

An ELISA that makes use of recombinant Equine Encephalosis Virus isolates (EEV) VP7 antigen and HRP conjugated protein G in an indirect format was developed. The kit has undergone fit-for-purpose

validation and is currently being used in-house for routine diagnostics. This ELISA will enhance specificity and sensitivity to be attained and also makes it possible to standardise the test.

An un-named *Theileria* species (buffalo) which is genetically similar and thus, interfering with *Theileria parva* (cause of the controlled Corridor disease) test and its biology are the subject of great attention for many years. The most important achievement in the study of the organism is the successful cultivation of the parasite in tissue culture and the development of a more specific and sensitive test. This is likely to have positive economic consequences in cattle farming and the game industry

STRATEGIC OBJECTIVE 2: SUSTAINABLE NATURAL RESOURCES

KRA 2.1: Characterisation of the natural resources and ecological systems

Programme A: Characterisation and quantification

Effective management of the available grazing is essential for to ensure the long-term sustainability of the livestock industry in South Africa. Researchers at the ARC-API have developed a method to establish dry land legume pastures under minimum till conditions on old abandoned arable grazing land. This has enabled the establishment legume pastures on a landscape scale. Investment in this sector could result in significant increase of livestock production from communal grazing land in the moderate to high rainfall pastoral areas of the Eastern Coasts of South Africa.

It has also been shown that the removal of grazing pressure alone does not ensure effective rehabilitation of semi-arid rangelands in Namaqualand. Research has indicated that the seed bank of palatable plants in soil is depleted due to cropping and heavy grazing. Palatable species, which occur in virgin land and lightly in grazed areas, have been identified and will be used as a source to ensure rehabilitation.

KRA 2.2: Maintenance and use of National Assets

Programme A: Maintenance of National Assets

Seven hundred and fifty (750) new accessions have been added to the viruses and antisera banks maintained at the ARC-OVI. This brings the total number of accessions held by the collection to 414109.

The national assets of livestock managed by the ARC-API have been maintained at 23 species.

Programme B: Use and enhancement of National Assets

The total collection of tick species is 375 identified species of which 54 species are type specimens. They have been collected internationally and consist of 2500 collections (accessions). The past 2 years 300 new collections, comprising 120 species of which 70 species are 1st time acquisitions have been added to the collection.

The South African Veterinary History Museum was established after the centenary celebration, 8 October 2008. It is jointly run by ARC and SAVA. The items being displayed depict the life Sir Arnold Theiler and his associates. To date 180 visitors, inter alia from Russia (veterinarians); Switzerland; Scotland (a descendant of one of Sir Arnold Theiler's co-researcher); group of "Upcoming Farmers" (Buchle, Ermelo) and local visitors, have enjoyed guided tours through the Museum.

STRATEGIC OBJECTIVE 3: FOOD SAFETY AND SECURITY

KRA 3.1: Increased access and availability of quality and safe, nutritious food

Programme B: Animal improvement and nutrition

The ARC-API has reached an important milestone in its efforts of improving access of resource poor beef farmers to the mainstream agricultural sector

by registering 30 of the participants in Kaonafatso ya Dikgomo to the main Beef Recording and Improvement Scheme. This will bring the number of resource poor farmers participating in the main beef scheme to 140 and enable them access to more accurate decision making tools for managing and improve productivity of their herds. In an effort to achieve the commercialisation of emerging beef farmers, a total of 300 farmers were trained through Kaonafatso ya Dikgomo Scheme during the reporting period. The remarkable record has been achieved with some farmer teams in Gauteng and Limpopo raising their annual cattle off-take to above 20%. Off-take relates to the percentage of the herd that is sold replenished. This is a record achievement considering that nationally, emerging farmers' off-take is estimated at 5%. In addition the prices that were obtained were equivalent to that obtained by commercial farmers and twice the value that they achieved before entering the scheme. The scheme has increased the wealth of the farmers 8 fold. It is logical to conclude that the scheme is making an impact.

Renewed interest in the role of abattoir procedures (electrical stimulation and chilling) on final meat quality has inspired the industry to request further investigations into this subject, The first round of results emphasised the importance of electrical stimulation but also that local abattoirs are probably over-stimulating carcasses which can have equally detrimental effects on meat quality than no stimulation at all.

Customised communal group breeding schemes for the genetic improvement of communal sheep in situ have been established successfully in 9 communal pastoral villages of the Eastern Cape. Reciprocal progeny tests indicated substantial genetic improvement in wool quality and production. Again production potential was suppressed by nutritional demand exceeding limited supply.

Performance recording and BLUP breeding technologies have been used to improve the National SA Merino breed over the last 20 years. Average fibre diameter declined from 20.6 micron to 18.2 micron, while body weight increased from 49 to almost 53 kilogram and clean fleece weight remained constant at 3.1 kg. Attributable to the accumulated effect of genetic improvement, performance recording is the

best investment for sustained profitable production of wool and meat to deliver products highly desired by clients and customers.

Breeding improvement from communal nucleus ewe flocks that has proved to improve the genetic attributes of communal rams has been established and are demonstrated in the farming communities of the communal Eastern Cape.

Pedigree and progeny performance trends of small stock production traits revealed a conflict between direct growth (weaning weight) and maternal growth performance that could result in selection of undesirable rams if breeding values for maternal growth are not considered in future breeding plans for meat production from sheep and goats. This makes pedigree and performance recording an obligation and prerequisite for successful genetic improvement of small stock.

The ARC in conjunction with a private company have developed and patented a process to synthesise heavy metal-free fulvic acid, which was named carbohydrate-derived fulvic acid (CHD-FA). The CHD-FA has been shown to be effective as a sterilising agent in the veterinary field against Avian Influenza Virus and Feline Herpes Virus. The researchers intend to expand the testing of their product against important fungal, bacterial and viral diseases of potatoes and tomatoes and grains.

ARC in association with the Department of Agriculture and Game Ranch Association, Free State compiled and uploaded 34 animal species abstracts to the public wildlife game species web site wildlife, currently under construction. He also developed computer model blueprints for springbok and nyala production optimisation that will be incorporated into the Game Manager computer software program.

Toxicology and Ethnoveterinary Medicine focused on the identification of plants, fungi and cyanobacterial toxins as causes of feed poisoning. The main emphasis is on the isolation, characterisation of the toxic compounds, their in vivo physiological effects and their mechanism of actions; development of optimised and newly designed innovative diagnostic tools to improve identification of the toxic organisms; prevention

and treatment of animal poisoning by mitigating the effects of toxins. The laboratory extended its scope of accreditation to include more mycotoxins.

Investigations on cyanobacterial poisoning in dogs have linked the source of poisoning to recreational dams, which are contaminated with blue-green algae. This work has highlighted the need for pet owners to prevent their animals from playing in areas which are contaminated with this particular alga. These findings have been considered important by the Veterinary Profession and have been included in the Continuing Professional Development programme.

STRATEGIC OBJECTIVE 4: AGRICULTURAL RISKS

KRA 4.2: Solutions for prediction and management of pests, diseases, weeds and alien invasives

Programme C: Integrated crop and animal disease /pest management

The past year's outbreak of Rift Valley fever has once again highlighted the impact of animal diseases on society, and the role of ARC-OVI in animal disease control. A large number of livestock samples from the outbreak of Rift Valley Fever in different parts of South Africa were processed. In total, 185 323 samples were tested serologically for: avian influenza (48 %); porcine reproductive and respiratory syndrome (11.2 %); classical swine fever (10.5 %); swine influenza (10 %); others (20%).

An outbreak of FMD Foot-and-mouth disease (FMD) was diagnosed clinically on 7 September 2009 and confirmed virologically by ARC-OVI on 8 September 2009 in cattle within the buffer zone (ie zone where routine vaccination is undertaken) in Mpumalanga. Characterisation of the causal agent revealed that the outbreak was caused by SAT 1 FMD. These isolates were found to be similar to previously characterised SAT1 strains from Kruger National Park. The involvement of SAT1 in the current outbreak is somewhat surprising. The majority of outbreaks that have occurred in SADC member states during the last 10 years were caused by SAT2.

By application of molecular tools to pathogen identification and characterisation, viruses and protozoa not previously thought to be present in South Africa were discovered: a new strain of Bluetongue virus and a new strain of epizootic hemorrhagic disease virus (EHDV) were isolated from Alpaca in the Cape, and a Kilifi-type *T. congolense* were found in both tsetse flies and cattle in KwaZulu Natal. These observations have significant implications for epidemiology of livestock diseases in South Africa.

The Rift Valley outbreak has now continued to spread from the original focus of Free State Province to KwaZulu-Natal, Northern Cape, Eastern Cape, and Gauteng Provinces. Animal samples from all these Provinces are sent to ARC-OVI to confirm the presence of Rift Valley fever virus. Since the beginning of the outbreak (February 2010) ARC has analysed a total of 265 samples, 66% of which have tested positive. The high rate of positive samples is an indication of the severity of the disease in the effected areas. We are working closely with NICD to compare the sequence homology between human isolates with those from animals.

Heartwater, a rickettsial disease that affects cattle, sheep and goat production is controlled at present by a cumbersome infection and treatment procedure. Research into an effective subunit vaccine has therefore long been regarded as a priority. During the past year, six genes from *Ehrlichia ruminantium* were identified using bioinformatics and were expressed in a heterologous system. The resultant proteins each induced a different set of cytokines when they were exposed to immune lymphocytes. This finding allowed potential vaccine targets that stimulate both innate and acquired immunity to be identified, an important step towards understanding how best to elicit immune protection against the disease. Recent research into a way of delivering *E. ruminantium* proteins or nucleic acids to animals in a vaccine formulation has shown that biodegradable microspheres can release vaccine antigens in a programmed way that could make it possible to vaccinate against heartwater without needing to administer a separate booster. Heartwater is transmitted by ticks. A laboratory tick challenge model which

was developed this year to simulate the field situation under laboratory conditions means that experimental vaccines can now be more realistically evaluated. Aspects of this project are now funded by the Red Meat Research and Development Trust and Onderstepoort's Joy Liebenberg Trust. It is anticipated that this funding will make it feasible to characterise heartwater antigens at the T cell epitope level which in turn should make it possible to focus and optimise the immune responses elicited by heartwater antigens.

Screening of wild bird samples (swabs) for the presence of AIV and NDV is done by real time RT-PCR, a labor-intensive, tedious and costly exercise. Previously, two separate assays were applied to detect the two viruses. In collaboration with VLA-Weybridge we have developed a heteroduplex rRT-PCR for detection of both viruses. This combined test will save on time and it is estimated that the cost of the assay will be reduced by approximately 40%. This method has now been accredited by SANAS.

For the past three years we have conducted contract diagnostic testing for AIV and, more recently, NDV for CIRAD. The samples were collected from observatories in Zimbabwe. Results indicate a prevalence of 6.2% AIV infection and 0.74% for NDV in wild ducks over the two year sampling period. This project is of particular interest to South Africa from a regional point of view, since local wild ducks migrate between here and Zimbabwe and thus extrapolations can be made for the prevalence of these diseases in SA.

The distribution of economically important tick vectors in South Africa (six species) have been re-modelled based on a national survey, historical presence data and newly acquired national vegetation data (VEGMAP), combined with climatic, environmental and terrain variables.

The efficiency of the ARC-OVI-developed Culicoides trap, Rieb, mini-CDC, Pirbright and BG-sentinel, used at present and during the past in Europe, was compared in the field in South Africa. The trap developed at ARC-OVI collected significantly more

Culicoides midges in summer and in winter than the other traps. It was that relatively small variations in the height at which the light trap is deployed can have a significant influence on the number of midges collected as well as the species composition and age-grading results and sex ratios. Significant differences were found in the number of Culicoides and especially *C. imicola* numbers collected at various distances from host animals. The trap is fundamental in the epidemiological studies of the African horse sickness and blue tongue.



Grain and Industrial Crops



ARC-SMALL GRAINS INSTITUTE



Dr. Cobus le Roux
Research Institute Manager

MANDATE

The Small Grain Institute (ARC-SGI) is mandated to conduct research, development and technology transfer within South Africa. The Institute's research is aimed at the provision of suitable small grain cultivars, sustainable crop production systems and related technologies, to enable producers to be internationally competitive and to ensure the availability of affordable cereal food of high quality.

The Institute is committed to the development of relevant crop production technologies and the supply of superior disease, pest and drought-tolerant cultivars that have acceptable agronomic and quality characteristics. It is also committed to rendering the necessary support services and

transferring effective technology to all small-grain producers and processing industries in South Africa, regardless of the size of the enterprise. Innovative technological solutions are implemented to maintain and extend the contribution that the small grain industry makes to the wealth and social welfare of all the people of the country, while conserving the country's natural resources.

The Institute was active with on-farm trials and demonstrations in 13 rural communities where 104 emerging commercial farmers were trained in an endeavour to fast-track their successful entrance into the commercial sector. Specific producers were able to increase their yields from 2,5 tons/ha to 4 tons/ha as a result. As for commercial producers, 1162 attended our information days.



Dr. Graham Thompson
Research Institute Manager

MANDATE

The mandate of the ARC-Institute for Industrial Crops (ARC-IIC) is to conduct applied and adaptive research on important industrial crops for improved intensive and extensive crop production through crop genetics, nutrition and management practices. ARC-IIC wishes to be recognised as an internationally acclaimed scientific centre of expertise in the field of cotton, hemp, flax, kenaf, sisal, indigenous fibre crops, cassava, tobacco and other crops with industrial potential. ARC-

IIC remains committed to assisting small scale farmers obtain the necessary skills through various training programmes it offers. Through the modular programme conducted together with the cotton industry 213 farmers acquired skills in all phases of cotton production. In a public-private partnership 51 extension officers in Zambia were trained through a “train-the-trainer” programme enabling them to train other colleagues and farmers in turn. Three small scale farmers were successfully mentored enabling them to sign contracts with a major buyer



ARC-GRAIN CROPS INSTITUTE



Dr. Hannalene du Plessis
Acting Research Institute Manager
(Resigned 10 December 2009)

MANDATE

The Grain Crops Institute (ARC-GCI) is mandated to serve the summer grain as well as oil and protein seeds sectors. The Institute conducts research and development to enhance national productivity and the competitiveness of relevant producers and related industries. The Institute's mandated

summer grain crops are maize (*Zea mays*), grain and sweet-stem sorghum (*sorghum bicolor*). The oil and protein seed crops include groundnuts (*Arachis hypogaea*), dry beans (*Phaseolus vulgaris*), sunflower (*Helianthus annuus*), soybean (*Glycine max*), cowpea (*Vigna unguiculata*) and bambara groundnut (*Vigna subterranean*).

STRATEGIC OBJECTIVE 1: GENERATE, DEVELOP & APPLY NEW KNOWLEDGE AND TECHNOLOGY

KRA 1.2: Increased Agricultural Productivity

Programme A: Agricultural Biotechnology

A notable first was the publication of a Wheat Production Guideline for the South African Emerging Commercial Producer. This is a step-by-step guide to ensure lower risk taking and increased yields and profits through the use of improved production practices. This publication which was in English is to be followed-up by a guideline in Sesotho in the following year.

The ARC is participating in a public-private partnership called Water Efficient Maize for Africa (WEMA). The objective of the WEMA project is to work, under a philanthropic mandate, to develop and deliver water efficient maize cultivars, improved using conventional breeding, marker assisted breeding and transgenic biotechnology, for use by small-scale farmers in sub-Saharan Africa. The project partners are the African Agricultural Technology Foundation (AATF), the International Maize and Wheat Improvement Center (CIMMYT), Monsanto and national agricultural

research systems (NARS) of South Africa (Agricultural Research Council, **ARC**), Kenya (Kenya Agricultural Research Institute, **KARI**), Mozambique (Agricultural Research Institute of Mozambique, **IIAM**), Tanzania (Commission for Science and Technology, **COSTECH**) and Uganda (National Agricultural Research Organisation, **NARO**). These African organisations manage the African testing of conventional and transgenic drought tolerant varieties, including developing confined field trial (CFT) sites, securing the required regulatory permits and ensuring that CFT trials of transgenic maize are conducted in compliance with all bio-safety and regulatory requirements from each country. They also provide adapted germplasm and participate in conventional variety development and marker-assisted breeding for drought tolerance. The focus of this first five-year phase of the project is to develop and field test maize varieties developed using conventional and marker-assisted breeding as well as evaluate the efficacy of the *csxB* transgenes in African maize genetic backgrounds under African field conditions. The second phase will include completing variety development and bringing the product to market without royalties through African seed companies. The Bill & Melinda Gates Foundation and Howard G. Buffett Foundation are funding the project through a grant to AATF. The AATF awarded the ARC a sub-grant for a total amount of US\$1 062 499 for product development activities. In addition, the ARC receives additional funding for (i) Regulatory and (ii) Communication & Outreach activities.

The Improved Maize for African Soils (IMAS) project is a public-private partnership aimed at developing and deploying royalty-free, nitrogen-use efficient (NUE) maize cultivars improved using conventional breeding, marker-assisted breeding and transgenes, for use by smallholder farmers in sub-Saharan Africa (SSA). The project partners are the International Maize and Wheat Improvement Center (CIMMYT), Agricultural Research Council (ARC), Kenya Agricultural Research Institute (KARI) and Pioneer Hi-Bred International. The Bill & Melinda Gates Foundation and USAID are funding the project through a grant to CIMMYT. Pioneer, ARC and KARI are funded as sub-grantees of CIMMYT. The ARC's sub-grant amounts to US\$1 325 112 over five years. In addition, CIMMYT will fund all international travel to project review and planning meetings.

The published marker for the Yr18/Lr34 gene complex effective against stripe rust, *Puccinia striiformis* of wheat, in the cultivar Swift was validated. This enabled the ARC-SGI germplasm development team and plant breeders to utilise this most effective gene complex, with linked genetic resistance against both stripe rust and leaf rust of wheat, to develop and release resistant bread wheat cultivars quicker.

Sixty three (63) single spore *Fusarium* isolates were identified using genus and species-specific primers. The Fg16N primer identified 22 of 30 isolates as *F.graminearum*. This is the first time that Marker Assisted techniques were used to identify *Fusarium* isolates to species level in place of the old mycology taxonomy techniques.

Nucleotide-binding-site (NBS) technology was utilised in order to screen cassava germplasm for resistance gene fragments. NBS-related primers specifically target gene sequences identified in insect resistance genes and this methodology has been implemented in cassava in order to screen for resistance against cassava green mite.

The annual sorghum quality report for the 2007/2008 season was submitted to the Sorghum Forum and it was approved. This is important for cultivar choice for the next planting season.

Tagetes minuta L. (khaki bos) is a strong weed competitor and can therefore be cultivated as an

alternative crop. Khaki weed oil has great demand in the essential oil and pharmaceutical industry, therefore it is an income generation avenue for growers and essential oil distillers. Research findings indicate that plant spacing has greater influence on green mass and seed yield.

The release of the spring wheat irrigation cultivar, Sabie, strengthened the ARC's recommended cultivars package for the irrigation areas of the Northern Cape, North West Province and Limpopo. It has superior yield levels, disease resistance and bread-making qualities.

Twenty four (24) Russian Wheat Aphid samples, mostly SA2, were screened in the glasshouse to determine the prevalence and spread of the newly detected and more virulent Russian Wheat Aphid biotype, SA2. Wheat producers in different areas can now be advised on the proper control strategies.

Programme B: Bio-prospecting

Two fungal strains, SGI 892 and SGI 893, were isolated from the Russian wheat aphid, *Diuraphis noxia*, and oat aphid, *Rhopalosiphum padi* respectively in our search for effective bio-control agents. Pure cultures of both isolates were submitted to the National Collection of Fungi (NCF) at ARC-PPRI for identification to species level.

Significant progress was made with the formulation of oil to inactivate fungal spores of an aphid specific fungus. This development enables ARC-SGI to quicken the process of the possible release of a bio-control agent against specific problematic aphids.

During the 2008/2009 season a by-product of sugarcane (code BMS) managed to reduce the total root-knot nematode population in an organic cotton farming system by 18% and increase the yield by 32% compared to the control. This could be a highly useful product to use within an organic farming system where pest control agents are a problem.

Two types of moths, Rooibos clearwing (*Monopetalotaxis candescens*) and Rooibos looper (*Isturgia exerraria*) are primarily responsible for diseases of rooibos plants. The ARC has made significant progress against both

types of moths. A prototype fungal product has been developed and will be evaluated by Rooibos South Africa for the control of the looper.

An electronic dispensing sprayer for the application of insecticides against the Clearwing moth was developed through a collaborative project between engineers and the crop specialist the ARC. Significant research findings were established where one should apply the insecticide, at what dosage, rate and time. The efficacy of a novel insecticide applicator against the Clearwing moth was confirmed with 80% control. This is the more serious pest of Rooibos in South Africa and this applicator will now be scaled-up to accommodate at least four nozzles for simultaneous application. This apparatus and newly generated knowledge will greatly enhance agricultural productivity and efficiency.

A number of strains of entomopathogenic nematodes which are highly effective in the killing of cut worm larvae were identified. In addition, nematodes that show positive mortality against the maize stalk borer were also discovered. Research on the mass production and formulation of these nematodes is currently in progress. If proven effective this will greatly enhance biological control of cut worm and stalk borer.



Stalk borer infected with entomopathogenic nematodes



Cutworm, *Agrotis segetum*, infected with entomopathogenic nematodes

Significant progress was made with the formulation of an oil carrier to inactivate fungal spores of an aphid specific fungus. This development enables ARC-SGI to quicken the process of the possible release of a bio-control agent against specific problematic aphids.

12 bacterial strains were isolated from cutworm (7 isolates) and bollworm (5 isolates) cadavers. The pathogenicity of these strains was tested (through injection) against the wax moth, *Galleria mellonella*, larvae with 8 strains causing 100% mortality. These strains will now be tested using per os inoculation to further verify pathogenicity. The possible development of a biopesticide to target soil-borne insect pests such as cutworm, black maize beetle and wire worms is supported through this discovery.

Programme D: Soil Health

At the same time as controlling diseases that effect Rooibos, researchers have collected rhizobia specific to the rooibos planted from soil in the Clanwilliam district. Nodulation trials and characterisation of rhizobium from rooibos will follow based on results of the baiting experiment. This could potentially increase the yield of the Rooibos.

Programme F: Agricultural Production

At the F6 stage of the 1st dioecious South African hemp cultivar (SA Hemp1) that yields at par with the best imported hemp cultivar Kompolti has been developed. Such a local cultivar will enable a local industry to be established should the legislation become enabling.

Cultivars of oats, wheat and rye grass were found to be resistant to the root-knot nematode. These can be used as rotational crops where these nematode species are problematic.

Flue-cured tobacco breeding lines and cultivars varied between being tolerant or resistant to the root-knot nematode species *Meloidogyne javanica*, *M. incognita* race 2 and *M. incognita* race 4. Lines can be developed further as they already have root-knot nematode tolerant or resistant traits. A tobacco breeding line has been identified with resistance to all three root-knot nematodes. This is a break through for the breeding programme and will lead to considerable savings for producers since they

will not have to control the nematodes. In the past tobacco cultivars were resistant to a maximum of two nematode species and therefore the third one had to be controlled. This line has the potential to replace cultivars in sandy soil regions.

The ARC has on going projects that aim to identify genes of interest in a drought tolerant cowpea line. There are several methods that can be used for gene discovery, however they are labour-intensive and currently very costly. Additionally, they are most effective if an annotated genome sequence is available. Thus, suppression subtractive hybridisation (SSH) was optimised to, since it is a popular technique for gene discovery from non-model organisms without an annotated genome sequence, such as cowpea (*Vigna unguiculata* (L.) Walp). The method was used to enrich for genes expressed during drought stress in a drought tolerant cowpea line.

STRATEGIC OBJECTIVE 2: SUSTAINABLE NATURAL RESOURCES

KRA 2.1: Characterisation of the natural resources and ecological systems

Programme C: Conservation agriculture and integrated sustainable management of natural resources

ARC-IIC continues to support the established industrial crop industries for cotton and tobacco by conducting research to overcome major constraints to production. Breeding programmes mainly focus on developing lines with resistance to major pests or diseases. Two cotton lines with tolerance to *Verticillium* wilt are undergoing registration trials and will enable many farmers to again plant in infested soils. Cotton lines with tolerance to leaf hoppers are in the advanced stage of evaluation. When released, these lines will greatly assist the approximate 3000 small scale farmers in regions like Makhathini in KwaZulu Natal to produce cotton more economically. Similarly the institute continues to release tobacco lines with multiple disease resistance enabling producers to reduce production costs. ARC developed cultivars continue to dominate in this

market. Furthermore it's programme on optimising fertiliser recommendations is leading to producers increasing yields and reducing costs. This is support through the more than 46 000 soil, plant and water samples analysed for clients. Research is being continued on organic cotton production to enable producer to successfully enter this niche market.

During a long-term crop rotation trial for the control of nematodes, there was a significant increase in the lesion nematode numbers where sunn hemp was planted. These preliminary results indicate that as the species complexity of major nematode pathogens increases in a particular field, the ability to develop effective crop rotation systems becomes more difficult. It also shows that it is essential to know which nematodes are present in a field before a non-host crop is chosen.

In a maize-pigeon pea intercropping system the best results were achieved when maize was planted simultaneously or 20 days after the pigeon peas. Land Equivalent ratios revealed an intercrop advantage over mono culture of maize. Intercropping maize with pigeon pea will give both a yield and increased food base advantage to small scale farmers

Statistical analyses revealed that rotations and intercropping practices had a significant effect on the incidence and severity of crown and stem rots in 360 maize root samples from the conservation tillage trial utilising visual symptoms associated with root, crown and stem rot.

More moisture was available in the skip row cotton than in the solid row cotton in the trial on minimal cultivation practices for small scale farmers in the Makhathini area. This was postulated to have a profound effect on the yield on cotton with minimal inputs under dry land conditions. However data collected during this past season showed that the yield of cotton planted in a double skip row configuration was lower than the normal solid row configuration. However the input cost (fewer plants) of the skip row is significantly less than the solid configuration resulting in no significant differences between profit gained between these two configurations. The importance of these findings indicates that the risks are less in the case of the skip row configuration. This can be significant for small

scale farmers planting under dry land conditions. Potential leaf yield of re-grown flue-cured tobacco was increased by roughly 1 000kg/ha by the application of agricultural gypsum. Further research regarding the N-mineralisation potential of soil is important as it may successfully be used to streamline the nitrogen-fertiliser guideline for flue-cured tobacco. The higher yield could make growing the crop viable.

Of eight organic nutrient treatments applied, compost and compost tea applications resulted in higher seed cotton yield. These results will be used to develop recommendations regarding organic nutrient application potentials for organic cotton producers (small-scale as well as commercial) in South Africa. This past season, organic cotton was produced on approximately 40 ha in South Africa. If successful production guidelines can be developed and South Africa can successfully enter this growing niche market.

In a study funded by the NRF, soil chemical properties of cultivated lands (home gardens and fields) were measured and compared with those of adjacent uncultivated lands in a range of soils from the Eastern Cape Province. Although the soil nutrient status varied widely, the differences between either fields or home gardens and adjacent uncultivated lands were mostly found to be small. However, instances of low pH and generally low soil P contents will require remedial action in order to prevent a further decline in crop productivity and food security in the region.

KRA 2.2: Maintenance and use of National Assets

Programme A: Maintenance of National Assets

In total there are 33 713 accessions in the grain collection of which 381 were added in this year.

The rejuvenation of the hemp (8), tobacco (60) and cotton (100) accessions were successfully initiated. Some of the cotton accessions failed to germinate but attempts are being made in the laboratory to germinate these.

At present, the wheat collection consists out of 13 591 accessions with good agronomical and yield

characteristics as well as several disease and pest resistance genes. A total of two thousand one hundred and eighty five (2 185) accessions were maintained for germination rejuvenation in the previous season. The entries were meticulously screened and notes were taken on materials segregating pure breeding as well as entries with possible genetic contamination.

At present, the oats collection consists out of 459 accessions mainly with good agronomical and yield characteristics. Eight (8) accessions were maintained for germination rejuvenation in the previous season.

STRATEGIC OBJECTIVE 3: FOOD SAFETY AND SECURITY

KRA 3.1 Increased access and availability of quality and safe, nutritious food

Programme A: Crop improvement

In a rotational trial involving legumes, there was significant growth yield of cotton on plots previously cropped with pigeon pea, soya beans and sugar beans compared to other treatments. This is important in establishing the optimal rotational practice for cotton producers.

A cowpea breeding line that is resistant to cowpea golden mosaic virus was identified. This will reduce yield loss due to this disease as well as provide breeding stock for germplasm enhancement to improve production

Knowledge on intercropping and diversification of food base for smallholder farmers in South Africa is of importance. Results on the project on intercropping legumes with vegetables showed that cropping Amaranthus and pigeon peas is beneficial and compatible in relation to Amaranthus and cowpea combination.

The short duration Pigeon pea cultivar was found to fix atmospheric nitrogen at a rate of 60 kg N ha⁻¹. Intercropping pigeon peas provided a source of dietary protein for rural poor communities. The crop also provided compensatory yield during drought periods.

The conservation tillage project for development of sustainable conservation tillage systems in the Southern and Western Cape production regions concluded findings on the suitable planting densities to be used in no-till production in these regions at the end of the 2008 production season. These findings confirmed earlier work on planting densities and is incorporated in the 2009 production guidelines.

A newly available barley cultivar, Cocktail, was included in the nitrogen management trials under irrigation in the Northern Cape region. This research will show the way forward with nitrogen fertilisation to produce acceptable malting grade barley for the market.

Results from the past two years on seeding density and planting date indicate that variable seeding rates for different cultivars should be used to planting dates during the season. The recommendations will be adapted after the current season, while this research must be expanded to include other dry land production regions to determine the optimum seeding densities of cultivars under these climatic conditions.

Programme C: Agricultural products improvement

For cassava to compete with maize as a viable source of starch, yields in excess of 20 tons fresh cassava roots per hectare per annum are required. Several of the lines evaluated by the ARC-IIC have exceeded this with some yielding up to 50 t/ha under experimental conditions. These cultivars will enable sustainable production to be achieved to support a factory for starch extraction. Other lines including yellow fleshed ones also being evaluated will advance this crop as an alternative food crop among small scale farmers. Approval has been granted to conduct a field trial with cassava lines genetically modified for amylose-free starch production. This type of starch has many advantages over conventional starch.

KRA 3.2: Improved pre-harvest, harvesting and post harvest technologies

Program A: Agricultural Value chain improvement

A Larger Grain Borer (LGB) survey was conducted in maize storage structures in the Limpopo Province. An important finding was that LGB was, for the first time, found in stored maize in South Africa.

STRATEGIC OBJECTIVE 4: AGRICULTURAL RISKS

KRA 4.2: Solutions for prediction and management of pests, diseases, weeds and alien invasives

Programme C: Integrated crop and animal disease /pest management

The ARC in collaboration with a private company has developed and patented a process to synthesise heavy metal-free fulvic acid, which was named carbohydrate-derived fulvic acid (CHD-FA). The CHD-FA has been shown to be effective as a sterilising agent in the veterinary field against Avian Influenza Virus and Feline Herpes Virus. In vitro tests on 6 different fungal pathogens were carried out to test the efficacy of CHD-FA. The CHD FA 400 effectively inhibited growth of *A. solani*, *S. rolfsii*, *P. ultimum*, and *F. graminearum*, and slightly inhibited *B. cinerea* growth. The method generated knowledge that can be used in future projects. Thus, studies conducted on the effect of a given compound on a specific pathogen will now yield results much faster.

Virulence for the stem rust resistance gene Sr31, similar to Ug99, which causes international concern, was found for the first time in South Africa. Five stem rust isolates collected in December 2009 from breeding lines and the ARC-SGI trap nursery planted at Cedara, KwaZulu-Natal, were found to

be virulent on Sr31. The new race was designated as “2SA107”. Since breeders started incorporating Sr31 into wheat cultivars as a source of resistance in the early 1950’s, virulence for Sr31 was not reported anywhere in the world for more than four decades until 1999 when a stem rust pathotype designated Ug99 was detected in Uganda. Following the first detection of Ug99 in Uganda, virulence for Sr31 has been reported from Kenya, Ethiopia, Sudan and Iran. 2SA107 is also virulent on Sr24, a resistance gene bred into many South African cultivars. Sr31 has not been widely used in breeding for stem rust resistance in South Africa. Moreover, virulence for Sr24 has already been detected in 2007. Therefore, 2SA107 shouldn’t result in a major shift in the susceptibility of current commercially available cultivars. These findings are of international importance with a direct effect on future wheat breeding strategies.

However early in 2009 the use of gamma-irradiation to increase the genetic diversity/resistance against Sr31 and Sr24 virulence of *Puccinia graminis* f.sp. *tritici* was successfully reported. This first intervention resulted in two M1 populations which as M2 generations will be screened against Sr31 and Sr24 virulence in Njoro, Kenya and Sr24 virulence in South Africa. This pro-active endeavour is most important to ensure resistant wheat cultivars before the increased prevalence of Sr24 virulence and the possible arrival of Sr31 virulence in South Africa.

Three-and-a-half (3½) tons of seed of two improved sorghum varieties were produced to be distributed to resource-poor farmers during the coming cropping season. This will increase farmers’ access to improved seed and contribute to commercialisation of the second economy.

Ten (10) different cotton cultivars were included in the National Cotton Cultivar Trials. Two (2) Australian cultivars, Candia and CandiaBG, a Russian cultivar and two (2) ARC lines were included in this season’s trial. The Russian cultivar F3 reached cut-out stage

earlier than the other cultivars in the trial, but also resulted in lower fibre percentages. CandiaBG resulted in high fibre percentages of up to 45%. Cotton producers now have access to statistical research regarding which cultivar produce the best yield in the different cotton producing areas in South Africa.

During quarter 4, 13 experiments were conducted to increase the efficiency of commercial herbicides. Of these, 11 were done with the herbicide Skoffel (bipyridylum – Group D herbicide) and two (2) were done with Roundup (glycines – Group G herbicide). All the experiments were conducted to determine if these widely used herbicides can be optimised by developing or adding the correct adjuvant. With herbicide resistance becoming an ever increasing phenomenon, a limited number of herbicides with different modes of action available in South Africa needs to be increased. Data indicated that the efficacy of both widely used herbicides, Skoffel and Roundup, can be significantly increased using the correct adjuvant combinations,

Ryegrass was screened for resistance to Roundup. It is imperative to know the herbicide resistance status of all production areas of South Africa as this significantly influence all future production practices with regards to weed control. The results experiments clearly indicated that all six biotypes showed resistance to herbicides from the SU and the Fops groups. As these are both post-emergence herbicides, other alternatives must be found to control weeds post-emergence. Cultivated ryegrass was screened for resistance to Roundup because if resistance occurs in cultivated ryegrass it can easily be carried over to the ryegrass (weed, *Lolium*) species. Only one cultivar showed some degree of Roundup resistance. Of the 37 samples that were screened for Roundup resistance, none showed incidence of resistance. This is very positive, as it means that Roundup can still be used to control the ryegrass biotypes effectively.

Horticulture



ARC-VEGETABLE AND ORNAMENTAL
PLANT INSTITUTE



Dr. Sonja Venter
Research Institute Manager

MANDATE

The mandate of ARC-Vegetable and Ornamental Plant Institute (ARC-VOPI) is to do innovative, need-driven and environmentally friendly research, technology development and technology transfer on commercial vegetables, African/traditional/indigenous vegetables, medicinal plants and indigenous bulbous plants. Research involves a variety of disciplines including crop science, crop protection, breeding, genetics, biotechnology and agronomy.

The aim is to improve the productivity, competitiveness and sustainable use of vegetables and ornamental plants not only in South Africa, but also the rest of Africa.

Mandate crops include vegetables (potatoes, sweet potatoes, onions, tomatoes, garlic, etc), indigenous

vegetables (amadumbe, amaranth, spider plant and indigenous leafy Solanaceae, etc), indigenous ornamental plants (Lachenalia, Ornithogalum, Veltheimia, Eucomis, etc), and indigenous medicinal plants (Agapanthus, Scilla, Tulbaghia, Hypoxis, wild ginger, etc).

During the past year five major programmes have been developed as part of the new research and development strategy of the ARC, namely: Root and Tuber Crops; Commercial vegetables; Indigenous vegetables; Floriculture and Medicinal Plants. Multidisciplinary aspects are integrated within the various programmes and plant breeding, crop science and crop protection strategies are developed to address economically important disease problems, to mitigate production risks, climate change, and sustainable use of natural resources, malnutrition problems and food security.



ARC-INFRUITEC-NIETVOORBII

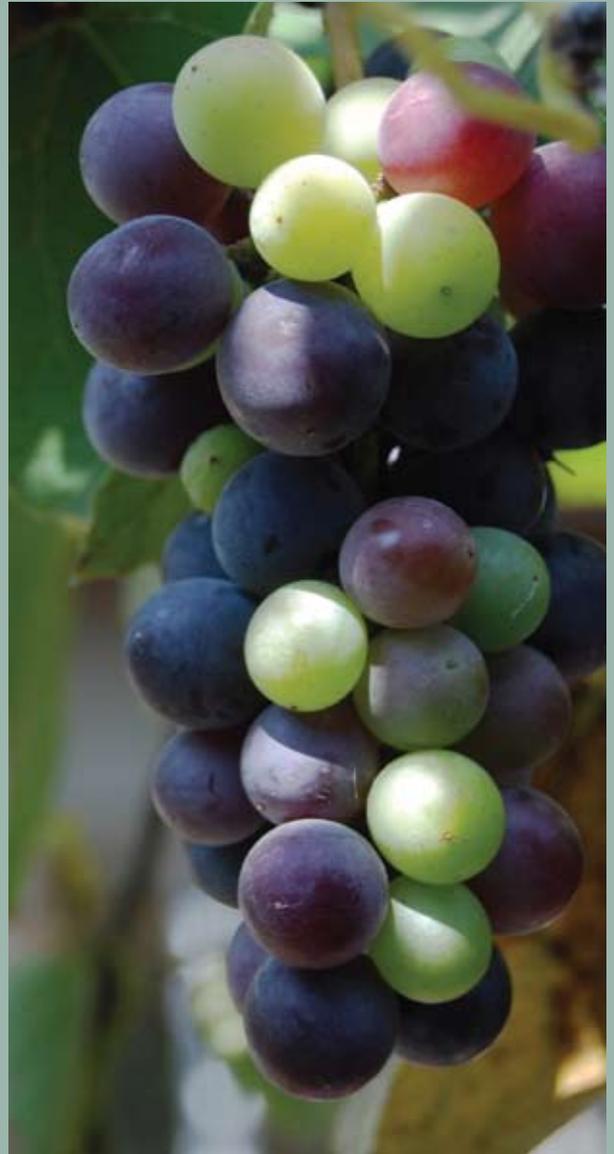


Dr Johan van Zyl
Research Institute Manager

MANDATE

The mandate of ARC Infruitec-Nietvoorbij (ARC-INF NVB) is to conduct research, development and technology transfer on deciduous fruit, grapes, alternative crops (eg. berries, figs and olives), indigenous herbal teas and regional medicinal plants. Research involves a number of disciplines namely soil and water science, viticulture, horticulture, post-harvest and wine technology, plant protection, breeding and germplasm. Post-harvest activities include wine and brandy production, cold storage and other forms of shelf-life extension (drying, canning, juicing and jam production). The major portion of research and development is focused on food security and mitigation of agricultural risks, but the generation of new knowledge as well as the sustainable use of natural resources are also addressed.

The Institute is located in Stellenbosch in the Western Cape and has 6 research farms representing different climatic regions. Unique facilities include a winery, cannery, irradiation facility and rooms for cold storage, as well as for controlled atmosphere storage. Infruitec-Nietvoorbij is also the custodian of grapevine, deciduous fruit and wine yeast gene banks that preserve genetic resources for breeding purposes, training and comparative descriptions.





ARC-INSTITUTE FOR TROPICAL AND SUBTROPICAL CROPS



Dr. Org van Rensburg
Research Institute Manager

MANDATE

The purpose of the ARC-Institute for Tropical and Subtropical Crops (ARC-ITSC) is to provide sustainable and appropriate technologies for production and post-harvest handling of citrus and subtropical crops in order to enhance food security and nutrition, global competitiveness and wealth creation by addressing national priorities through its research agenda and related activities. Post-harvest technologies include agro-processing and export protocols, thus catering for both the commercial and developing agricultural sectors of South Africa. The Institute has a main campus in

Nelspruit, Mpumalanga, where the growth of said crops is highly favoured due to the regional climatic conditions and several other research farms in the region and other selected provinces.

The mandate crops of ARC-ITSC include the following:

- Citrus, avocado, mango, litchi, banana, guava, macadamia nut, pineapple, papaya, granadilla, pecan nut, cashew nut, coffee and ginger.
- Medicinal plants, herbs and essential oil crops.
- Indigenous fruit crops.
- Exotic crops such as carambola, surinam cherry, white sapote, annona, and jaboticaba.

STRATEGIC OBJECTIVE 1: GENERATE, DEVELOP & APPLY NEW KNOWLEDGE AND TECHNOLOGY

KRA 1.2: Increased agricultural productivity

Programme A: Agricultural Biotechnology

Research into the pathogenicity genes of the bacterium *Xylophilus ampelinus*, causal agent of bacterial blight (“vlamsiekte”) of grapevine requires artificial medium that mimics conditions found in planta. In order to investigate the in vitro expression of the (TTSS), a medium that supports expression of Type III Secretion system (pathogenicity-related genes TTSS) genes of the pathogen was developed successfully. This is a major step towards the strategy to study and understand the host-pathogen interactions at the molecular level in an effort to deliberately breed for resistant varieties.

Different banding profiles were obtained for the

RAPD primer OPH11 for 11 citrus rootstock parents grown at the Addo Research Farm. This discovery has potential use in the identification of hybrid seedlings produced from the citrus rootstock breeding program.

Cross-pollination of varieties that have distant parents is important to introduce a greater range of genetic diversity into plants. However the cross-pollination results in inherently weak embryos. A technique to rescue these embryo's have been successfully established to germinate seed from early ripening peaches. To make efficient use of an embryo rescue program it is vital that the embryos survive past the seedling transplant stage and develop into viable plants. Under the experimental conditions applied, about 30% of the embryos germinated successfully. This is in line with best germination rates reported in the literature. Acclimatisation conditions were also optimised and resulted in the survival of almost 80% seedling plants which is significantly higher than the 60% reported in the literature. The development of the method will allow the ARC to initiate the early variety peaches within a shorter period.

In addition to the work on peaches researchers managed to rescue embryos from undeveloped ovules obtained from four different controlled crossings for novel seedless mandarin development. Extremely high percentage germination was obtained which enhances the potential for success with this batch of rescued embryos.

Research has also opened up new market potential. Variegated pineapple selections identified at Bathurst Pineapple Research Station have been proliferated and are being prepared for hardening-off and supply for field evaluation of ornamental potential. Breeding of variegated pineapple selections opened up a new field in the landscaping industry that can be exploited through the introduction of new ARC bred pineapple selections. The pineapple breeding programme also managed for the first time to germinate and grow white “albino” pineapple seedlings. In the past such material always succumbed shortly after germination. This new material could significantly enhance the breeding of new and ornamental pineapple selections. Several new pineapple selections with potential tolerance to drought conditions have also been established. Furthermore, a white guava selection has been identified that could open up new markets in terms of fresh produce as well as in the processing sector.

A milestone was reached on the use of SSR markers to identify and distinguish between Guava cultivars with resistance to Guava wilt disease. A reliable guava cultivar identification protocol has been developed. In addition it was found that one of the SSR markers might be associated with guava wilt resistance. This will have a positive impact on the potential to develop reliable strategies for the management of pest and diseases on guavas by identifying resistant cultivars for release to the industry.

New tetraploid selections of the phytoremediation plant, *Berkheya coddii*. *Berkheya coddii* an indigenous plant species which is extremely efficient at absorbing nickel from the soil was made. By increasing this heavy metal absorption capacity, the productivity of the plant, and therefore the earning-potential of farmers cultivating the plant could potentially be increased. Similarly new tetraploid selections of *Vigna unguiculata* of an important leafy vegetable and common source of

protein for the people of Africa were made. Selections from this species will be investigated further for its potential in terms of enhanced nutritional value. A simple and rapid method for DNA extraction from citrus leaves was developed which is cost and time effective and precludes the use of toxic chemicals which will in future be used in the identification of polyembryonic x polyembryonic rootstock cross hybrids using molecular methods.

A challenge experienced in the citrus breeding programme was to distinguish between novel hybrid citrus rootstock embryos and nucellar embryos. Nucellar embryos have the same genetic profile as the female parent and the two types of embryos cannot be distinguished from each other with the naked eye. A DNA extraction technique which precludes the use of expensive liquid nitrogen and toxic chemicals was adapted for citrus, thereby reducing costs substantially. Furthermore, a tissue fixing and ambient temperature storage protocol, which does not affect the amount and quality of DNA extracted, was also developed. The DNA extraction technique and storage protocols have resulted in a sevenfold reduction in DNA preparation time compared with standard methods used for citrus.

Understanding the chemistry and bioactivity of constituents is crucially important when validating claims relating to the health promoting attributes and medicinal value of plants. Three compounds were isolated from Bush Tea (*Athrixia Phyllicoides*). Two of these compounds were subsequently identified as hypolaetin -7-O-glucoside and gossypetin -7-O-glucoside using LC-MS, LC-MS/MS ¹³C-NMR and ¹H-NMR.

The root system of the plant species *Pentanisia prunelloides* is widely utilised by Traditional Healers (TH) and because of the time required for the roots to reach maturity, natural populations are declining. A germination trial on *Pentanisia prunelloides* has been initiated to determine optimum conditions to germinate their seeds. The plant species is very difficult to grow and takes a number of years to reach maturity. Scarifications broke the dormancy and a number of seeds were germinated at two different temperatures. This new methodology will

be applied to multiply and propagate the species in order to secure future availability.

A genetically modified potato was developed exhibiting resistance against the potato tuber moth (PTM). Bt-Mnandi is the first South African potato cultivar that has been genetically modified in South Africa by a South African research organisation, i.e. the ARC, for which commercial release has been applied. The cultivar Mnandi was chosen for modification, since this cultivar is preferred by small-scale farmers. The Bt gene, resulting in resistance against the PTM was inserted into this cultivar. This is the same gene construct that has been inserted into the cultivar Spunta. The newly developed Mnandi lines have been tested for insertion of the transgene using PCR, and bioassays have been performed indicating that the tubers and leaves of these lines exhibit total resistance against potato tuber moth feeding. An application to perform field trials with four transgenic Mnandi lines has been submitted to the Department of Agriculture, Forestry and Fisheries and if permission is granted, the field trial will commence during 2010.

The full length coding gene sequence of the cowpea LEA5 (late embryogenesis abundant 5) protein, playing an important role during drought tolerance, was identified and isolated. Incorporation of this unique gene into various crops of importance to resource poor farmers in South Africa can overcome constraints to crop production in South Africa, leading to increased crop productivity, thereby improving food security in rural households of South Africa and the African continent. It will contribute to poverty alleviation by the selling of excess produce. Furthermore, depending in which crop this gene will be used for engineering of drought tolerance, it will lead to increased availability of nutrient rich foods, for example protein, carbohydrate and vitamins. It will also increase the scientific knowledge base as to a better understanding of drought tolerance mechanisms in plants.

Programme C: Plant Protection

Pomegranates are one of the 'new' fruits that have expanded rapidly in recent years. Bacterial blight was identified by researchers of the Germplasm, Breeding and Evaluation Division for the first time on pomegranates in South Africa. Suspect disease

systems were found on pomegranate trees in the Breede River Valley of the Western Cape Province in 2009. The symptoms were leaf and fruit spots, and cankers on stems, branches and trunks. Based on biochemical and molecular analyses and pathogenicity tests, *Xanthomonas axonopodis* pv. *Punicae* was identified as the casual agent. This is the first report of bacterial blight on pomegranate in South Africa.

The efficacy of a novel insecticide applicator against the Clearwing moth was confirmed with 80% control. This moth is the most serious pest of Rooibos in South Africa and the greater efficacy of the insecticide will ensure that farmers obtain a higher yield. This applicator will now be scaled-up to accommodate at least four nozzles for simultaneous application and thereby reduce the time and cost of application.

Today, the agricultural industry uses a variety of post harvest synthetic chemicals to avoid or delay disease and prolong the shelf life of fresh produce. However, fungicide-tolerant strains, e.g., *Botrytis* spp., *Penicillium* spp., are present in most packing houses, cold stores, rendering synthetic chemicals less effective or totally ineffective. Essential oils are made up of many different volatile compounds. The volatile compounds can play an important role in the defence system of fresh fruit, i.e. table grapes against decay. A one minute exposure of *Botrytis cinerea* spores to essential oils inhibits germination compared to water control. The control plates were completely covered with *B. cinerea*. Preliminary results showed that the combination of controlled atmosphere (CA) and essential oils exhibited better inhibition of radial growth of *B. cinerea* compared to regular atmosphere (RA). Further studies are in progress to explore the efficacy of the volatiles from the oils in combination with CA and RA.

Programme D: Soil Health

Nitrogen fertiliser requirements for four medicinal plant species were developed. The source and level of nitrogen fertiliser application for *Artemisia afra*, *Leonotis leonurus*, *Sutherlandia frutescens* and *Ruta graveolens* were determined and will be used for recommending nitrogen fertiliser application for these medicinal plants species in future. These

fertiliser recommendations take into account the increase in yield, but also the effect on the medicinal properties of the plants

The ARC is continuously researching environmentally friendly practices to grow fruit crops. In a long term study the effects of biological soil amendments were investigated on apples and pears. Cumulative pear yields increased from 29t/ha to 44t/ha with some treatments while tree growth also improved significantly. Organic substances also improved tree performance significantly on Apple Replant Disease (ARD) sites. ARD is a major impediment to an economically viable apple industry. Although biological amendments reduce ARD symptoms, fumigation still gave the most significant and consistent response in tree performance. An employee of the institute obtained her PhD on this project but more research is still essential for application of these biological management strategies in practice.

Programme F: Agricultural Production

Hypoxis species (African potato) is used in traditional healing. The removal of the leaves and flowers from the rootstock makes it difficult to identify the rootstock as the African potato. Chromatographic methods have been developed to distinguish between four species which can then be utilised to verify the root species and ensure that people using the traditional medicine get the correct medicine. Two compounds were also isolated from the African potato. One of these compounds is only present in some species and might explain the differences in medicinal properties of the species. The compounds will be isolated and test developed to identify and promote the most suitable species for future use

STRATEGIC OBJECTIVE 2: SUSTAINABLE NATURAL RESOURCES

KRA 2.1: Characterisation of the natural resources and ecological systems

Programme A: Characterisation and quantification

The ARC has been involved in a project titled "Mutation technology to develop new flower bulbs"

that has been funded by the Innovation Fund since 2003. This project has now been concluded and the final technical report was submitted to the Innovation Fund. The project successfully developed a technique to induce mutations in the Hyacinth family and produced more than 80 mutants. Four of these mutants were selected for commercialisation and applications for Plant Breeders Rights were filed on two of these selections. The introduction of new flower bulb lines is essential to keep the market interested and to grow community production initiatives. New lines will stimulate additional sales in the market resulting in increased production, which in turn again contributes towards the sustainability of commercial production units, such as the Nieuwoudtville community flower bulb production project. The availability of techniques to induce mutations also opens up additional possibilities for the development of new products in the Hyacinth family of flower bulbs.

Initiation of *Kaempferia aethiopica* (wild ginger) in-vitro was successful. Contamination of explants is usually a major challenge with such tuberous species. The in-vitro material will be included in the genebank and will be used to develop improved selections as part of a PhD study.

KRA 2.2: Maintenance and use of National Assets

Programme A: Maintenance of National Assets

The national assets of fruit trees totals 9133 accessions of which 416 were added in this reporting period.

The national assets of vegetables had 3209 accessions of which 112 were added in this reporting period.

The national assets of medicinal plants totals 110 accessions of which 40 were added in this reporting period.

The national assets of flowers totals 6662 accessions of which 123 were added in this reporting period.

Programme B: Use and enhancement of National Assets

Four new *Lachenalia* accessions were added to the

Lachenalia genebank. The accessions, originating from the Struisbaai area, Western Cape were donated by Ms Tienie Beukes. The accessions will be characterised during flowering. These are the first accessions from this area of South Africa and resulted in an increase of our biodiversity in this genebank and will improve our ability to develop new genetic material eg. Cultivars.

A white guava selection has been identified on a farmers' property in the Mara region of the Mbombela Local Municipality. Material of this white selection has been collected and grafted onto rootstocks at the ARC-ITSC's nursery. If found feasible the release of a white guava selection to the industry will greatly benefit guava farmers. New markets could open up in terms of fresh produce as well as in the processing sector.

Red flesh peach fruit was discovered on non-registered seedling trees on a farm at Stutterheim in the Eastern Cape Province. Mr Werner Pieterse obtained permission from the owner to collect budwood material to establish trees as parental material at Bien Donne. These accessions of plants are valuable additions to the red flesh fruit germplasm collections of ARC Infruitec-Nietvoorbij. The desirability of red flesh fruit is their higher levels of anthocyanin content which is associated with higher anti-oxidant levels. Red flesh apple and plum cultivars currently under development in South Africa have the potential to become popular "superfruits" as a result of their anthocyanin content. "Superfruit" status could increase the demand for South African red flesh apples and plums on the fresh fruit and beverage markets of the world.

Researchers established passion fruit plant material in vitro. This new technique will enable the rapid propagation and maintenance of new selections for future release of promising cultivars. To have the material available in vitro will also assist in the genetic analysis for marker assisted selection purposes.

A number of different accessions of medicinal plants were added to the genebank from various sources. The highlights below indicate the breadth of these collections. Twenty accessions of medicinal plants were added to the medicinal genebank. The collection includes highly utilised species and was

collected during a rescue operation. The plants were collected in an area identified for a new hydro-electric plant in KZN and would have been lost, since the whole area will be covered by a new dam. A new medicinal plant species, *Seline bellidioides* was collected from Sasolburg in the Free State. Since no prior information existed regarding the propagation of this species, a germination trial was initiated to determine the optimal germination conditions for their seeds. Results showed that the seed germinated extremely well (99%) at 15°C. This new methodology will be applied to multiply and propagate the species to secure future availability of the species

The Mokgwaneng medicinal plant nursery was established as a production model for communities to conserve scarce medicinal plants through propagation and cultivation. The launch was attended by more than 70 people including officials from DAFF, Department of Health, Limpopo Department of Economic Development, Environment and Tourism, Limpopo Department of Agriculture, City of Tshwane representatives, Mothong Medicinal Plant project, National United Nations Development Programme, Marble Hall Municipality, National Youth Commission, community members and Traditional Health Practitioners. Four accessions of medicinal plants were added to the medicinal plant genebank. One of the accessions, *Harpephyllum caffrum*, is a new species. The optimisation of in vitro maintenance and multiplication is an accomplishment since prior knowledge in this field is very limited.

A Queen pineapple selection was initiated into tissue culture as part of a genetic material exchange agreement between the Rwandan Department of Agriculture's National Research Institute and the ARC.

The processing unit at the ARC-ITSC was successful in making chutney, jelly and jam with the exotic star fruit or *Averrhoa carambola* (Carambola) from the exotic fruit gene bank. The new products developed will be tested for consumer preferences and SABS approval, where after the plant material and the processing technique will be made available to small scale farmers as a new opportunity.

A cold storage regime has been developed for strawberries, blueberries and peaches. The storage of strawberries can now be offered as a service to clients.

Pineapple seed were collected from 33 pineapple varieties in the pineapple germplasm. This is part of the ongoing process to breed improved pineapple varieties. The seeds were planted out and the resultant plants will be evaluated for their improved characteristics.

A total of 9 new granadilla selections identified as promising emanating from the granadilla germplasm collection were established in tissue culture.

All the honeybush selections and trials are on private farms and it is important to conserve the selections on ARC property. Since the honeybush has no nursery facilities of its own, it uses the facilities of the Fynbos nursery at Elsenburg. Unfortunately this facility is in a poor condition and often there is no water available. This may lead to the loss of valuable genetic material. An initiative to transfer the honeybush selections to ARC property started in Jan 2010, since all the material is still on private property. It is important that the selections and other important genetic material are conserved. The aim is to collect material of all the selections of *C. subternata* and *C. genistoides* a seed orchard for two species on Bien Donne in August/September 2010.

STRATEGIC OBJECTIVE 3: FOOD SAFETY AND SECURITY

KRA 3.1: Increased access and availability of quality and safe, nutritious food

Programme A: Crop improvement

The South African apple industry relies heavily on varieties that were imported from countries with extremely cold winter months. Due to the high chilling requirements during dormancy, cultivation of these apples in South Africa is restricted to geographical areas with cold winter months such as Ceres, Grabouw, Villiersdorp and the Langkloof. A number of newly bred apple selections in the ARC

Infruitec-Nietvoorbij breeding programme exhibit low chilling requirements and good fruit quality. These selections are presently being evaluated for cultivation in warmer geographical areas and to offset effects of global warming. In Phase 2 evaluation the selections showed very good results having very good fruit colour, high production with acceptable taste and ripens 4 weeks before 'Royal Gala' (first ripening cultivar). Some of these selections are also planted at a low-chill evaluation site in Limpopo. At this evaluation site three of these selections exhibited very promising results and initiated huge interest from local producers who wish to start commercial plantings. Commercialisation of the low chill varieties will extend the production areas, and will compensate for effects of global warming.

The stone fruit varieties released, are either replacing older and non-performing varieties, or will fill important harvesting gaps in the season. The eleven new varieties consist of

- four plums
- five peaches
- two nectarines

that ripen either very early, or late in the season. Of the four plums, two have a full red, one a black and one a yellow skin colour. Three of the peaches were released for the dessert industry, one for the canning industry to extend the harvesting season, and one for the drying industry. Of the two nectarines released, one is a very early variety for the fresh market. The second nectarine variety which is being marketed as "Colorburst™", will extend the drying season for the yellow skin nectarines suitable for drying. "Colorburst™" is the trade mark registered for the unique range of yellow-skin nectarines bred by the ARC and is currently sold exclusively by Woolworths in South Africa.

Breeding for red flesh apples is a high priority world wide. The ARC acquired the genetic resources for red flesh and the first generation of these crosses is already bearing fruit in seedling orchards at Bien Donné. During this past season, three red flesh apple selections were promoted to Phase 2 evaluation. The desirability of red flesh fruit is their higher anthocyanin content which is associated with higher levels of anti-oxidant activity. Red-fleshed apple cultivars currently under development in South Africa have the potential to become popular "superfruits" as a result of their anthocyanin content.

“Superfruit” status could increase the demand for South African red-fleshed apples on the fresh fruit and beverage markets of the world.

Excellent progress has been made to address South Africa’s need for peaches that ripen early in the season and fetch high prices. An embryo rescue technique to germinate seed from early ripening peaches was successfully established at the Cultivar Development Division. To make efficient use of an embryo rescue programme it is vital that the embryos survive past the seedling transplant stage and develop into viable plants. Under the experimental conditions applied, about 30% of the embryos germinated successfully. This is in line with the best germination rates reported in the literature. The acclimatisation conditions applied, resulted in the survival of almost 80% seedling plants which is significantly higher than the 60% reported in the literature. This achievement was made possible by the collaboration of Dr Maria Rubio Cabetas from Zaragoza, Spain who visited researchers at the Germplasm, Breeding and Evaluation Division during October 2009 and shared her expertise and experience of 19 years in this field.

Fruit from the new blushed pear selection Cheeky™, bred by ARC Infruitec-Nietvoorbij, was exported for the first time in small volumes. Most of the exporters reported very good market feedback and are optimistic and excited about the future prospects of Cheeky™. Representatives of various overseas nurseries and producers expressed great interest in Cheeky™.

During the past season, 88 new pear selections were identified in Phase 1 seedling orchards at Bien Donné and Drostersnes. This is the highest number of new selections ever selected in one season. Two selections with exceptionally good texture, appearance and eating quality will be fast-tracked to Phase 2 during the forthcoming season. These include a fully green selection, harvested on the 30th of January, and a blush selection harvested on the 5th of February.

The first three peer reviewed publications from a series of four on “Rapid induction of ageing character in Brandy products” appeared in the South African Journal of Enology and Viticulture. This series of

papers is a fitting finale to projects which ran from 1995 to 2004. These publications place the seal on a job well done.

The pineapple breeding programme at Bathurst managed for the first time to germinate and grow white “albino” pineapple seedlings. In the past such material always succumbed shortly after germination. This new material could significantly enhance the breeding of new and ornamental pineapple selections. An additional 4 000+ pineapple seeds were collected and planted out. This is an indication that the efforts of crossing specific material have been successful. This amount of hybrid material will also greatly enhance the potential of the project to make new selections

As part of ongoing activities in the litchi breeding programme a number of phase I and phase II orchards at Nelspruit were harvested during the past season and the fruit evaluated for improved characteristics. One of the seedlings in Phase II has shown consistent good quality, namely a small pip and large fruit. This new selection has the potential to compete with the standard Mauritius fruit. This selection will now be promoted to Phase III evaluation. The process of propagation of the material has already started.

Thirteen new early maturing citrus selections were made. These selections will be evaluated further as possible new citrus cultivars. The Tarocco citrus selection E11S10 proved to have high levels of anthocyanin pigment that enhances the colour of the fruit. This new selection will now be submitted for Plant Breeders’ Rights as a future replacement of the current commercial Tarocco cultivar.

Sweet potato cultivar recommendations were developed for resource-poor and commercial farmers in the Elsenburg area (Western Cape), the Fort Cox area (Eastern Cape) and the Roodeplaat area (Gauteng). Varieties were identified with a combination of improved yield (experimentally 5 - 10 t/ha) coupled with higher dry matter content (>22%), and acceptable taste. These will lead to food security improvement for communities and emerging farmers, and a reduction of malnutrition of mothers/children due to increased production of orange-fleshed sweet potato.

ARC was requested by GDARD to adapt 2 standard tunnels for disabled people. The one tunnel was left standard for disabled people who can walk without assistance while the second tunnel was adapted for people in wheel chairs. The layout of the second tunnel includes paved walkways (suitable for wheelchairs) inside the tunnel. Hydro lines were constructed at a level where disabled people in wheelchairs can manage planting and harvesting of the crops. Tomatoes were planted in the standard tunnel while the adapted tunnel will be planted with lettuce, spinach and herbs. A voluntary member from the community is currently assisting the disabled with the day to day activities in the tunnels. The method can be rolled out to other disabled projects where disabled people can utilise the system to produce fresh vegetables where they can gain 70% more production with this method compared to open field production.

Plant Breeder's Rights were filed for two sweet potato varieties namely sweet potato variety Isondlo and sweet potato variety Purple Sunset during the year. Both varieties are useful to commercial and resource-poor farmers. These two varieties are also the first South African orange-fleshed sweet potato varieties targeted for the export market. They are expected to be able to compete with USA cultivars - thereby enabling SA exporters to retain market share, and also leads to income generation. The export price for orange-fleshed sweet potato is estimated to be up to 30% higher than white-fleshed sweet potato (however the production is considerably lower and the local market is not well developed). Those likely to benefit from the varieties are commercial farmers, exporters, and also emerging farmers. Through marketing on to local markets, the varieties can benefit mothers/children suffering from malnutrition. The varieties are commercialised through licensing agreements and the ARC should earn royalties in the future.

Different plant spacing (in-row & between rows) were evaluated for four leafy lettuce cultivars during the winter growth season. Plant growth & development were monitored throughout the growth season. Spacing of 10cmx25cm was identified to improve yield and additionally resulted in a shorter growth season and more optimal use of space. The closer plant spacing revealed an increase of more than

45% in yield of the lettuce cultivars utilised in this trial, while the time from plant to harvest decreased from 6 weeks with conventional spacing (25cmx25cm) to 4 -5 weeks with the closer spacing.

Optimal nitrogen levels for hydroponically grown Chinese cabbage were determined for Chinese cabbage that was established in a gravel flow system and applying different nitrogen levels. The optimal nitrogen level for hydroponically grown Chinese cabbage has been identified as 190ppm. The methodology will contribute to increase in income for the farmers, as well as a significant decrease in input costs for hydroponically produced Chinese cabbage.

Improved methods of fruit and stem pruning have been identified for tomato and sweet pepper. The methods resulted in improved yield (from 8kg to more than 10kg per sq meter) and quality of sweet pepper and tomato, meeting market requirements. The change in spacing of plants from 3 plants /sq m combined with pruning to 2 stems increased the marketable yield by 23% as compared to standard practice. Hydroponic farmers will be able to maximise their yield and quality of tomato and sweet pepper with good market returns per unit area.

African Leafy Vegetables have been an essential source of food for years providing vital nutrients and vitamins in South African rural communities. However, little is known about their agronomic requirement while today's agricultural economy dictating producers to fine-tune their farming practices to maximise yields and minimize production costs. In order for farmers to increase their production; they must be able to know their plant population, planting time and harvesting method with considerable precision. Research results identified optimum transplanting time (14-21 days from emergence) that avoids early flowering of Amaranths, which is critical for resource poor farmers in marketing the vegetable. Early flowering of vegetables reduces marketability of the harvestable yields. Amaranthus and Chinese cabbage grown at a spacing of 20cmx20cm has also been found to give higher fresh mass yield that could double the income of resource poor farmers. Harvesting Amaranthus using the tipping method was also found to give higher yield and good quality leaves. Soil fertility is a key component in the production

of leafy vegetables as it enhances the quantity and quality of leafy vegetables. The experiment identified optimum application of fertiliser combinations of Nitrogen at 100 kg ha⁻¹, Phosphorus at 20 kg ha⁻¹ and Potassium at 150 kg ha⁻¹, which results in optimum harvestable yields. These will benefit resource poor farmers as it could double the yield and income per unit production area. The benefit will be in terms of increased availability of nutritious foods (vitamins and minerals), amongst the rural households and reduced leaching of fertiliser from the soil, to the nearby water resources.

Production systems for tomato production were evaluated. This resulted in the identification of tomato cultivars with increase marketable yield, and improved yield and quality. Since many cultivars are released on an annual basis from overseas, it becomes difficult for farmers to select the best cultivar. Incorrect cultivar choice results in economic losses. Identified cultivars for different production systems will result in higher income generation due to good performance of tomato cultivars in terms of yield and quality.

Transplanting time, harvesting method and planting density of Amaranthus was optimised. By limiting the time the seedlings are kept in seedling trays before transplanting to 15-20 days after seedling and identification of the correct planting date prevents the plant from being mostly leaf based to being mostly flower and seed based. This improved the yield by more than 100%. Cutting at 30 cm above the ground resulted in a decrease in labour of more than 50% without any significant effect on the quality of the final product. These improvements are of benefit to emerging farmers.

Fertilisation requirements of Amaranthus, Cleome and Chochorus were determined. Applying of the NPK fertiliser combination resulted in the highest yield. Eliminating nitrogen (N₀-P-K) from the crops reduced their yield significantly. Potassium (N-P-K₀) elimination, however, did not show any negative effect on the yield. This is of value to commercial and poor resource farmers, since it will improve yield and quality of the harvestable yield of amaranths, Cleome and Chochorus.

Indigenous food crops have been evaluated for their fertiliser and water requirements, as well as spacing and planting dates. Crops responded positively to the application of fertiliser. Maximum water productivity was measured in treatments where deficit irrigation was applied. These results are important for recommendation in preparation of guidelines of indigenous vegetable production at national level.

New value adding opportunities have been developed by the Fruit Processing Unit of the Institute. Methods to make chutney, jelly and jam from the exotic star fruit, Averrhoa carambola, have been developed. These new products will be tested for consumer preferences and SABS approval, where after the plant material and the processing techniques will be made available to small scale farmers as a new entrepreneurial opportunity. Carambola fruit is rich in antioxidants and Vitamin C, whilst it is low in sugar, sodium and acid. The entire fruit is usable and the star shape of the cut fruit makes it very popular for use as decorative material in salads.

STRATEGIC OBJECTIVE 4: AGRICULTURAL RISKS

KRA 4.2: Solutions for prediction and management of pests, diseases, weeds and alien invasives

Programme C: Integrated crop and animal disease /pest management

A research project investigating the possible role of insects in the dispersal of grapevine trunk disease pathogens made its first major breakthrough. *Phaeoconiella chlamydospora*, one of the causal organisms of Petri and Esca diseases was found on a beetle which was collected from a diseased vine at Nietvoorbij. Australian researchers observed collembolans and mites in association with *Phaeoconiella chlamydospora* sporulating inside deep, protected cracks in Australian grapevines nearly 10 years ago, but their role in dissemination was never studied. This might therefore be the first report of such an association in the world.

ARC-ITSC is also proud to report that Mr M C Khoza, a PhD student in nematology, visited the USA as Norman E Borlaug fellow. The program at the University at Missouri focussed on the isolation and identification of viruses, bacteria, fungi and nematodes which occur on plants and in the soil. These techniques will be incorporated in IPM strategies to enhance the efficacy of pest and disease control in vegetables and subtropical crops. Opportunities for further international collaboration will be explored.

Collaborative research programmes in partnership with various national and international institutions were conducted. The ARC-ITSC, DAFF and the growers association Subtrop have embarked on a national surveillance program to monitor alien invasive fruit fly species in the north-eastern parts of Limpopo and Mpumalanga. One of these notorious pest species, *Bactrocera invadens*, has already established in the northern regions of Mozambique and its anticipated arrival in South Africa will have a serious impact on subtropical fruit production.

Rearing methods for the potato tuber moth was adapted to include small scale (500 moths) and medium scale (up to 10 000 moths) could be produced in a month. This was a simplified method that ensured that larger amounts of moths could be reared in a shorter time. Thus, studies conducted with potato tuber moths will now yield results much faster and as a result, research output will be achieved in a shorter time period.

The development of a full registration package for the biological control of *Verticillium* wilt on potatoes as part of an Innovation Fund consortium was concluded. Excessive losses on potato and tomato production have been caused by fungal infections. *Verticillium* wilt has increased to such an extent that it now is of major concern to the potato industry in South Africa, and yield losses can be as high as 50 % in susceptible cultivars and 20-30 % in tolerant cultivars if control is inadequate. To curb such losses, effective control measures have to be developed. The need to address the above problems has given rise to opportunities to develop cost-effective yet pathologically effective biological control products. This will lead to improved food security due to the increased availability of high

quality carbohydrate rich potato. Higher marketable yield will result in income generation by emerging farmers, thus addressing poverty alleviation in these communities, and in so doing improving the quality of life.

A new trial to investigate litchi die-back produced new knowledge on the possible causes of the disease. In all root and soil samples that were evaluated it was found that the pathogenic fungus, *Pythium sp.* was the most prevalent organism and could probably be responsible for die-back in mature trees. This is a new finding that has not been reported previously and could lead to a possible solution for a long standing problem.

The development of a digital database on common scab of potato in South Africa is unique and contains various purified *Streptomyces* strains with molecular identification details. The database also contains information on the origin of the strains, the morphological identification, pathogenicity, lesion type, potato cultivar, photographic image and disease index values. The database that was developed is unique in South Africa. It contains valuable information on the causal agents of common scab on potatoes and can be used to track the spread of various strains in the potato industry over time. The information can also be used to design alternative control strategies to reduce common scab incidence on seed and ware potatoes which will aid the production of high quality produce in the commercial and emerging potato markets. This will lead to improved food security due to the increased availability of high quality carbohydrate rich potato. Higher marketable yield will result in income generation by emerging farmers, thus addressing poverty alleviation in these communities, and in so doing improving the quality of life.

For the second successive season coconut bugs did not damage litchi fruit in the Onderberg area as a result of measures applied to control this pest. An insecticide spray early in the season statistically reduced insect damage on prematurely aborted fruit, but final yield at the end of the season did not differ which indicate the following possibilities: Trees were either able to compensate for damage because they were bearing profusely, or fruit only became attractive to coconut bugs later in the

season when the residual action had worn off and as a result the bugs had an equal effect on both treatments. These results can have a significant impact on future chemical control of sucking bugs in commercial litchi production.

Sweet potato feathery mottle virus (SPFMV) is the major contributor to yield losses in the sweet potato industry of South Africa. This project is aimed at developing screening methods to evaluate sweet potato varieties/ breeding lines for resistance/ tolerance against SPFMV. A glasshouse trial was carried out on 17 of the most promising virus resistant/tolerant lines to determine the effect of virus treatment on tuber yield and marketable tuber yield. Blesbok showed a marked decrease in percentage yield and marketable tuber yield following virus treatment. Three lines were identified that showed tolerance to SPFMV. Inclusion of these lines into the sweet potato breeding program may lead to the development of high- yielding lines that are virus tolerant. Potential SPFMV sweet potato tolerant lines will contribute towards the breeding of virus tolerant sweet potatoes through the ARC breeding program, ultimately increasing the production of good quality sweet potatoes, thereby increasing food availability, commercialisation and income generation. This will lead to improved quality of life. Virus tolerant orange sweet potato cultivars will contribute to the food diversification programs to address Vit A deficiency, thus, alleviating malnutrition. This will improve food security due to the increased availability of nutrient rich foods.

Training of farmers

The food-based project of the Institute strives to reduce vitamin A through promoting production and consumption of pro-vitamin A-rich vegetables, with emphasis on orange-fleshed sweet potato. Vitamin A deficiency is a serious health problem in South Africa (64% of 1-9-year old children and 27% women of reproductive age are vitamin A deficient). During this year, the major event arranged was a Regional Crop-based Information sharing Workshop which was attended by 45 delegates from South Africa, Lesotho, Mozambique and Botswana. The focus is on implementation of the crop-based approach on provincial level in Eastern Cape and in North West. Training sessions were conducted at 5 regions in

the province during January – February 2010. This effort will proceed with establishment of nurseries with orange-fleshed sweet potato in the five regions and 5-day training course for 45 officials. Future efforts will be strengthened considerably through co-operation with the CENCE agri-entrepreneurship program aiming to reach 90 schools in 6 provinces during 2010. The impact of the food based approach is firstly on improved nutrition. Vitamin A deficiency has far reaching consequences on the growth, development and health of the population. It compromises the immune system and consequently increases the risk of infection. Results of previous food-based project have shown that the approach significantly improves the vitamin A status and intake of pro-vitamin A-rich vegetables and reduces reported levels of illnesses for children aged 1-5 years while maternal knowledge regarding vitamin A nutrition improved. Therefore for beneficiaries of the food-based project, the value can not necessarily be expressed in monetary terms, but would entail those mentioned above. The second area for impact is income generation/food security. Orange-fleshed sweet potato cultivars developed by ARC have a combination of improved yield (experimentally 5 t/ ha) as compared to imported cultivars coupled with acceptable dry matter content (>22%), and acceptable taste. Increased income as compared to production of imported cultivars can be estimated at R5000/ha due to increased yield.

Demonstrations were established with orange-fleshed sweet potato and training presented in 5 schools representing 5 regions of North-West to promote the production of the crop: Mafikeng, Kenneth Kaunda Region, Rustenburg, Hammanskraal and Vryburg. About 300-500 cuttings of orange fleshed sweet potato were distributed among 50 schools in each region. ARC established sweet potato demonstration plots at different primary schools in North West regions to supplement the training knowledge provided by garden teachers in order boost the national school nutrition programmes: Bojanala Platinum Ngaka Modiri Molema, Bojanala East and Ruth Mompati. ARC provided training and assistance to visited food-based projects and nurseries in order to follow up in areas of the Nelson Mandela Bay region, such as at Walmer, Sapphire and Canzibe primary schools.

Cotlands Nutrition in East London is collaborating with ARC to promote vitamin A rich vegetables to address malnutrition. They have included orange-fleshed sweetpotato into their nutrition and health advocacy plan, after training provided by ARC-VOPI. ARC was requested by GDARD to adapt 2 standard tunnels for disabled people. The one tunnel was left standard for disabled people who can walk without assistance while the second tunnel was adapted for people in wheel chairs. Tomatoes were planted in the standard tunnel while the adapted tunnel will be planted with lettuce, spinach and herbs. The method can be rolled out to other disabled projects where disabled people can utilise the system to produce fresh vegetables where they can gain 70% more production with this method compared to open field production. Training on basic principles of production was given to 26 disabled children, a facilitator and the school teacher at the Soshad centre in Soshanguve.



Cotlands Nutrition in East London is collaborating with ARC to promote vitamin A rich vegetables to address malnutrition. They have included orange-fleshed sweet potato into their nutrition and health advocacy plan, after training provided by ARC-VOPI.

Training and technology transfer to growers and communities receive continuous attention from ARC Infruitec-Nietvoorbij in 2009/10. These activities are demonstrated by the publication of 70 popular articles, 47 talks at information days, 26 radio talks and 53 training interventions. Activities that deserve special mentioning, include training on growing of deciduous fruit trees in 14 villages within the O.R. Tambo and Alfred Nzo districts of the Eastern Cape. Nursery trees were also provided to these farmers. Interest in the juicing incubators conducted by Dr Chris Hansmann in Limpopo and Mpumalanga remains high. In Venda, activity was



Group photo of the group who is responsible for the tunnels with a teacher and a volunteer from the community.

resumed after a long absence caused by budgetary uncertainties. Further technology transfer in terms of nectars also took place in Mokopane / Potgietersrus (Nguni juices / SEDA) and prospects for continued involvement remain good. Dr. Hansmann provided continued support to the Khumbe group in terms of processing and addressing deficiencies in the group's training. In the fourth quarter he presented one jam course at Khumbe (Vhembe) (38 attendees), one course on Marula jelly production at Makonde Vhembe and 9 training sessions at Khumbe, Vhembe, concentrating on developing skills to allow independent operation by the Khumbe group.



The community members on training by the ARC research team at the project site.

Production of indigenous vegetables for food security and poverty alleviation in Mukondeni village, Limpopo Province was conducted. The African leafy Vegetables (ALVs) project has been funded by the National Lotto Distribution Trust Fund (NLDTF). Fourteen hectares of land was allocated by the headman of the village, Chief WS Nemukongwe. Five hectares of land were de-bushed and planted with amaranths, cowpeas,

cleome, night shade and pumpkins. The objectives of this project are the introduction of a model of ALV's production in the Mukondeni village. The market for ALV's is expanding and the consumption of African traditional vegetables has more than doubled in the last five years in East African countries. This project has the potential to provide an annual income of more than R200 000 to the beneficiaries with the current 5 ha optimally utilised. With the planned expansion to 10 Ha the income can be doubled with the additional advantage of availability of an alternative, nutritious food source to the surrounding communities consisting of hundreds of households.



Natural Resources and Engineering



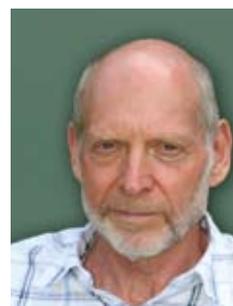
**ARC-INSTITUTE FOR SOIL,
CLIMATE AND WATER**



Dr. Mphokgo Maiba
Research Institute Manager

MANDATE

The ARC-ISCW undertakes research and development that promotes the sustainable utilisation and management of agricultural natural resources. Emphasis is placed on the transfer of sustainable technologies and knowledge to rural and disadvantaged urban communities using participatory applied research approaches. The Institute is also a key provider of technical services within its area of competence, including the provision of information from its earth observation systems, agro-climate monitoring network, soil/water/plant analytical laboratories, and the development of geospatial information systems.



Dr. Rami Kfir
Research Institute Manager

MANDATE

To conduct research, technology development and technology transfer on:

- pests, diseases, and weeds that threaten plants in crop or natural environments;
- the interactions between invasive plants and pests and their natural enemies; and
- the environmental factors that influence their interactions.

The following strategic Assets are maintained on behalf of the State:

- Custodian of the South African Rhizobium Culture Collection, and the National Collections of Arachnids, Fungi, Insects, and Nematodes. These collections house some of the world's most comprehensive research material of southern African insects, mites, spiders, nematodes, and fungi. It is a unique centre for applied taxonomic research,

focussing on economically important groups of organisms;

- diagnostic and biological information services, and
- provision of insect quarantine facilities.

The ARC Plant Protection Research Institute provides extensive and specialist knowledge of the organisms that threaten agricultural crops and plants in natural environments. Research is focussed on promoting economic and environmentally acceptable management strategies for pests and plant diseases that attack a wide range of agricultural plants, and which cannot be assigned to a single commodity ARC institute. The Institute has expertise for, and manages pollution of the environment which includes monitoring pesticide residue levels in agricultural areas to mitigate agricultural and health risks.



ARC-AGRICULTURAL ENGINEERING INSTITUTE



Dr. Timothy Simalenga
Research Institute Manager

MANDATE

ARC-Institute for Agricultural Engineering (ARC-IAE) strives to be a national and international Agricultural Engineering Centre of Excellence of the highest standard. The focus is on cost effective and

affordable production methods and equipment to improve livelihoods, competitiveness and agricultural productivity to the agricultural sector. The Institute performed well in 2009/10 regarding its mandate. The programmes are on track in proportion to targets set at the beginning of the financial year.

STRATEGIC OBJECTIVE 1: GENERATE, DEVELOP & APPLY NEW KNOWLEDGE AND TECHNOLOGY

KRA 1.1: Accurate prediction of risks (drought/diseases and pests)

Programme B: Agricultural drought and water use management

Two manuals for the training of farmers and designers on drip irrigation technology have been developed. Initial indications are that this output has been well received, and that its contribution to drip technology expertise will be invaluable.

Programme E: Mechanisation, automation and precision agriculture

Computer software for the collection of data for sprinkler test results from in-field irrigation systems as well as power data for animal drawn implements has been developed. The data is currently stored on various databases and is utilised to make recommendations to farmers on the optimal use of irrigation systems, as well as animal-drawn farm implements.

The Engineering Group has developed a laser-based land profile meter to determine the extent of soil disturbance by an implement, during use in land tenure.

A prototype chemical applicator was developed for the Rooibos tea industry, and promises extensive utilisation in this industry.

A computer-aided calculation sheet using Microsoft Excel was developed for the calculation of the total cost to construct a multi-sided boundary fence, which takes into account the cost for constructing, amongst others, poles, fences, gates, and water gates. A technical drawing of a multi-sided boundary fence with specifications can be constructed, and is available separately.

STRATEGIC OBJECTIVE 2: SUSTAINABLE NATURAL RESOURCES

KRA 2.1: Characterisation of the natural resources and ecological systems

Programme A: Characterisation and quantification

An invasive annual weed, *Inula graveolens* was found in the disturbed parts and water channels of wetlands. Interviews conducted with the land users indicates that the seed was brought to the area four years ago with animal feed originating from the South-Western Cape. Land users employed mechanical eradication and burning to control the spread of this alien invasive (*Inula graveolens*), but

without success. It is important to take cognisance of the spread of *Inula graveolens* as it is currently not listed on SAPIA even though it has been described as a 'severe competitor'. If the spread of *Inula graveolens* is not curbed it would result in further loss of biodiversity in the sensitive wetlands, increase the cost of cropping and reduce grazing capacity of the affected land.

In a follow-up study to an earlier project funded by the Department of Agriculture, Forestry and Fisheries (DAFF) on the development of spatial modelling methodologies for semi-detailed soil mapping, soil attributes and associated spatial raster layers usable at a 1:50 000 -1:100 000 scale were created for the whole province of KwaZulu-Natal, including large adjacent areas in the Eastern Cape, Free State and Mpumalanga provinces, as well as Lesotho. This information can now be used for planning of land utilisation.

Direct mapping of certain soil features from multi-spectral satellite imagery was possible which reduced the dependency to model all soil attributes. The resultant soil associations, soil depth and clay content end products are conceptually easier to use in a Multilayer Decision Support System (MDSS) than existing land type data. On a detailed scale it should be possible to use these techniques to produce sampling frames, reducing the number of sampling sites needed for a more conventional approach. A significant amount of detailed image interpretation and field sampling will still be necessary but the overall time and cost should be less than with traditional survey techniques.

A project was completed for the Department of Agriculture, Forestry and Fisheries (DAFF) Directorate: Land Use and Soil Management during which 2000 specified geo-referenced fixed monitoring sites across the country were surveyed and soil attribute data collected which can be used to monitor changes over time and to assist with the calibration of satellite-derived modelling products. In order to provide the baseline data a total of 3000 soil samples were collected by a team of eight pedologists, and then analysed by the ARC-ISCW Analytical Services laboratories – a major

undertaking. The soil information was entered into an adapted section of the National Soil Profile Database. The Soil Profile Database provides geo-referenced soil descriptive and analytical data for a wide range of purposes, such as distribution of soil properties, yield estimates, agricultural economic investigations and more.

A module was developed in AGIS (Agricultural Geo-referenced Information System) to store the data and link it to photographs of each site to enable viewing, and with further development, manipulation of and adding to the data by persons who are allowed access. The AGIS model would thus offer a facility for time-series information from permanent sites for monitoring purposes.

The Institute participated in a project for AsgiSA-Eastern Cape to supply information regarding the natural resources of a large area of the Eastern Cape Province, centred on the former Transkei. The first phase of the investigation focused on an inventory of natural resources information that was already available (mainly concerning the extent of detailed and reconnaissance soil surveys that have been carried out), as well as a report on the main economic factors affecting agricultural production in the region. The second phase involved the creation of a number of algorithms, using the existing 1:250 000 scale land type survey data, considering the growth parameters for a number of crops (as identified by AsgiSA) and determining the distribution of suitable areas for cultivation within the region for these crops. The general agricultural suitability, irrigation suitability and soil suitability of the region were also investigated. The results of this exercise were supplied as a number of maps, both at A3 and A0 scale, as well as a report detailing the methodology used. This will allow AsgiSA to make judicial and pragmatic decisions concerning future activities and focus areas in the Eastern Cape.

A final report, after few years of intensive research, was submitted to the Water Research Commission on "Standards and Guidelines for Water use efficiency from dam wall release to root zone application". This

research sets new approaches and standards for optimal use in the agricultural sector.

Programme C: Conservation agriculture and integrated sustainable management of natural resources

The ARC's water harvesting and sustainable food production project on the west coast has attracted the participation of a non-governmental organisation in rolling out the project over to other communities in South Africa.

In a project funded by the Department of Water Affairs (DWA) via the Independent Development Trust (IDT), 118 households in Thaba Nchu in the Free State Province each received two 5000 litre tanks to collect roof runoff water for use as supplemental irrigation in their in-field rainwater harvesting (IRWH) backyard gardens. A series of seven formal training sessions and a total of 42 informal workshops were held where nearly 1000 people were trained in aspects of IRWH and supplemental irrigation using roof water tanks. To conclude the training an Information Day was held during which the 205 attendees were taken to various backyard gardens where interactive sessions were held with the owners to discuss what problems they were experiencing and how they could improve on sustainable food production. Finally, a gala awards event was held at which seven outstanding achievement awards were presented (sponsored replica green JoJo tank trophies with the winner's name engraved on a plaque) as well as certificates for all who attended the formal training course. DWA's Regional Director congratulated the 118 beneficiaries and committed to continued support for the project.

Farm level irrigation system evaluations were conducted for the Limpopo Department of Agriculture (LDA). A total of nine schemes (Elandskraal, Makuleke, Phetwane, Strydkraal, Krokodilheuwel, Magalatjane, Settabotswane, Tswelopele, Homu) were visited and evaluated for standard norms, which include pressure measurements, flow measurements and a distribution test. Six reports were generated and submitted to the LDA. The project incorporated a practical training component that involved the participation of LDA officials in the field evaluations.

The ARC, in collaboration with Bushveld Eco Services, determined the population numbers of nematodes within the different trophic levels of soil samples taken from the Suikerbosrand Nature Reserve (Gauteng). This forms part of an ongoing study on the rehabilitation of old farmlands to natural veld in this reserve.

KRA 2.2: Maintenance and use of National Assets

Programme A: Maintenance of National Assets

Forty rhizobium strains, preserved as freeze-dried cultures in ampoules for the past 20-35 years, were revitalised. Of these, 35 were viable, and preserved as fresh cultures in the SARCC's biofreezer.

Additions of more than 820 new specimens of insects, mites, spiders, nematodes and fungi were made to the National Collections. Five specimen loans were sent out to international collaborators in USA, Hungary, Australia and Spain, and to local collaborators at the Universities of Stellenbosch and Pretoria.

A survey to determine the diversity of the spiders of the Mfolo Nature Reserve was undertaken in collaboration with the Walter Sisulu University. Specimens (287) represented by 77 species were identified.

A total of 698 new map additions were made to the national assets.

The SAPIA (South African Plant Invaders Atlas) was expanded with invasive plant records received from the public. A survey of invasive alien plants in the SW Cape was conducted.

Programme B: Use and enhancement of National Assets

Taxonomic studies were conducted on various pests and beneficial organisms of agricultural importance in South Africa. This resulted in the drafting of 18 scientific taxonomic articles, two of which are focused on the description of new species.

A vital insect, arachnid, fungi, nematode, and virus diagnostic and information service was provided to various clients. These diagnostic services are vital to prevent the accidental importation of new agricultural pests/diseases into the country.

STRATEGIC OBJECTIVE 4: AGRICULTURAL RISKS

KRA 4.1: Reduced vulnerability of agricultural sector to climate change

Programme B: Natural resource information and decision support systems

The North West Province Agricultural Master Plan (AMP) and Decision Support System is an integrated spatial agricultural information and planning system packaged for the North West Department of Agriculture, Conservation, Environment and Rural Development (DACERD) to enable them to direct and inform the development or upgrading of municipal Integrated Developments Plans (IDPs) and Local Economic Developments (LEDs). It will provide a broad framework for decision making purposes and improve the capacity for compiling viable project and programme business plans. The AMP was loaded on a web-based environment accessible to all stakeholders and is also available on DVD. Hands-on training in how to locate all supplied information was given to about 120 provincial, district and municipal officials in a 1-day training session spread over 6 days at the Development Bank of Southern Africa (DBSA), by means of a training manual. The information was, in addition, introduced to the local farming community during a seminar at Lichtenburg. On implementation, which is the next phase of the project, the AMP will support the Presidential priorities that include land reform, capacity building, extension services and agri-businesses. It will facilitate job creation, skills development, increased sector investment in agricultural infrastructure and good practice farming systems among communities in the North West Province.

The Institute was contacted by the Eastern Cape Department of Agriculture (ECDA) to assist with

the identification of drought areas in the province. Data from 52 rainfall stations was used in the past, but it was problematical to identify areas that needed relief using data from fixed points. The monthly Umlindi Newsletter showed the possibility to utilise remote sensing data from the Coarse Resolution Imagery Database (CRID – a National Asset maintained by ARC-ISCW) to identify areas instead of specific points. Current drought monitoring algorithms were modified for the Eastern Cape and the data is being provided to the Province since October 2009 on a monthly basis. The data is currently being used by the ECDA to identify drought affected areas and plays an important role in the distribution of drought relief throughout the Province.

ARC-ISCW convened and authored chapter 3.4 on Agriculture for South Africa's Second National Communication (SNC) under the United Nations' Framework Convention on Climate Change (UNFCCC). The Institute, as a member of the SNC drafting team and Working Group, also contributed to chapter 1 (Introduction) and chapter 3.2 (Water Resources). The SNC was externally reviewed and some of the chapters, including Agriculture, were accepted by the Department of Environmental Affairs (DEA). The final SNC to the UNFCCC is due mid-2010. The SNC falls under the aegis of DEA and the implementing agency is the South African National Biodiversity Institute (SANBI).

KRA 4.2: Solutions for prediction and management of pests, diseases, weeds and alien invasives

Programme B: Integrated weed management

Post release follow-up monitoring of *C. visenda* and *H. jureceki* (biocontrol agents for Cats' Claw Creeper) was performed at 4 release sites around the country, and confirmed good dispersal and the successful overwintering of these species at three of the release locations.

A reliable rearing technique for the stem-boring weevil, a biocontrol agent on Tithonia weed, was developed. In addition, biocontrol agents for parrot's feather (a water weed) were released.

Programme C: Integrated crop and animal disease /pest management

Intensive surveys were continued to determine the spread of the American Foulbrood (AFB) disease in the Western Cape Province. An extensive AFB Management Strategy was produced for DAFF and the South African Bee Industry.

In semi-arid rangelands in Namaqualand, the seed bank of palatable plants in soil is depleted due to cropping and heavy grazing. Palatable species, which occur in virgin land and lightly in grazed areas, have been identified and will be use-protected to increase the seed bank as to increase plant diversity on the land.

KRA 4.3: Developed and Sustained Expertise and Technical Advisory Services to Support the Management of Natural Disasters in Agriculture

Programme A: Disaster and risk management in agriculture

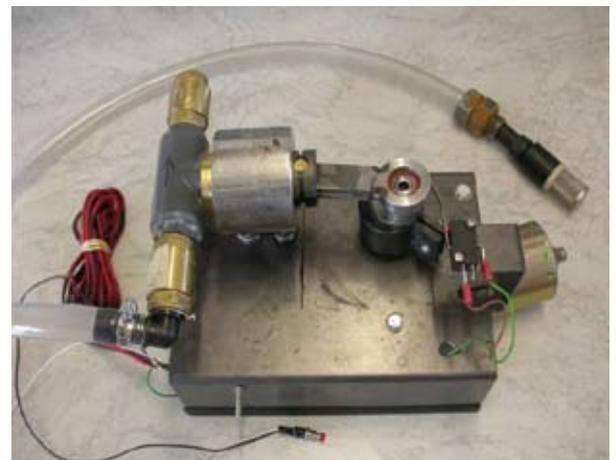
The Response Farming project, funded by the Government of France through the Southern African Development Community (SADC), was completed in 2009/10. The project was designed to help resource-poor subsistence farmers in the Limpopo and Mpumalanga Province cope with agroclimatological risk associated with dryland farming, thereby improving food security. Response Farming is responding to the weather and climate conditions by altering or introducing certain farm management activities. The method aims to help farmers make optimal crop planning decisions and to adapt their day-to-day management by responding to the current crop-plant-weather situation as well as the medium-term forecast for the coming weeks. Important savings on inputs can be made by applying them only when there is a good chance of success. Weather forecasts are obtained from the South African Weather Service (SAWS) on a daily basis, whilst rainfall data and information on the physical condition of the crop fields are obtained from the farmers. After analysing the data and converting the weather forecast probabilities for different localities, recommendations are made and sent to the farmers twice weekly via SMS to their cell phones to advise them of the activities to

be undertaken. The farmers and extension officers were trained to understand the weather forecasts and how to interpret the recommendations in order to implement them. In most cases subsequent crop yields exceeded the normal harvest obtained during previous years. In this participatory research project the farmers learned by working together with the researchers, whilst the latter became more aware of external aspects which influence farmer decisions, particularly cultural and sociological aspects and beliefs.

KRA 4.4: Agricultural Bio-diversity Management

Programme A: Collection, maintenance and use of bio-resources

By means of a collaborative project, ARC-SGI and ARC-IAE developed an electronic dispensing sprayer for the application of insecticides against the clear wing moth. This apparatus and newly generated knowledge will greatly enhance agricultural productivity and efficiency.



Prototype precision-sprayer for delivery of insecticide

Technology Transfer



Technology Transfer



Ms. Anati Canca
Executive Director: Technology Transfer

TECHNOLOGY TRANSFER – Strategic Objective 5

The current reporting year, 2009/10 represents the first year of execution of technology transfer and commercialisation activities of the organisation in a coordinated and coherent manner. This follows the development and adoption of a five year strategic plan, implemented from the 2008/9 financial that identified the need for increased effort in technology transfer, one of the key mandates of the ARC together with research and development, as per its founding Act of parliament. Prior to this decision, the technology transfer effort of the ARC had been under par and the organisation was not positioned to measure and report on its impact effectively.

The division that is responsible for this objective was conceptualised and redefined in the previous year and is made of six programmes, thus

- Training and Information Dissemination,

responsible for appropriate packaging of knowledge and technologies for dissemination using various modalities

- Commercialisation, responsible for the conversion of ARC R&D output into products and transfer through appropriate instruments
- Intellectual Property Protection, a key enabler in the pursuit of innovation in the organisation ensuring that the R&D output is appropriated as ARC property and protected using the most appropriate form
- Business Development and Generation set up to maximise potential for the ARC to provide support to the sector, maintaining relationships with clients and expanding the client base
- Economic and Biometrical Services to evaluate ARC business through impact assessment, inform future investment in R&D and technology transfer and provide internal services (for experimental design and analysis and market intelligence)

- Knowledge Management including the ARC library and information service (ARC –LIS) to ensure access to ARC information and access by the ARC to information to support its various business processes.

The principle that underpins technology transfer at the ARC is innovation; where the function is positioned to provide the processes and enabling infrastructure to ensure that innovation is achieved through the investments made in agricultural R&D.

The 2009/2010 Business Plan

The focus of the technology transfer and commercialisation objective during 2009/10 was to facilitate the organisation's ability to translate, disseminate and transfer its R&D output. This was the initial year of seeking the following outputs:

- Establishment of appropriate innovation infrastructure
- Formulating specific programmes for technology transfer addressing various user groups such as land reform beneficiaries and the different categories of agriculture (commercial, resource-poor)
- Setting up of systems to enable impact and value assessments of the programmes of the ARC on beneficiaries.

Achievements against Business Plan

The ARC's performance against business plan where the technology transfer and commercialisation is concerned was very good, given the very early stage of establishment in the organisation. Targets were met in most areas, whereas, it emerged with time that others would not be met. This was either as a result of targets having been over ambitious or with new information forcing changes of plan, as can happen in any business environment.

A report on each programme within the objective follows below.

Business Generation

Targets for external income in the private and international sectors were exceeded, with the income from the private sector at 53,2% as opposed to the targeted 49,5%, and the actual for international sector at 4,5% as compared to the 0,5% targeted. The target for income from the

public sector was not met, at 42,4% compared to the 50% targeted.

While it had been envisaged that this programme would aggressively seek new clients and projects with existing clients, the focus of effort was in presenting the ARC as a potential service provider to the public sector, in particular government departments the organisations had previously not had significant projects with. Considerable effort was spent on understanding the requirement of the departments of science and technology (social programmes specifically) and rural development and land reform. The premise for this approach was that outside the DAFF, these two had the best potential for fit between the outputs of agricultural R&D and its application in addressing the government's intentions with regard to socio-economic development.

Comprehensive proposals were prepared and in iterative fashion, discussed and amended to fit both departments' requirements and the ARC's capabilities. A contract was successfully negotiated with the DST and signed in March 2010. Discussions with the department of rural development and land reform continue. It is expected that as this new department fully scripts its mandate and outcomes, the ARC will be a key partner for the implementation of its programmes.

AMoU and project agreement was concluded with an agency of the Eastern Cape provincial department, Akgisa-EC, positioning the two organisations for a partnership in the dissemination of new knowledge and technology in the agricultural sector through co-investment in new programmes in that province. This also affords the ARC a learning opportunity for the development of a model for interactions with other provinces. A resource mapping, which is the initial phase of agricultural production development, has been done for this organisation.

In essence, public sector entities/departments that have the reach to afford the ARC the best opportunities for large multi-disciplinary programme implementation have been targeted in the public sector. The foundation has been laid for long term relationships.

In the private and international sectors, the approach in this reporting year has been more of

responsiveness to opportunities that arise, such as the FAO contracts, the seed supply contract with an Australian corporate and the MoU with ICRA (the Netherlands). These will be built on in the following years.

An important success has been the performance of the biometry unit in the provision of services and training to private clients and this will be built upon in future and managed for improved performance.

The actuals achieved by the organisation in regard to external income generation (i.e. non parliamentary grant income) provide a good baseline for target-setting going forward.

Commercialisation

Prior to the establishment of this programme within the TT division, the ARC's output in terms of products was uncoordinated and in essence not very visible to the organisation, thus making it difficult to leverage this output for dissemination to the sector. An important achievement in this area has been the compilation of an inventory of current and future products of the ARC, positioning the commercialisation programme to seek appropriate dissemination routes for these products. A strategy for the continued activity around new product development has also been drafted.

One of the major intentions in this programme had been the development of new incubators and SMME's for dissemination of ARC technology. This modality is attractive to the organisation as it enables innovation, a South African government strategy, and it also enables entrepreneur development and the creation of new jobs, leading to decent employment. However, it was necessary to take a step back in this regard to consider the organisation's current involvement in this area. The focus of effort was in this activity and a decision was taken to deprioritise the establishment of new incubators until clarity on risks was attained and mitigation was formulated. A key MoU was concluded with eGoliBio, a government owned incubator and this positions the ARC to succeed in its intentions for SMME development and the creation of new ventures in future.

A considerable amount of effort was in licensing and license management as this is the most common form of technology dissemination in the ARC and has the best potential for income generation, increasing

the visibility of the organisation and contributing to the international competitiveness of the sector. The licensing processes of two institutes in the horticulture division (VOPI and ITSC) were reviewed and new cultivars ready for commercialisation were identified. Licensees are being sought for the commercialisation of a number of these varieties. A seed supply contract signed with Magnus Kahl of Australia is a direct result of the review of VOPI output and in this sense; this activity has already demonstrated positive results. The potential to generate income and increase the international footprint of the ARC will be pursued in future years.

The target for income generated from licenses was R10,5 million and the actual achieved was R9,9 million. This shortfall can be attributed to the often long negotiation processes for licensing agreements.

It had been intended that a procedure to audit licensees of the ARC in respect of the royalties paid and unauthorised use of ARC cultivars would be developed and in place in the course of the year. Work towards this commenced. However it was determined that the organisation's capacity to do this is not at the required levels and investment in building this capacity is considerable. Other sources of funding for the capital investment were sought and the BRICS were approached. Discussions will continue with the Technology Innovation Agency. The target, therefore, could not be achieved.

Training and Information Dissemination

Targets set in this programme were generally met, especially those relating to information dissemination. These include the development of brochures from various sources of information, appropriately packaging this information for accessibility to various user groups and producing the brochures. In addition the development of a database of ARC training offerings leading to the development of marketing material to communicate the organisations services in this regard is a key achievement. The submission of a number of these training offering for accreditation by the AgriSeta is a significant achievement. This, together with the marketing material positions the ARC well in the agricultural education and training space as a credible service provider. This will lead to increased opportunities for the ARC for visibility and impact.

The two rural communities (Winterveld and Bethanie) are being assisted with training and other services for

the development of agricultural production capacity using the ARD approach. This is an important step in building the ARC's own capacity in implementing community based programmes that have the best potential sustained success and significant contribution to employment creation, food security and rural development.

The target for the number of training events was not met. However a considerable number of people were provided with training. Included in this number are some examples below:

- 65 subject advisors of the Department of Education, trained in soil science and agricultural management. This contributed to an improved pass rate of scholars in agriculture in grade 12 in 2009
- 20 farmers were trained in a food based approach to address vitamin A deficiency. These included farmers from Hammanskraal and Lusikisiki
- 90 facilitators linked to the Eastern Cape Community Workers were trained in sweet potato production
- 24 disabled children and their two teachers were trained from the Soshad Disabled Centre in Soshanguve, Gauteng were trained in hydroponics
- 247 farmers were trained in beef production through the Kaonafatso ya Dikgomo (Beef Profit Partnerships) programme. This includes farmers from the Eastern Cape (Hobeni, Gusi, Ntlasana, Lower Weza), Limpopo (Zebediela, Polokwane, Verena), Mpumalanga (emalahleni, Sizanani Leeupoortjie, Draaihoek) and other areas.

As this was the first year of operation of the training programme in an integrated manner, a target for income generated from training was not set. A baseline has been established however and this is set at an estimated R1 768 421, 00. This will be used for accurate target-setting in future years.

With the full establishment of the training programme, the introduction of its marketing materials and the determination of the crucial baseline data, it is envisaged that training provision as a mode of technology transfer will improve in scope and the numbers of people trained will continue to rise in future years.

Intellectual Property Management

A key deliverable in this programme is the raising of awareness of ARC personnel of the importance of the R&D output and the need to treat this as a strategic resource. This requires all to understand their role in the protection of this resource. This has been done through four awareness workshops. A target of 100% of all ARC science personnel to have gone through the awareness programme was set. However, due to other work-related pressures not all were able to attend and the actual achievement in this regard is 88%.

With regard to the IP portfolio management aspect of this programme, this was achieved as new applications for registration were filed and IP currently owned by the ARC was maintained. The target of 50 new applications and registrations was not met and it has been determined that this target was over ambitious and that dependencies on the output of the R&D section of the organisation was not taken into account.

However, it is a significant achievement for the ARC that 29 new plant breeders' right were granted to the organisation, including two in the US (where they are referred to as plant patents). Three new plant breeders' rights applications were filed from two institutes. In addition, a United States patent application has been filed for a vaccine. Finally, a design application has been filed.

In implementing the IP policy of the ARC (adopted in October 2008) and the addressing organisational shortcomings identified in the 2008 IP audit report, a system for the management of the ARC 's photo library was developed and will be implemented as part of the implementation of the IP management system. This system is currently being integrated with other appropriate ARC systems (such as HR and Finance). Training for executive and senior management has been done. The database of registered and unregistered ARC IP has been loaded onto the system and this is continuously done as more information becomes available.

The trademark strategy formulation was not finalised but the document is in draft form.

Economic Services and Biometry

Market intelligence by way of two economic outlook reports was provided. The development

of organisational capacity to do comprehensive impact assessments of its programmes on intended beneficiaries was initiated through the conclusion of agreements with key partners. The terms of reference for the impact assessment study of an ARC Iachanelia bulb programme implemented in the Northern Cape Province were accepted by internal clients and work has commenced. However, the target of two completed studies was not reached due to the highly involved process of impact assessment. It was determined that this target had not been realistically set. Lessons learned in this reporting period regarding capacity and solutions found for this have positioned the ARC to do better in this very important area in future.

Considerable effort was focused on the ad hoc decision support system, through provision of support and advice to the planning processes of the organisation. Viability reports on two products were not done as no requests for these were received. The focus therefore had to be shifted to communicating the existence of the programme in the organisation and thus raising awareness about the services it is set up to offer internally. Two contracts with an external client were successfully completed and another was finalised in March for delivery in the 2010/11 financial year.

The Biometry services have achieved most of its targets in the provision of services through consultations and review of proposals and publications. This unit continues to provide a crucial service to the organisation and in the sector.

Knowledge Management

A strategy for knowledge management in the organisation has not been finalised due to capacity constraints in this specialised area. However, the library services aspect of this programme has achieved its targets for document delivery. A customer satisfaction survey has been done and will be used as one of the inputs in the formulation of a strategic plan for new and modern ARC-LIS services.

Enhanced Organisational Capacity

Establishment of the Office of Technology Transfer

As required by the Intellectual Property Rights from Publicly Funded Research (IPRPFRR) Act, the ARC has to establish an Office of Technology Transfer (OTT) for the proper management of IP rights that

accrue to it as a result of publicly funded R&D. This is also a requirement of the IP policy of the ARC and the composition of this office is determined in this policy.

Following the recruitment of the senior manager for commercialisation in June 2009, the personnel required for this office was now in place and this was established formally through the calling of a meeting to signify this. The OTT meets every month and deliberates on all matters related to IP management and its conversion into products and services.

An inventory of ARC products has been compiled and this enhances the capacity of the OTT (and thus the ARC) to disseminate in appropriate ways the outputs of R&D conducted in the ARC.

The RIM's have been appointed as institutional IP managers, responsible for the day-to-day management of IP in their domains and ensuring compliance to the IP Policy and procedures of the ARC. The IP system is now functional, although work continues to integrate it with other ARC systems to enhance its utility to the organisation.

The IP training sessions have been successful in raising awareness of IP as an asset of the organisation and the OTT has been engaged by the research function of the organisation frequently with regard to investigating possible protectibility of a variety of inventions.

The achievements in this area; the Institute IP managers, the IP system and the training sessions, all work in concert to foster a link between technology transfer and R&D that can only serve to ensure organisational goals are reached.

Key New Appointments

The human resource capacity of the ARC's technology transfer and commercialisation was strengthened through the appointment of two senior managers for the key programmes of commercialisation and business generation. This significantly improves the organisation's capacity to perform in these areas.

In addition, the Economics and Biometry programme was established as an integrated and visible function to provide various key services to the organisation in the

mode of decision support. Three new appointments were in this unit, including the appointment of the team leader for the Biometry unit following a retirement and the appointment of two economists.

Client and Stakeholder Interactions

Considerable effort has been spent on building new relationships and strengthening those that already exist. Communication of the new organisational goals and the capabilities has been focused on, particularly with government departments such as Science and Technology, Correctional Services, Rural Development and Land Reform as well as Agriculture, Forestry and Fisheries. Provincial government departments have also been engaged including Limpopo, the Eastern Cape (largely through its agency Asgisa-EC) and the Western Cape.

Interactions in the private sector include Citrus Research International, Winetech, Protea South Africa and Deciduous Fruit Producers' Trust. These interactions position the ARC for enhanced relationships with these and other industry groupings for mutual benefit as intended.

Building Capacity for Innovation in the Sector

Innovation often happens when stakeholders work with each other. Hence, the ARC has invested in Agricultural Research for Development (ARD) training since 2003, to improve skills in inter-institutional, trans-disciplinary collaboration. The ARC also initiated a National ARD Task Team (NARDTT) and led this consortium of Research, Development and Higher Education institutions in establishing a national collective innovation capacity.

In October 2009, the ARC hosted a Symposium that evaluated lessons learnt from these Collective Innovation processes. Six local universities; various public institutions and delegates from Kenya; Zimbabwe; the Netherlands and the United Kingdom attended. Twenty papers were delivered and an ARD Resource Book was launched. Findings that were published included that the disconnect between actors involved in R&D needs to be addressed through interactive learning; that producing knowledge is insufficient and value in terms of application needs to be created and; that knowledge from other actors than scientists is also necessary for innovation to

happen. It was agreed that a Collective Innovation Network of Southern Africa (CINSA) would evolve from the NARDTT.

An independent evaluation by consultants from the Royal Tropical Institute (KIT) and the International Livestock Research Institute (ILRI) after the Symposium found that the ARC has managed the national ARD initiative well and that major outputs were effectively communicated.

Over the years 58 ARC staff members were capacitated in ARD out of a total of 103 SA professionals. The ARC has established itself as a player in collective innovation and formed valuable linkages with respected local and international organisations, aligning specific ARC initiatives with the government's Africa agenda. Collective Innovation overlaps with technology transfer; as it facilitates action research and feedback from end users to researchers on priorities. This capacity will be maintained and strengthened in for instance community development projects.

Conclusion

The newly established technology transfer division responsible for driving strategic objective 5 – technology transfer and commercialisation – has performed well in this reporting period. Key achievements are evident in all the programmes of the division. Relationships have been built and systems formulated to enable visible technology transfer activity. The ARC is positioned to achieve even more as the division matures and addresses the capacity constraints that currently beset it.

It is clear that those targets that have not been met are the result of over ambitious target setting that did not take into account the stage of development of the division. In addition, environmental factors in the business environment made it necessary to revisit some of the targets, especially those related to incubation and SMME development.

The ARC now has implemented its strategic plan in regard to technology transfer and is positioned to address past shortcomings identified in several institutional reviews in this regard. It can only improve on this performance in its first year of operation.

STRATEGIC OBJECTIVE 6: ACHIEVE ORGANISATIONAL GROWTH AND SUSTAINABILITY

FINANCE

CHIEF FINANCIAL OFFICER'S REVIEW

65

HUMAN CAPITAL AND SUPPORT SERVICES

72

PUBLICATIONS 2009/10

86



CHIEF FINANCIAL OFFICER'S REVIEW

for the year ending 31 March 2010



Mr. Gabriel Maluleke
Chief Financial Officer

FINANCIAL PERFORMANCE

1. Financial Performance Review

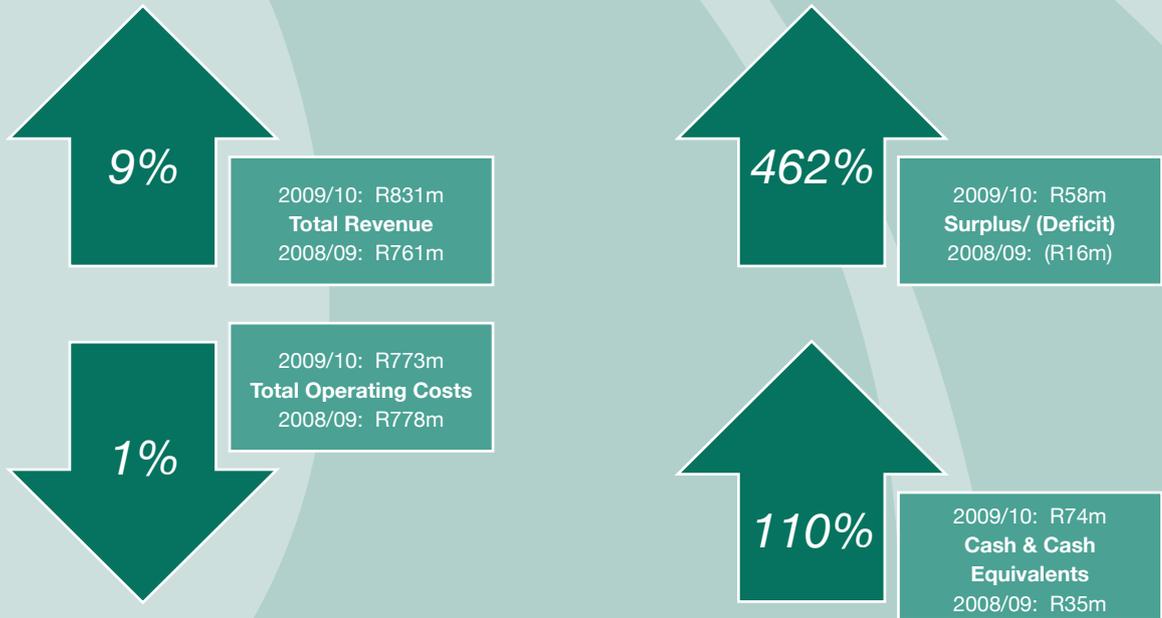
1.1 Overview

The financial performance presented in this report highlights the effectiveness of the ARC's financial strategy towards ensuring sound financial controls to meet the Strategic Objectives as set out in the ARC's Strategic and Business Plans. Financial performance of the ARC during the year

under review (2009/10) has been in accordance with the approved Strategic and Business Plans, notwithstanding the challenges the organisation continues to face.

The ARC realised a surplus of **R58.27million** for the period ending 31st March 2010, which represents a 462% increase when compared with the previous year's deficit of **R16million**. Detailed analysis of this performance is presented in the annual financial statements between pages 138 and 190.

Financial Highlights



Summary of Financial Performance

	2009/10 R'm	% Change	2008/09 R'm
Total Income	831.05	9%	760.60
Parliamentary Grant	532.85	13%	469.99
External Income	292.52	14%	255.73
Other income	5.68	(84%)	34.88
Total Expenditure	772.77	1%	777.76
Personnel Costs	490.22	5%	467.04
Operating Expenditure	264.76	11%	296.47
Depreciation	17.79	(25%)	14.25
Loss/Gain on Sale of Property and Equipment	(0.01)		1.08
Net Surplus/(Deficit)	58.27	462%	(16.08)
Cashflow from Operating Activities	56.11	55%	36.11
Capital Expenditure	17.72	(71%)	62.10
NET ASSETS	559.45	12%	501.54

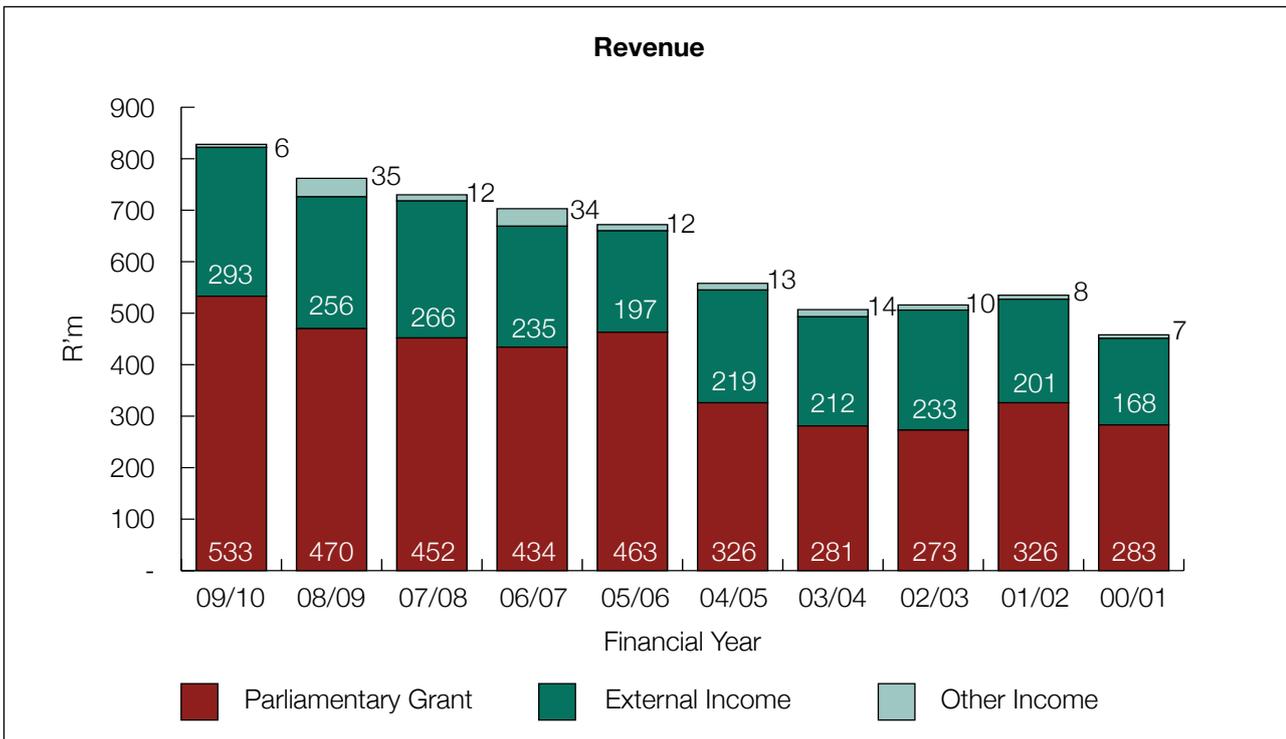
1.2 Revenue

ARC's revenue increased by 9% to **R831 million** (2008/09 **R761 million**). The revenue increase should be seen in light of the following:

Parliamentary Grant

- An increase of 2.24% in baseline Parliamentary Grant to **R502 million** (2008/09: **R491 million**).
- A Parliamentary Grant adjustment of **R10.2 million** relating to salary increments which were settled above budget.

- A parliamentary grant adjustment of **R20 million** due to the adoption of Accounting Standard GRAP 23 coupled with changes in ARC's accounting policy regarding revenue recognition. This income was previously recognised as deferred income in the Statement of Financial Position in prior years.
- Including adjustments, Parliamentary Grant increased by 13%



External Income

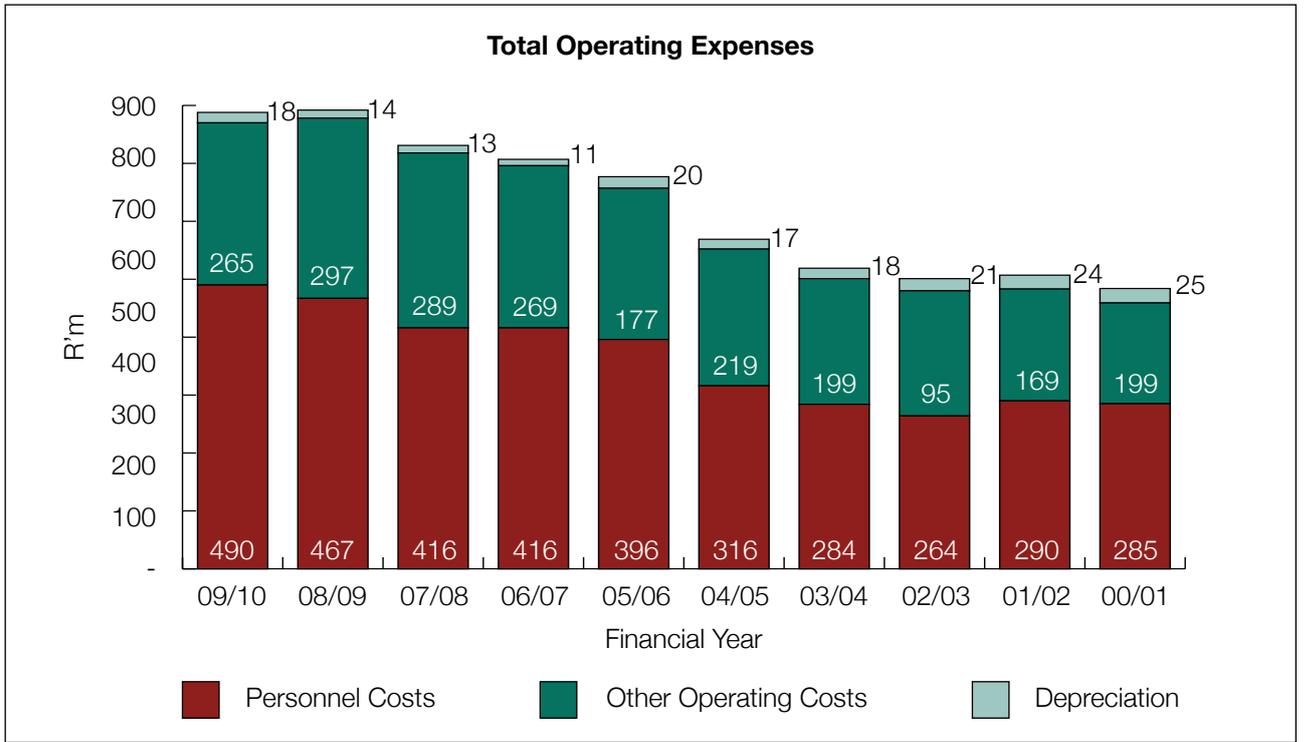
- Contract income also increased by 14% from the previous year to **R292.5 million** (2008/09: **R255.7 million**), although it was 6% below budget due to the slow down experienced in the South African economy during the year under review.

Other Income

- Other income decreased by 84%. However, it should be noted that the previous year's other income included adjustments related to audit clean up which resulted in a R26.3 million addition to other income. During the year under review, other income was represented by interest income which also decreased by 34% to **R5.7 million** (2008/09: **R8.5 million**).

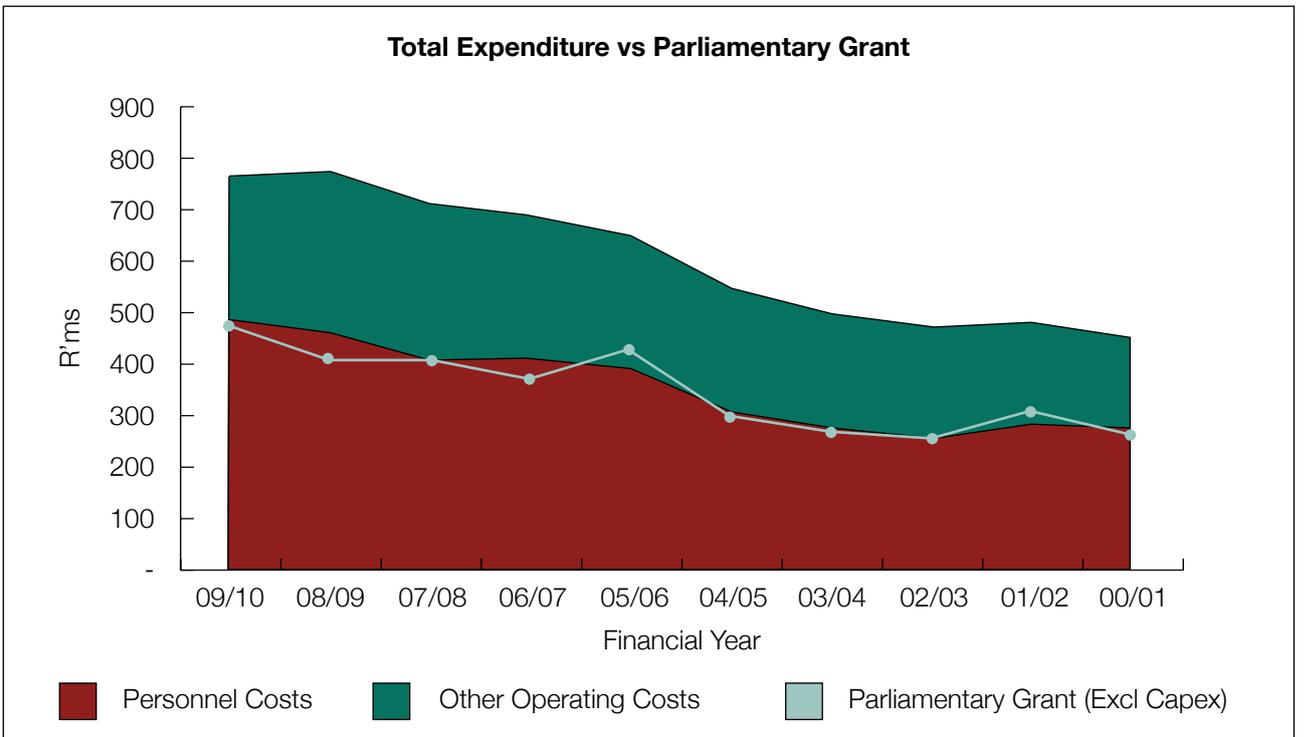
1.3 Operating Expenditure

Total operating expenses decreased by only 1%. The budgeted salary increment for 2009/10 was 6% and salary increments were settled at 6.8% after negotiations. However, due to vacancies that arose during the financial year, the net effect is that personnel costs increased by 5% to **R490 million** (2008/09: **R467 million**). Other operating costs decreased by 11% to **R264.8 million** (2008/09: **R296.5 million**) as a result of the reprioritisation of projects as well as cost control initiatives undertaken by management during the year under review. Depreciation on property, plant equipment and computer software increased by 25% due to the re-assessment on the assets' useful lives as well as capital expenditure of **R17.7 million** during the year under review.



1.4 Comparison of Total Expenditure vs. Parliamentary Grant

The graph below shows that baseline operational Parliamentary Grant does not cover personnel costs. This has been a funding challenge over the ten-year review period.



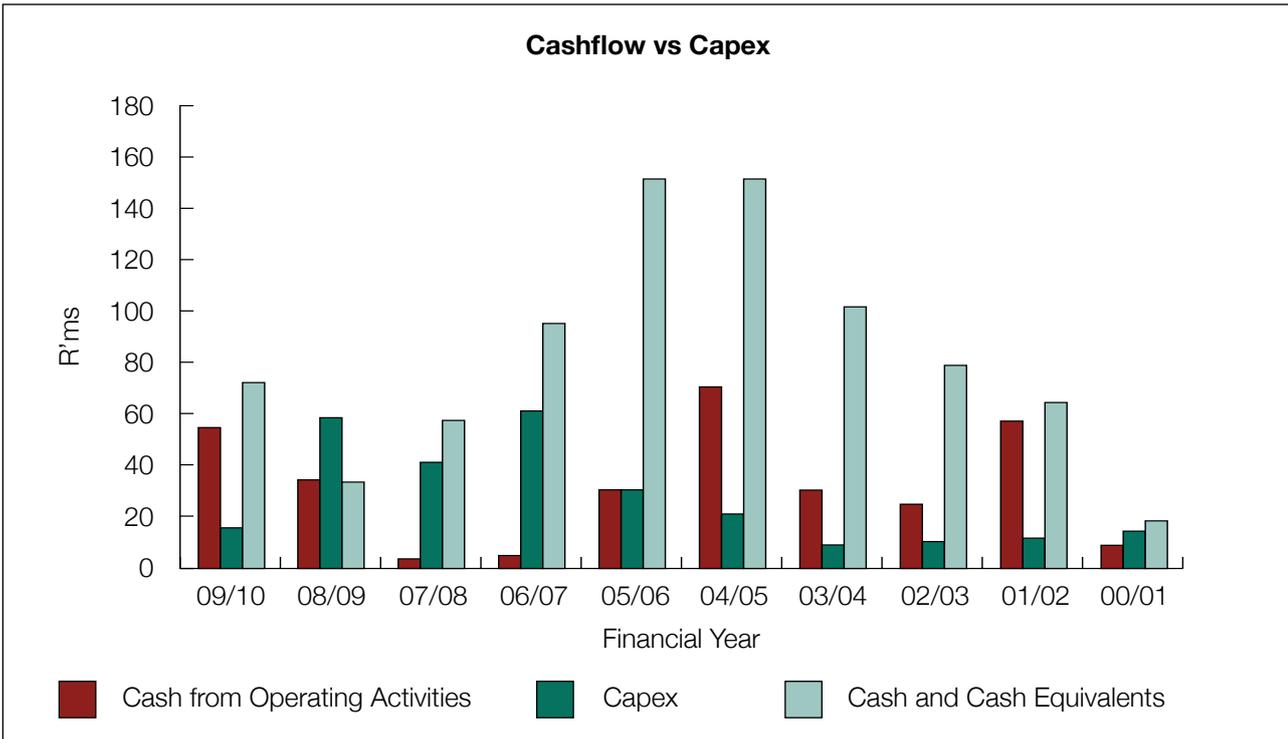
The effect of the scenario highlighted on the graph above, has resulted in the ARC not being able to attract and retain skilled personnel, whilst vacancies had to be filled based on how critical they are during the period. The ARC has over the same period reduced its head count from 3241 to 2400. This is the result of the funding that grew at a lower rate than the growth in personnel costs.

Other operating costs are financed from contract

income. Funding from external contracts continues to subsidise operating costs for fundamental research.

Cashflow and Capital expenditure

The ARC's cashflow from operating activities increased by 55% to **R56.11 million** (2008/09: **R36.11 million**); however, the ARC has been faced with funding shortfalls since 2004.



As shown on the graph above, there has been significant investment in capital expenditure since the 2004/05, which was funded mainly from the balance sheet as reflected through declining cash reserves. The ARC's ageing infrastructure and replacement of capital expenditure currently requires a capital injection of **R435 million**. This capital injection will ensure that the ARC retains its status as a premier science research institution with adequate research capabilities and facilities.

1.5 Supply Chain Management

Another treasured value is our continued commitment to playing a dynamic and substantial role in facilitating and proactively promoting the successful advancement of Broad-Based Black Economic Empowerment (BBBEE). ARC's support

for BBBEE through its targeted procurement pre-dates legislation. It is this spirit that underpins our commitment to advancing transformation that will present opportunities both internally and externally in a just, fair and equitable manner.

In terms of Preferential Procurement Policy Framework Act 5 of 2000 (PPPFA) and its Regulations, the ARC is expected to give preference to Historically Disadvantaged Individuals (HDI) and or Broad base Economic Empowerment (BEE) owned companies. The giving of preference points is aimed at addressing the historic economic imbalances thus encouraging effective economic participation by those previously disadvantaged. The **80/20** and **90/10** principles are applied to all contracts that have a rand value of **R30, 000.00** and above.

The ARC reports monthly to National Treasury on contracts awarded that are **R100, 000.00** and above, while statistics for all procurement done are monitored monthly. The ARC has in the year under review spent **R174.4 million** on procurement and **R57.4 million** was spent on HDI owned companies which constitutes 33.29 % during this financial year

The year-on-year increase in procurement from HDI companies increased by 11% from the previous year's procurement of **R54 million**. Overall, the ARC achieved cost savings of **R7.3 million** due to improved procurement practises. The target for increases in procurement from HDIs is 15% and achievement of this target is being hampered by the lack of service providers with the appropriate skills and knowledge to service a science research institution. Efforts are being made to encourage collaboration between HDI and non-HDI companies.

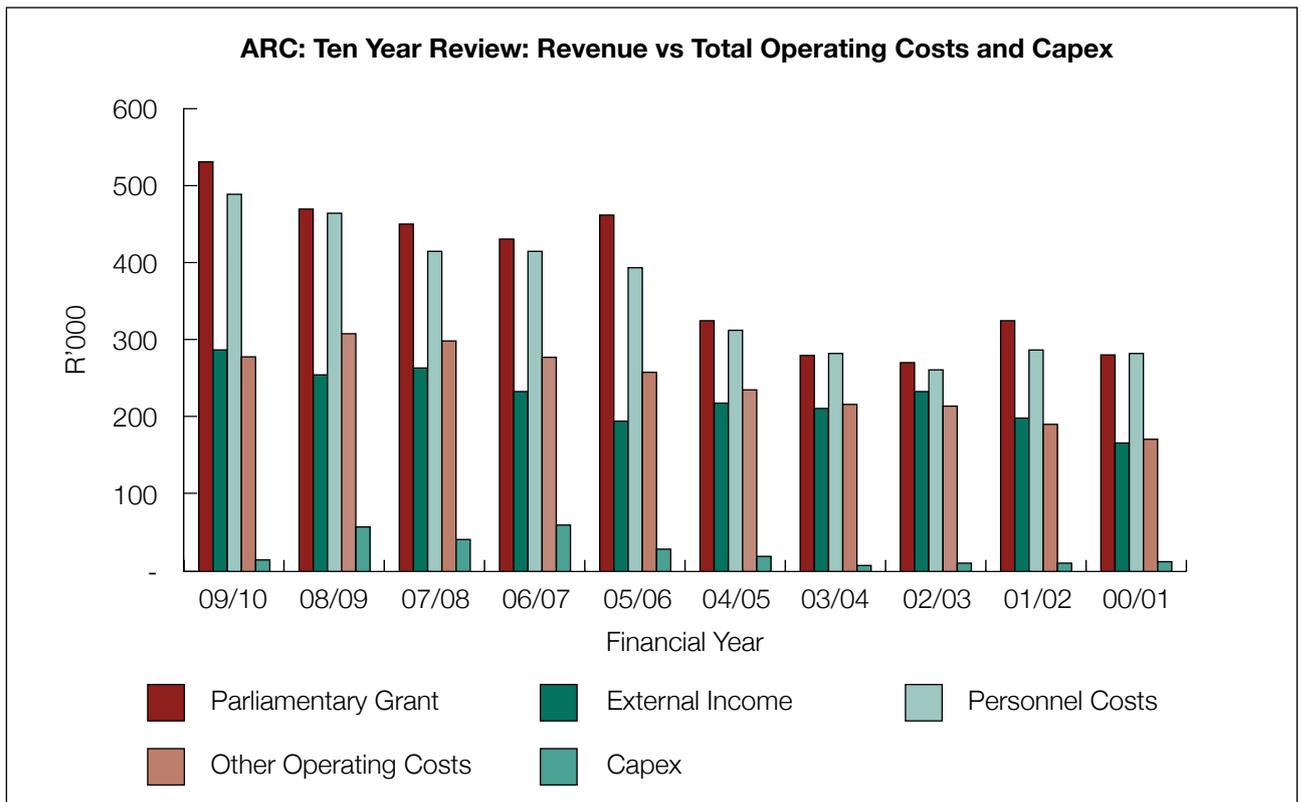
2. 10 Year Review

2.1 Revenue and Expenditure (Total Operating Costs)

The 10 year review below indicates an increase in Parliamentary Grant over the period. The

Parliamentary Grant also includes baseline capital allocations used to fund capital expenditure. However, when baseline capital allocation is excluded from the Total Parliamentary Grant, baseline Operational Parliamentary Grant continues not to cover the salary bill of the ARC. This leaves the ARC to depend on the external income to fund the rest of its personnel and operational costs from external income which is under serious strain as a result of the current economic conditions.

A ten year review of finances has revealed that the main source of revenue is the Parliamentary grant received through the Minister of Agriculture, Forestry and Fisheries. The overall trend for ten years suggests under – investment in the organisation by all stakeholders (public and private). Increments in annual parliamentary grant allocations have not exceeded 6% year-on-year, a level which is important to sustainably manage the impact of inflation on the organisation's resources. The net effect has been the inability to retain and recruit skilled personnel, which in turn has resulted in a steady decline in scientific publication and other research outputs in the ARC.



Agricultural Research Council										
Ten Year Review										
	2009/10	2008/09	2007/08	2006/07	2005/06	2004/05	2003/04	2002/03	2001/02	2000/01
	R'm									
Statement of Financial Performance										
Total Income	831.04	761.67	729.96	703.76	671.41	558.24	507.79	516.63	534.96	457.61
Parliamentary Grant	532.85	469.99	451.77	434.18	462.76	325.91	281.31	273.16	326.05	282.93
External Income	292.52	255.72	265.75	235.48	196.97	219.31	212.25	233.44	201.20	167.91
Investment Income	5.68	8.50	12.39	11.72	11.18	12.76	13.96	9.57	6.29	6.17
Other Income	(0.01)	27.46	0.05	22.38	0.50	0.26	0.27	0.46	1.42	0.60
Total Expenditure	772.77	777.76	718.01	695.61	657.06	552.17	501.42	479.74	556.35	458.87
Personnel Costs	490.22	467.04	416.08	415.97	395.97	315.85	284.23	263.63	289.80	284.59
Operating Expenditure	264.76	296.47	288.54	269.03	241.19	219.10	199.00	195.15	169.26	149.56
Depreciation	17.79	14.25	13.39	10.61	19.90	17.22	18.19	20.96	23.74	24.72
Impairment of fixed property	-	-	-	-	-	-	-	-	73.55	-
Net Surplus (Deficit)	58.27	(16.08)	11.95	8.15	14.36	6.07	6.37	36.89	(21.40)	(1.26)
Statement of Financial Position										
Property, plant and equipment	649.13	649.32	607.55	523.25	396.95	381.00	375.68	385.44	395.21	544.45
Investments	2.01	2.24	2.23	2.23	1.24	0.85	0.85	0.18	0.19	0.19
Current assets (excluding cash)	93.29	81.94	94.76	77.18	128.74	73.39	67.48	75.41	65.86	66.26
Cash resources (net of bank overdraft)	73.46	34.97	59.10	96.66	152.82	152.41	102.68	80.51	65.54	20.16
Total Assets	817.89	768.47	763.64	699.31	679.75	607.66	546.68	541.54	526.80	631.06
Capital and Reserves	559.45	501.54	272.91	205.63	197.47	184.56	382.00	380.35	350.21	494.79
Non Current Liabilities	70.65	92.27	326.45	309.34	230.30	288.90	30.64	55.78	71.00	64.17
Current Liabilities	187.79	174.66	164.29	184.34	251.98	134.19	134.04	105.41	105.59	72.10
Total Equity and Liabilities	817.89	768.47	763.64	699.31	679.75	607.66	546.68	541.54	526.80	631.06

Agricultural Research Council										
Ten Year Review										
Cash Flows										
Net cash flow from operating activities	56.11	36.11	4.77	6.62	31.64	72.01	32.45	27.05	58.55	9.88
Net cash flow from investing activities	(17.62)	(60.24)	(42.32)	(62.79)	(31.23)	(22.27)	(10.28)	(12.08)	(13.17)	(15.41)
Cash and cash equivalents at beginning of year	34.97	59.10	96.66	152.82	152.41	102.68	80.51	65.54	20.16	25.68
Cash and cash equivalents at end of year	73.46	34.97	59.10	96.66	152.82	152.41	102.68	80.51	65.54	20.16
Ratio Analysis										
Profitability and Asset Management										
Asset Turnover	1.5	1.4	1.2	1.3	1.5	1.2	1.2	1.2	1.3	0.8
Return on Net Assets (%)	10.4%	(2.7%)	2.0%	1.6%	3.4%	1.3%	1.5%	8.5%	(5.1%)	(0.2%)
Current Ratio	0.89	0.5	0.6	0.4	0.5	0.5	0.5	0.7	0.6	0.9
Operating Margin (%)	7.1%	(2.2%)	1.7%	1.2%	2.2%	1.1%	1.3%	7.3%	(4.1%)	(0.3%)
Performance										
Revenue per Employee (Rands)	0.344	0.293	0.292	0.249	0.245	0.206	0.195	0.191	0.184	0.147
Net Surplus/(Deficit) per Employee	0.024	(0.006)	0.005	0.003	0.005	0.002	0.003	0.014	(0.007)	(0.000)
Personnel Costs as a % of PG	92%	99%	92%	96%	86%	97%	101%	97%	89%	101%
Personnel Costs as a % of Total Expenditure	63%	60%	58%	60%	60%	57%	57%	55%	52%	62%
External Revenue as a % of Total Income	35%	35%	37%	35%	30%	40%	43%	46%	38%	37%
Number of Employees	2,400	2,475	2,457	2,686	2,698	2,643	2,525	2,652	2,872	3,057
Ratio Definitions										
Net Assets	Total assets less current liabilities									
Asset Turnover	Revenue (excluding investment and other income) divided by net assets									
Return on Net Assets	Net profit as a percentage of net assets									
Current Ratio	Current assets to current liabilities									
Operating Margin %	Net surplus/(deficit) as a percentage of turnover									

HUMAN CAPITAL AND SUPPORT SERVICES

Review for the year ending
31 March 2010



Mr. Michael Netsianda
Executive Director: Human Capital
& Support Services

1. EXECUTIVE SUMMARY

This report describes the deliverables and strategic interventions of the Human Capital Management Division for the 2009/10 financial year.

The success of the ARC's performance is predicted upon effective and efficient internal support services. This means various elements internal to organisational support must operate in a seamless and effective manner. Support services need to consistently deliver solutions that increase productivity, improve effectiveness, accountability and transparency for the organisation. An effective and efficient corporate service capability enhances the level of sustainability of any organisation and contributes towards creating a conducive environment for institutional performance.

In this regard the Human Resources Division provides support services and functional expertise to ARC and is responsive to the needs of all its stakeholders, whilst ensuring effective and efficient management of ARC. It provides strategic leadership to ARC through interpretation of legislation and regulations, formulating organisational policies and rendering operational and procedural support to the organisation.

2. TALENT MANAGEMENT

The management of talent, which encompasses recruitment, performance management, development, succession planning and reward, remains a priority function in the division. This is a critical function in view of the prevailing shortage of skills in South Africa and the intense competition which takes place to attract and retain talented employees, particularly in view of the requirements of the Employment

Equity Act (EEA). Talent audits are conducted twice a year and on the basis of their results retention and development plans are formulated and carried out. Trends in the departures of employees from the organisation are monitored to enable the divisions to react to any risks that might endanger adequate employee or talent retention. Best practice in the area of reward is critical in an environment where there is intense competition for skilled people. A number of projects have been completed in this connection to ensure that the division's approaches are up to date and relevant and that they provide the organisation with the best opportunity to employ and retain suitable people. With this objective in mind the division has implemented a new job evaluation system designed to achieve more effective measurement and comparison of jobs internally and externally. To embed the new system permanently, a re-grading exercise was conducted during the period under review. One of the key milestones was the implementation of Performance Management and Development System for the first time in ARC.

During the year, ARC adopted a competency-based job profiling process. The latter entailed defining technical and behavioural competencies for each job and job family. The change was necessitated by the generic nature of the previous job profiles and the difficulty of creating career advancement especially in the technical stream and subsequently a dual career path model was developed and implemented.

3. EMPLOYMENT EQUITY PROGRAMME

The organisation continues to be committed to the goals of properly representing the economically active population of South Africa and ensuring that competent individuals are given equal opportunities across all levels. The ARC operates within the framework of the national employment equity policy in South Africa and its plans are within the guidelines of the affirmative action guidelines. The organisation was subjected during the past year to an audit by the Department of Labour for employment equity compliance and the organisation obtained a clean audit report.

The organisation also focused its efforts on the attainment of Employment Equity (EE) targets, albeit

with great difficulty, particularly in attracting qualified female employees. Although the race and disability targets were attained, these will remain an area of focus in the new financial year.

The 3rd Mandatory Grant payment to the amount of R639 736.35 for 2009/2010 was paid on 29 March 2010, by the AgriSETA. To date, the ARC received an amount of R1,9 million from the AgriSETA.

3.1 Employee Well-being

A number of HR interventions were introduced during 2009/10. These included the implementation of the Employee Assistance Programme (EAP), which included the HIV/AIDS Programme awareness intended to deal with the pandemic.

3.2 Human Resource Information System

The importance of accurate and up-to-date employee information cannot be over-emphasised. To this end, ARC embarked on a project to upgrade the existing VIP system which possesses improved functionalities required to provide strategic management information and business intelligence reports.

With the eminent migration of HR information to ERP platform, the focus was on ensuring that all functionalities of the new version were customised and adapted to fully support ARC's Human Resource Management Information System strategies. Processes were mapped, and data verification exercises took place to ensure a smooth migration to the new version.

4. VETTING

The nature of ARC's business is such that it requires the highest levels of confidentiality and secrecy. To ensure that the security of our clients is not compromised, all employees are expected to undergo a thorough screening process supported by the National Intelligence Agency (NIA). Employees are encouraged to complete documentation during the first month of employment and utilise our internal vetting section, which assists with such legal issues as taking fingerprints and completing the required documentation to expedite the process.

5. PROFESSIONAL DEVELOPMENT PROGRAMME

As mentioned, the science and technology industry is faced with a dire shortage of qualified and skilled personnel. In order to meet this challenge, ARC, through the Professional Development Programme, identified young people with relevant qualifications and potential to undergo an intensive development programme for job readiness in ARC and the industry in general.

The Professional Development Program enables the Agricultural Research Council to attract candidates and empower them with scientific skills. On 31

March 2010, the PDP program had 67 candidates who participated in the mentoring program. The general progress of the candidates is good and in line with the training program and goals that both the mentor and candidate set at the beginning of the relationship. The challenge is however to retain these young professionals within the ARC.

ARC intends to grow the PDP into an all-encompassing youth programme which will include internships, learnerships, graduate development and bursaries. This approach will broaden the developmental reach, which, in turn, will improve ARC's prospects of developing and attracting relevant skills, as well as contributing to the skills pool in general.

The Table below reflects the candidates that are currently busy with post-graduate studies:

PDP PROGRAM			
Study Program	Male	Female	TOTAL
PhD	4	7	11
MSc	11	12	23
MTech	3	3	6
BSc Hons	4	8	12
BTech	3	4	7
BSc	2	4	6
NDipl	0	2	2
TOTAL	27	40	67

For the period 1 January till 31 March 2010, the movement within the program was as follows:

New Participants	Withdrawals	Conversion to permanent appointment
1	2	4

The Table below reflects the number of Professional Development Program beneficiaries over the past three years.

NUMBER OF PDP STUDENTS

Year	Number of Students
2007/08	68
2008/09	97
2009/10	72

The Table below reflects the number of beneficiaries who successfully completed their studies.

How Many Completed Studies

YEAR	PhD	MSc	MTech	BSc Hons	BTech	BSc Engineering	NDipl	TOTAL
2007/2008	1	9	1	4	4	1	0	20
2008/2009	0	8	1	1	3	0	0	13
2009/2010	2	20	4	2	1	3	0	32

This has been our flagship program and we had (37) MSc; (6) MTech and (3) PhD graduates over the past three years. The greatest achievement is that two of our PhD students are currently busy with the Post Doctoral Degrees. The Table above

shows the students who completed their studies over three year period specialising in various study programmes that we identified as critical and scarce disciplines like Meteorology; Plant Breeding; Virology; Veterinary Tropical Diseases etc.

How Much Was Spent on PDP

YEAR	No. Candidates	Mentor Allowance	Operational Budget	Study Fees	Salary	Total
2007/08	68	816,000	2,965,388.50	590,415.09	5,730,429.00	10,102,232.59
2008/09	97	1,164,000	4,605,900.89	563,446.72	4,829,832.45	11,163,180.06
2009/10	72	828,000	2,487,976.13	523,087.62	4,730,844.83	8,578,908.58

The above Table shows the actual expenditure incurred over three year period. In a resource scarce environment it is important to ensure that all investments are getting the maximum return. To fulfill the research mission of ARC, MSc/PhD and MTech/DTech students Young Researchers and Research Technician are mentored and exposed to various research methodologies and placed throughout the many national programs to achieve organisational goals. The ARC mentoring Program is used as a feeder system for filling permanent positions in ARC hence it is important to invest in this huge capacity building initiative program.

6. DST PROFESSIONAL RESEARCH DEVELOPMENT PROGRAM

The grant received from the Department of Science & Technology is assisting the ARC to accelerate the development of young doctoral scientists who recently qualified and those currently studying to increase their experience of research. There are 25 beneficiaries on this program; 19 studying their PhD's and 6 doing Post Doctoral Programmes. The beneficiaries of this program have been proactive in participating at various scientific conferences and publishing papers.

6.1 Staff Development

The ARC acknowledges that the generation and diffusion of technology and management capabilities for more intensive and modernised agriculture and supporting services are imperative and these can only be achieved by upgrading the quality of human resources employed in the ARC, hence there is such emphasis on empowering our workforce.

Formal Training									
Study Program	Male				Female				Total
	A	C	I	W	A	C	I	W	
PhD	9	4	1	5	5	1		12	37
MSc	8	1		4	6			4	23
BSc Hons	1				3			2	6
BSc	1							1	2
DTech	1								1
MTech	1			2	3			3	9
BTech	5	2		2	9			1	19
NDipl	6			1	3	1		3	14
ABET	3	2			2				7
TOTAL	35	9	1	14	31	2	0	26	118

The AgriSETA announced 3 programmes which will assist the ARC to intensify its capacity building initiatives. In this regard, the AgriSETA is willing to assist the ARC with the training of those employees who wish to further their studies towards MSc and PHD in the top ten critical and scarce skills. Furthermore,

they are also prepared to put R30 000 p.a. per student/interns from the Universities of Technology to enable them to complete their experiential learning in order to graduate. They will also invest R30 000 p.a. per candidate to assist the students, who have graduated but are unemployed.

The ARC will house these students, so that they can get workplace experience.

Informal Training									
Summary: Number of Beneficiaries	Male				Female				Total
	A	C	I	W	A	C	I	W	
	230	145	3	112	123	25	3	154	

The informal training comprised of a wide range of short courses which the employees needed to improve on service delivery. Much of the training was based on the transfer of knowledge, which relied on outside experts passing on new technical knowledge from.

- % female employees: 45%
- People with disabilities: 3 – 4%

ii) The equity percentage of the ARC is currently 65.5% black employees and 38.7% female employees. The percentage employees with disabilities are less than 1%. Although the average percentage of black employees is 65.5%, Annexure A gives a clear picture per occupational grouping of the percentage black employees. It is evident that diversity challenges remain specifically in the core business groupings viz Senior and Middle Management, Researchers and Research Technician levels. Although the appointment patterns remain

7. EQUITY PROFILE

i) The employment equity targets have been revised with a strong emphasis to increase the recruiting of women, particularly Africans, and people with disabilities. The set targets up to 2014 are as follows:

- % black of employees: 65%

positive in terms of black female employees, there are a high percentage of black and female employees leaving the ARC. This situation puts a strain on the ARC's attempt to increase the Equity statistics in the ARC.

8. HR PATTERNS

8.1 Employee numbers (Annexure A)

The total number of employees decreased from 2351 at 31 March 2009 to 2246 on 31 March 2010. The reason for this decrease was mainly because the number of employees who left the employ of the ARC exceeds the number of new employees who entered the ARC

8.2 Qualifications (Annexure B)

The number of employees with PhD-degrees is 155 and employees with MSc degrees are 267. The number of employees with Professional Veterinarian and Engineering qualifications is 10.

8.3 Appointments

As indicated in above paragraph, the appointment patterns remain positive in terms of the appointment

of black and female employees, but the exit patterns still indicate a relatively high percentage of black and female employees who are leaving the services of the ARC.

8.4 Turn Over Rate

The year to date turnover rate for the ARC is 4.9%. Although the average turnover rate of the ARC is below the market norm, the turnover rates in the Middle and Senior Management occupational groups are quite high and must raise concern.

8.5 Union membership

To maintain a harmonious and peaceful work environment, ARC management through its negotiating team meets regularly with organised labor as set down in the main collective agreement. Through this partnership, salary negotiations during the period under review were concluded successfully without any work stoppage and strikes.

The ARC remains highly unionised with 1803 employees belonging to unions representing 80.2% of the current ARC workforce of 2247. Therefore 444 of our total staff are non-unionised.

Union	Membership	Percentage of Workforce (2247)
SOLIDARITY	862	38.4%
NEHAWU	929	41.3%
NUF	5	0.2%
FAWU	7	0.3%
TOTAL	1803	80.2%

Above numbers include senior managers who are members of unions.

9. KEY HR CHALLENGES / RISKS

One thing is clear, as we move into 2011 and beyond, the challenges will be ever greater. The economic conditions over the next year and beyond will place tremendous pressure on us to deliver on our mandate and retaining competent and skilled personnel with the advent of OSD (Occupational Specific Dispensation Policy) in government.

Meanwhile, no effort is spared in attaining performance targets set, as well as needing to respond to the new performance framework introduced in the organisation. So the pressure to continue transforming and meeting stake-holders expectations will not go away.

ANNEXURE A

ARC EE DEMOGRAPHICS - TOTAL EMPLOYEES PER OCCUPATIONAL GROUPING: 31/03/2010

ARC Occupational Group	Male					Female					Total	% Black	% Female
	African	Coloured	Indian	White	African	Coloured	Indian	White	Indian	White			
	Executive Management	3		1		1							
Senior Management (Core)	6			6	1			1			14	50.0%	14.3%
Senior Management (Support)	5	2		2	2						11	81.8%	18.2%
Middle Management (Core)	19	1	1	38	2			6			67	34.3%	11.9%
Middle Management (Support)	8			3	5			2			18	72.2%	38.9%
Researchers (Including Specialist Researchers)	72	9	4	115	50	5	4	125			384	37.5%	47.9%
Technical	64	11	1	118	70	5	1	87			357	42.6%	45.7%
Research Support	170	36	0	12	90	23	0	74			405	78.8%	46.2%
Support	125	7	2	22	104	20	2	120			402	64.7%	61.2%
Artisans	26	5		24							55	56.4%	0.0%
Farm personnel	15	11		15	1						42	64.3%	2.4%
Labourers	354	62		3	62	4		2			487	99.0%	14.0%
Grand Total	867	144	9	358	388	57	7	417			2247	65.5%	38.7%

Figures exclude PDP's and DST's

ARC EE DEMOGRAPHICS - % TOTAL EMPLOYEES PER GENDER AND RACE: 31/03/2010

ARC Occupational Group	Male					Female						
	African	Coloured	Indian	White	African	Coloured	Indian	White	African	Coloured	Indian	White
	Executive Management	20.0%	0.0%	0.0%	0.0%	60.0%	0.0%	20.0%	0.0%	0.0%	0.0%	20.0%
Senior Management (Core)	7.1%	0.0%	0.0%	7.1%	42.9%	0.0%	0.0%	0.0%	42.9%	0.0%	0.0%	42.9%
Senior Management (Support)	18.2%	0.0%	0.0%	0.0%	45.5%	0.0%	0.0%	18.2%	18.2%	0.0%	0.0%	18.2%
Middle Management (Core)	3.0%	0.0%	0.0%	9.0%	28.4%	1.5%	1.5%	56.7%	28.4%	1.5%	1.5%	56.7%
Middle Management (Support)	27.8%	0.0%	0.0%	11.1%	44.4%	0.0%	0.0%	16.7%	44.4%	0.0%	0.0%	16.7%
Researchers (Including Specialist Researchers)	13.0%	1.3%	1.0%	32.6%	18.8%	2.3%	1.0%	29.9%	18.8%	2.3%	1.0%	29.9%
Technical	19.6%	1.4%	0.3%	24.4%	17.9%	3.1%	0.3%	33.1%	17.9%	3.1%	0.3%	33.1%
Research Support	22.2%	5.7%	0.0%	18.3%	42.0%	8.9%	0.0%	3.0%	42.0%	8.9%	0.0%	3.0%
Support	25.9%	5.0%	0.5%	29.9%	31.1%	1.7%	0.5%	5.5%	31.1%	1.7%	0.5%	5.5%
Artisans	0.0%	0.0%	0.0%	0.0%	47.3%	9.1%	0.0%	43.6%	47.3%	9.1%	0.0%	43.6%
Farm personnel	2.4%	0.0%	0.0%	0.0%	35.7%	26.2%	0.0%	35.7%	35.7%	26.2%	0.0%	35.7%
Labourers	12.7%	0.8%	0.0%	0.4%	72.7%	12.7%	0.0%	0.6%	72.7%	12.7%	0.0%	0.6%
Grand Total	38.6%	6.4%	0.4%	15.9%	17.3%	2.5%	0.3%	18.6%	17.3%	2.5%	0.3%	18.6%

ARC EE DEMOGRAPHICS - TOTAL SCIENTIFIC CAPACITY PER OCCUPATIONAL GROUPING: 31/03/2010

ARC Occupational Group	Male				Female				Total	% Black	% Female
	African	Coloured	Indian	White	African	Coloured	Indian	White			
Snr Management (RIM / TT)	6	0	0	6	1	0	0	1	14	50.0%	14.3%
Programme Managers/ Team Leaders	19	1	1	38	2	0	0	6	67	34.3%	11.9%
Specialist Researcher				22				6	28	0.0%	21.4%
Researchers (PI 4 - 6)	72	9	4	93	50	5	4	119	356	40.4%	50.0%
Research Technicians	64	11	1	118	70	5	1	87	357	42.6%	45.7%
Grand Total	161	21	6	277	123	10	5	219	822	39.7%	43.4%

ARC EE DEMOGRAPHICS - TOTAL % SCIENTIFIC CAPACITY PER OCCUPATIONAL GROUPING: 31/03/2010

ARC Occupational Group	Male				Female			
	African	Coloured	Indian	White	African	Coloured	Indian	White
Snr Management (RIM / TT)	42.9%	0.0%	0.0%	42.9%	7.1%	0.0%	0.0%	7.1%
Programme Managers/ Team Leaders	28.4%	1.5%	1.5%	56.7%	3.0%	0.0%	0.0%	9.0%
Specialist Researcher	0.0%	0.0%	0.0%	78.6%	0.0%	0.0%	0.0%	21.4%
Researchers (PI 4 - 6)	20.2%	2.5%	1.1%	26.1%	14.0%	1.4%	1.1%	33.4%
Research Technicians	17.9%	3.1%	0.3%	33.1%	19.6%	1.4%	0.3%	24.4%
Grand Total	19.6%	2.6%	0.7%	33.7%	15.0%	1.2%	0.6%	26.6%

ANNEXURE B

QUALIFICATIONS OF RESEARCH CAPACITY IN THE ARC: 31 MARCH 2010

Staff qualifications	Number	Number: PDP & DST students	% of staff excluding PDP/DST: (2247)	% of Research Staff: 822	
Research staff with PhD degrees (including Executives and R&T Managers)	155		6.9%	18.9%	
Research staff with Masters degrees (including Executives and R&T Managers)	244		10.9%	29.7%	
Professional Veterinarians and Engineers	13		0.6%	1.6%	
Staff enrolled for Masters or PhD degrees	60		2.7%	7.3%	
Staff enrolled for MTech and DTech	10		0.4%	1.2%	
Staff enrolled for Engineering or Medical or Veterinary Science degrees	3		0.1%	0.4%	
			% of staff including PDP/DST: 2314	% Total PDP/DST: (67)	
Students enrolled for Masters or PhDs (PDP & DST students)	34	Black	40	1.7%	59.7% *
		Women	22	1.0%	32.8% *
Students enrolled for Engineering or Medical or Veterinary Science degrees (PDP & DST students)	6	Black	6	0.3%	9.0% *
		Women	4	0.2%	6.0% *
Students who enrolled for Honors degrees (PDP & DST students)	12	Black	12	0.5%	17.9% *
		Women	8	0.3%	11.9% *

* total PDP/DST staff (67)

10. Overview of ARC Scientific Outputs

Indicator	Target	Actual
ARC personnel registered for post-graduate training		
MSc	45	46
PhD	59	48
MTech	-	16
DTech	-	1

The above Table reflects the actual number of employees busy with post graduate degrees. Whilst we exceeded our target for the MSc group, the data shows that we had a shortfall of 18% on the PhD group and it is difficult to predict whether rates will increase, decrease or remain the same in coming years.

Adding to the challenge are the changing internal and external demographics. ARC relies on specialised, highly educated, experienced professionals to lead its research mandate. While an adequate supply of these professionals represents the essential prerequisite of the mission, in many instances

candidate pools are diminishing. Furthermore, the smaller pool of potential candidates is highly valued by other government departments, universities and the private sector.

To address this challenge, the ARC will need to include various interdependent efforts as follows:

- Systematically identifying and developing internal talent for positions of greater responsibility;
- Ensuring performance management and reward systems reflect the critical nature of succession planning; and
- Maximising recruitment and selection flexibility, creativity and accountability.

11. Support Services

11.1 Information Communication Technology (ICT)

Information and Communications Technology (ICT) has become increasingly important and is an integral part of doing business today. The Human

Capital and Support Services provides support which cuts across the organisation. As a support function under the HC &SS, the ICT division is an operational enabler to the organisation. ICT is integrated into the strategic and business processes of the organisation, and is fundamental for the support, sustainability and growth of the ARC. The ICT division is a strategic asset which can be leveraged upon to support and enable the ARC's business strategy, delivers value, improve performance and create opportunities. The following are some of the successful ICT initiatives that implemented during the 2009/2010 financial year:

- A significant improvement with regards to audit compliance. A number of audit queries have been addressed and a proactive approach has been adopted.
- In order to ensure optimal alignment of ICT with business, the ICT strategy and business plans were developed.
- A new generation, Virtual Private Network had been deployed that will ensure redundancy and connectivity to remote sites.
- The implementation of An Employee Self Service system, with full workflow capabilities and audit trail will ensure that employees apply for leave electronically and increase accountability.
- The ARC also implemented electronic payslips to eliminate paper payslips and courier services. Employees now receive their payslips from the email system.
- A new ICT steering committee was appointed.
- A number of ICT initiatives to address challenges in the ICT environment have been identified and will soon be implemented.

11.2 Marketing and Communications

The year started with a lot of hype around the country's national elections and the appointments of various new Ministers. The new Minister of DAFF, Ms Tina-Joemat Pettersson was received with a lot of enthusiasm and excitement and the media coverage on her appointment was very positive. The ARC supported the minister's appointment with a congratulatory advert in the Sunday Times.

11.3 Exhibitions; Workshops & Lectures:

The ARC participated in a number of exhibitions, workshops and open farmer's days including the NAMPO show - the biggest agricultural show in Southern Africa. Our participation was more dynamic and favorably responsive to the needs of the local farming community because. This was evident in the interaction of the visitors at the ARC stands and the sharing of valuable research information with the industry. A visit by the Chairperson of the ARC Board cemented ARC's commitment to this event. The Chairperson had the opportunity to see some of the showcased products, meet and greet the Deputy Minister of DAFF Dr Pieter Mulder, Senior Manager - DoA Northern Cape - Mr Mafoko, Counsellor of the republic of Belarus in SA Mr Aleksei Lesnoy, Mr Gary Farr from Rainbow Nation Renewable Fuels and Mr Felix Kaup from Alensys regarding a bio-diesel project funded by the German government. This presented an opportunity for the ARC to share its research milestones with the chairperson.

The Royal Agricultural Show in Pietermaritzburg was the highlight of the first quarter, with the Chairperson of the ARC again gracing the show with her presence and made contact with farmers during the farmers' day, including meeting the General Manager of the Royal Agricultural Society of Natal as well as other stakeholders over two days. The prestigious President's Cup and a gold medal for excellence were awarded to the ARC for superior performance.

Some events for the year included the International Cotton Advisory Committee (ICAC) conference; the annual World Food Day celebrations held in the Muyexe village, Giyani, Limpopo with the theme "Food security & safety in times of crisis"; the prestigious annual Bien Donne expo which hosted over 100 exhibitors in the Western Province Agricultural Industry for the 67th year running, graced by the presence of the honorable deputy minister Dr Pieter Mulder. A number of high profiled delegates from our stakeholders hosted by the ARC Executive Management were in attendance; the Indigenous Knowledge Systems (IKS) Expo where the ARC-API held livestock exhibitions In Limpopo province.

The ARC also hosted an informative lecture on Genetic Resources and Intellectual Property (GRIP), which was held at the ARC-CO Auditorium. The lecture was presented by an internationally renowned academic Professor Anotole Krattiger from the Sandra Day O'Connor College of Law at Arizona State University,

11.4 Stakeholder, International Relations & Sponsorships:

The Water Efficient Maize for Africa (WEMA) SA task team was involved in many activities to equip themselves in their endeavor to create awareness on genetically modified and water efficient maize for Africa. This included a MHDia handling training workshop and Confidentiality in Technology Development workshop; team building and update session for WEMA product development, regulatory & communications outreach teams in Nairobi, Kenya; a feedback session with all five participating countries held at the Grain Crops Institute and in Maputo, Mozambique.

The launch of a new project "Improved Maize for African Soil" (IMAS) in Nairobi, Kenya was attended by the ARC President & CEO in February, along with the ARC project team members. This was a great opportunity for the President & CEO to solidify relations with the project funder AATF and participating organisations such as CYMMIT, FARA, Monsanto and many other international parties who play a vital role in the project.

The National Press Club "News Maker of the Year Awards", is another event that provided the ARC with an opportunity to interact and profile products and services to high ranking government officials, with President Jacob Zuma being celebrated as the news maker for 2009. A table was secured through a corporate sponsorship of wines from the ARC-Nietvoorbij research farm, where the Executive Management were able to host stakeholders at the event.

Other corporate sponsorships included the ARC Beef Star Performers Awards and the National Science Technology Forum (NSTF) Awards. International activities saw us hosting a variety of multinationals such as the Minister of Agriculture from Namibia for an MOU ceremony in collaboration

efforts with the ARC; the Gauteng MEC of Agriculture and her department at ARC-OVI; the Mexican Delegation at ARC-PPRI, as well as the PC on DAFF at ARC-API on 29 March 2010.

Sadly, the executive management bid farewell to the outgoing council members on 27 November 2009 at a dinner function to thank them for their contribution towards fulfilling their mandate during their term. Their support in many strategic interventions was exemplary.

11.5 Print Advertising; Media Releases; Editorials & Publications; Technical articles for print & broadcast:

Focus was given to the rigorous developed and conclusion of the 2008/09 Annual Report which was tabled in parliament on 9 November 2009.

The organisation participated in a number of publications such as the Agricultural Career Guides; sponsored the 2009/10 edition of the Succeed VUNA publication in conjunction with DAFF, with the theme "Food security and safety"; the production of the 2010/11 Business Plan and 2010/11 – 2014/15 Strategic Plan documents which were tabled in Parliament for consideration by the Portfolio Committee on Agriculture, Forestry and Fisheries on 9 March 2010.

Other media participation included the British Airways Media – Country Section Publication - an interview with the ARC President & CEO; Local media coverage on the IMAS Project launch in Nairobi in Business Day, Business Report, and DAFF News; technical articles on "Agricultural Infrastructure" in Agri Review publication; Opportunity Magazine on "Renewable energy"; Rift Valley Fever in collaboration with DAFF; Mail & Guardian article on "Water Infrastructure"; SABC 2 TV Interview on Macaroni Penguins with Dr Alison Lubisi of ARC-OVI; AgriTV interview with President & CEO on the "impact of Genetic Resources on Intellectual Property".

The ARC also provided a media response regarding corporate responsibility concerns on xenophobic attacks; bio-technological advancements on the SpuntaG2 GMO Potato as well as GMO developments on maize. These provided the ARC with a good platform to effectively market its products and services and gain a positive spotlight

for the excellent work it does to improve agricultural resources in the industry.

Some negative media inquiries and feedback was received relating to the annual report figures; the IMAS project launch and Sondag Tabloid complaint by Solidarity, and these were appropriately handled and mitigated.

Corporate profiles were done with publications like the Commonwealth Partnerships Programme; New Agenda - a South African journal on social and economic policy - 2nd quarter issue; Agriculture Today – profiles of PDP students; Living Land; Farmer's Weekly – Coverage of various ARC research projects carried out at institutes; Congratulatory message to the Minister and Deputy Minister of Agriculture, Forestry and Fisheries; the Culdevco (pty) Ltd with a joint venture between the ARC and deciduous fruit industry;

11.6 Management, Staff Events and Organisational Culture:

The Executive Management and Senior Management held various SEMI feedback sessions for the 2009/10 financial year.

The CEO and executive management conducted a series of road shows to the various institutes to share concerns, milestones achieved and also thank staff members for their performance and dedication towards achieving excellence in their research initiatives.

A variety of internal initiatives were undertaken on various annual corporate national celebrations around issues such as the World Aids day and 16 Days of Activism campaigns to highlight the plight of many South Africans living in dire conditions; Heritage; Arbor week; Secretaries and Casual day celebrations; staff feedback and year-end functions were also honored. These were used as opportunities to create employee engagement and solidify working relationships between the departments.

A significant organisational development event was held where the Employee Delight Survey results were shared with staff at ARC-CO. This was aimed at interpreting results of the survey conducted in 2005, in order to provide leverage on the much

needed Employee and Customer Satisfaction Surveys which are envisaged to be revived in the 2010/11 Financial year.

11.7 Conclusion:

Even with the success of the above activities that took place during the year, the Marketing & Communications unit is facing internal challenges with regards to human resource capacity to carry-out its contracted activities. Further strain was added to the unit's workload with the departure of the previous Marketing and Communications Manager in August 2009. A new manager was recruited in November 2009 to take over leadership of the unit.

Further to the above, the unit is faced with financial constraints which have seen limitations in the number of activities that could have been implemented to effectively market and create brand awareness about the ARC's products and services.

11.8 Legal services

To ensure effective and seamless performance of the ARC, the Legal Division has continued to vet and draft contract timeously. The signing of contract of contract is imperative in ensuring that the interest of the ARC are protected and that income can be generated for services rendered. In ensuring protection of the ARC Intellectual Property, care is taken in ensuring that the provisions of the ARC's Intellectual Property Policy are applied when all contracts are negotiated.

In the current financial year, the division was able to finalise the electronic database of all signed agreements. Further, a Legislative Compliance Assessment has been finalised and submitted to the Audit Committee for approval. The aim of the Legislative Compliance Assessment is to determine the level of compliance to legislation within the ARC and to put in place measures to minimise the risks associated with non-compliance to legislation.

There was a reduction in number of cases against the ARC with two being settled and finalised. The Division is continuing in ensuring that debts owed to the ARC are collected timeously.

11.9 Security and Logistics Division

The Security and Logistics Division has a line functional responsibility to render advice and

support to management as well as administer the overall security services function for the ARC, which include, physical security (security appraisals to investigate the safeguarding measures of the infrastructure), operational security (i.e. access control, office security, key control), information security (i.e. documentation, vetting of staff & service providers, computer and communication security), contingency planning, as well as operations management.

The division saw the development of four security procedures in line with the ARC Security Policy as part of the implementation of the Minimum Information Security Standards (MISS). An integrated Security and Fraud Prevention Awareness programmes were developed and presented to the staff throughout the ARC. The ARC identified four communication systems as Critical Communication Infrastructure (CCI) which requires external funding. Security vetting was conducted on eighty percent of identified post levels that require security clearances. The ARC Assets Management Strategy was developed in order to evaluate the effectiveness of utilisation of the ARC properties.

The Fraud Prevention Committee is constituted to assist management in discharging their responsibilities relating to putting in place measures of identifying and managing fraud related risks. A Fraud Prevention Plan was revised and approved, with the purpose of incorporating internal environment, fraud risk identification and response; control activities as well as information and communication of fraud related activities. The hotline is used to report and record incidents related to fraud, corruption, theft, misconducts, unethical behaviour and general complaints and a number of cases were received and investigated during the period under review.

Publications 2009/10

STRATEGIC OBJECTIVE 1

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Governance

GOVERNANCE

REPORT OF THE AUDIT COMMITTEE

103

GOVERNANCE OF THE ARC

106

CORPORATE GOVERNANCE

108



Report of the Audit Committee

PURPOSE OF THE AUDIT COMMITTEE

The function of the Audit Committee (Committee) of the Agricultural Research Council (ARC) is primarily to assist the Council of the ARC (Council) in discharging its duties relating to the safeguarding of assets, the operation of adequate systems, control processes and the preparation of financial reports and statements.

These tasks are conducted in line with all applicable legal requirements and accounting standards as prescribed in the Public Finance Management Act of 1999 (Act no.1 of 1999) (PFMA). The Committee operates in terms of a written terms of reference (The Audit Committee Charter) which provides clear guidelines with regards to membership, authority and responsibilities. The Audit Committee Charter was reviewed and updated in May 2009.

The membership of the Committee comprises four independent external members, including the chairperson and one member of Council. The CEO, CFO, Internal Audit Manager and the Risk Control Manager also attend the meetings of the Committee. For the year under review the Committee met regularly, (scheduled and unscheduled) to address the issues at hand.

The Auditor General and Internal Audit service providers are invited to attend all the meetings of the Committee. The ARC Company Secretary acts as secretary of the Committee.

During the year under review approximately four meetings were held, which were well attended by the Committee members.

AUDIT COMMITTEE RESPONSIBILITY

The Committee reports that it has complied with its responsibilities arising from Regulation 38.1.8 of the prevailing Treasury Regulation dated 15 March 2005. The Committee also reports that it has adopted appropriate formal terms of reference as its Charter, has regulated its affairs in compliance with this Charter and has discharged all its responsibilities as contained therein.

EVALUATION OF INTERNAL CONTROLS

The Committee co-ordinates and monitors the activities of the Internal Audit Function. Through this, the Committee is able to report on the effectiveness of the internal control systems and to assess

whether the Internal Audit Function is fulfilling its roles effectively and efficiently.

In the conduct of its duties, the Committee has, inter alia, reviewed the following:

- The effectiveness of the internal control system;
- The operational risk areas covered in the scope of internal and external audits;
- The adequacy, reliability and accuracy of financial information provided to management and other users of such information;
- Any accounting and auditing concerns identified as a result of internal and external audits;
- Compliance with legal, accounting and regulatory frameworks;
- The activities of the Internal Audit Function, including its annual work program, co-ordination with external auditors, the reports of significant investigations and the response of management to specific recommendations; and
- Where relevant, the independence and objectivity of external auditors.

The Internal Audit Function is currently managed internally by an ARC employee, who is assisted by two independent services providers acting as the Internal Auditors. The contracts of these service providers terminated at the end of March 2010. The committee has appointed a new service supplier as from 1 April 2010

The system of internal control is in place as required by the PFMA. Reports emanating from both internal and external auditors have drawn the attention of the Committee to control weaknesses and areas of non-compliance in respect of the relevant policies and procedures. The Committee has taken note of the issues highlighted in the Auditor-General's latest management report and these will be rectified as soon as possible.

EVALUATION OF THE ANNUAL REPORT

The Committee has: -

- Reviewed and discussed with the Auditor-General the audited financial statements included in the Annual Report;
- Reviewed the Auditor-General's management report and management's responses;
- Reviewed the accounting policies and practices;
- Evaluated the audited financial statements included in the Annual Report and, based on the information provided to the Committee, considered that the said statements comply in all material respects with the requirements of the Treasury Regulations, the PFMA requirements as well as South African Statements of Generally Accepted Accounting Practice (GAAP) and certain Statements of Generally Recognised Accounting Practices (GRAP).

The Committee acknowledges that the ARC's ongoing concern status is totally dependant on the continued support of Government through its various Departments and with this support, is of the opinion that the adoption of the ongoing concern premise in drafting the Annual Financial Statements is appropriate. The Audit Committee has noted the constraints achieving certain targets as identified by management. These constraints have adversely impacted upon the ARC achieving certain objectives. The most important factor impacting upon the past and future performance is the under funding of the organisation. Such continuous under funding of mandates places a considerable strain on the financial resources of the ARC, which in turn places a huge risk on the ARC to not fulfill its delivery on certain mandates.

The Audit Committee has accepted the responsibility to ensure that the reporting on performance information and the policies and

procedures are of a standard acceptable to Council. The Audit Committee's mandate and charter will be changed to accommodate this responsibility and the Committee will assume full responsibility in the new financial year. The Audit Committee has taken note of the Performance Information Report as submitted by management. The report compares the actual performance of the organisation against the approved Business Plan for the financial year on the strategic objectives, key performance indicators and targets set in this Plan.

The Committee concurs in general with the conclusions of the Auditor-General on the Annual Financial Report of the Agricultural Research Council for the year ended 31 March 2010.

IN CONCLUSION

There has been a continuous improvement in the internal control function over the past few years. However, the Committee has once again taken note of the concerns of the Auditor General and accepts that there is always room for improvement in the accounting function and elements of the internal control environment. As in previous years the Audit Committee will ensure that the internal audit plans address the issues and will monitor the implementation of the recommendations of the Auditor General's Report.

I would like to thank all members of the Committee for their contribution and the professional way in which meetings were conducted. To the staff of the ARC our sincere thanks for the progress that was made this year.



Robert Wesseloo

Chairperson of the ARC Audit Committee

29 May 2010

Governance of the ARC

COUNCIL

The ARC Council appointed by the Executive Authority (the Minister responsible for the ARC) in terms of the provisions of the Agricultural Research Council Act, 1990 (Act no. 86 of 1990) governs the ARC.

MEMBERS OF COUNCIL

The members of the Council serving the year under review (1 April 2009 to 31 December 2009) were:

Ms. JN Davidson (Chairperson)
 Ms. RN Mlonzi (Deputy Chairperson) –Appointed deputy Chairperson (April 2008)
 Ms. A Geldenhuys
 Prof. MM Sibara
 Mr. JH McBain
 Prof. PM Kuzwayo
 Mr. AD Young
 Dr. M Madikizela
 Dr. MS Liphadzi
 Ms. MA Pyoos
 Ms. I Wilken
 Prof. MJ Kahn
 Dr. M Visser (Appointed November 2008)
 DR. SR Moephuli (President and CEO)

RESPONSIBILITIES OF THE COUNCIL

The statutory functions of the ARC Council are determined in terms of the provisions of the Agricultural Research Council Act, 1990 (Act No 86 of 1990) and the Public Finance Management Act, 1999 (Act No 1 of 1999) (the PFMA).

These include the following: To be the Accounting Authority; approval of the corporate business plan, strategic plan and the policies of the ARC; and setting of performance targets for the organisation.

The Council is responsible inter alia for preparing the Annual Financial Statements that accurately reflect the ARC's financial position and results at the end of the financial year, which is set at 31 March each year. The Office of the Auditor-General is responsible for reporting on the Annual Financial Statements of the ARC.

In the year under review, applicable accounting standards were adhered to and adequate accounting records and an effective system of internal control were maintained. Appropriate accounting policies, supported by reasonable and prudent judgments and estimates were applied on a consistent basis. Detailed delegations as required by the PFMA were in place.

COUNCIL MEMBERS REMUNERATION

Council members, who are not ARC staff members or Government officials, receive fees for the services they render to the ARC in accordance with the relevant tariffs as determined by National Treasury and approved by the Minister of Agriculture and Land Affairs.

Members of the Audit Committee are remunerated in accordance with an agreed tariff set by the ARC Council and approved by the Executive Authority.

Detailed information on fees, emoluments, bonuses and Subsistence and Travel claims paid to Council members, Audit Committee members and executive members as required per Treasury Regulation 28.1.1 is provided in note 19 of the notes to the Annual Financial Statements.

COUNCIL MEMBERS' INTEREST IN CONTRACTS

None of the Council members are involved in / have any interest in contracts entered into in the year under review.

PUBLIC FINANCE MANAGEMENT ACT

The ARC is fully committed to comply with the provisions of the PFMA.

The Internal and External auditors continue to provide the Council with assurance on the degree of compliance with the PFMA.

MATERIALITY FRAMEWORK

In accordance with the PFMA and Treasury Regulation 28.1.5 the ARC has developed a Framework of acceptable levels of materiality and significance.

During the year under review the following Council members attended the 4 (four) Council meetings scheduled:

Council member	No. of meetings attended
Ms. JN Davidson (Chairperson)	4
Ms. A Geldenhuys	3
Prof. MM Sibara	4
Mr. JH McBain	3
Prof. PM Kuzwayo	3
Mr. AD Young	3
Dr. M Madikizela	3
Dr. MS Liphadzi	-
Ms. MA Pyoos	3
Ms. I Wilken	1
Prof. MJ Kahn	2
Ms. RN Mlonzi (deputy Chairperson)	1
Dr. Visser	3
DR. SR Moephuli (President and CEO)	4

Corporate Governance

STATEMENT OF ADHERENCE

The ARC, as Public Entity, confirms its commitment to the principles of transparency, integrity and accountability as advocated in the King II report on Corporate Governance. The ARC Council takes note of the principles contained in the King III Report and will ensure that the ARC complies with these principles to the extent that they apply.

CORPORATE STRUCTURE AND RESPONSIBILITY

In the governance of the ARC, the Council is responsible for policymaking and control while the ARC President has been delegated the responsibility for the day-to-day execution of the policies and objectives as directed by the Council. The members of the Council are appointed by the Minister of Agriculture, Forestry & Fisheries on the basis of their expertise in the fields of agriculture, business, financial management, law, research, technology development and technology transfer in the field of agriculture, as prescribed by the Agricultural Research Act, 1990 (Act No. 86 of 1990). Council members are appointed for a maximum period of three years and eligible for re-appointment. With the exception of the President and CEO of the

ARC none of the members of the Council hold an executive position in the ARC. The Council exercises full and effective control over the ARC and monitors its Executive Management Committee. The Council may obtain independent professional advice if deemed necessary.

GOVERNANCE STRUCTURES

In order to comply with these principles, the ARC has and continues to design and implement appropriate governance structures across the organisation. ARC acknowledges that, for it to set up an effective governance framework, robust governance structures need to be in place. The following Council Committees operate as at 31 March 2010 together with their respective terms of reference in the form of Committee Charters:

Executive Committee (No meetings for the year under review)

Human Resources Committee (4 meetings scheduled, 1 held)

No. of meetings attended

M Pyoos (Chairperson)	1
A Geldenhuys	-
A Young	1
S Liphadzi	-

Research, Development & Evaluation Committee

(4 meetings scheduled, 3 held)

No. of meetings attended

M Kahn (Chairperson)	3
M Pyoos	2
S Liphadzi	2
M Kuzwayo	3
M Sibara	3
M Visser	1

Finance and Investment Committee (4 meetings scheduled, 1 held)

No. of meetings scheduled

JH McBain (Chairperson)	1
M Madikizela	1
I Wilken	1
M Mlonzi	-

AUDIT COMMITTEE

The Audit Committee comprised of four independent members and one member of Council. A specialist independent member chairs the Audit Committee. Council at its meeting resolved that Mr. McBain will continue as member of the Audit Committee after 30 November 2009 until the term of Office of the Audit expires.

The independent members are:

Mr. R Wesseloo (Chairperson)
 Mr. V Naiker (Deputy Chairperson)
 Ms. M Claasens
 Ms. K Moloto

The Council member on the Audit Committee as at 30 November 2009 was (Mr. McBain continued as independent member from 1 December 2009):

Mr. JH McBain

During the year under review the following specialist Audit Committee members attended the 4 (four) scheduled meetings. Mr. McBain attended 2 meetings whilst Council member and 1 meeting since becoming an independent member:

Mr. R Wesseloo (Chairperson)	4
Mr. V Naiker (Deputy Chairperson)	3
Ms. M Claasens	2
Ms. K Moloto	3
Mr. McBain	1

ROLES OF GOVERNANCE COMMITTEES

The ARC's Council Committees are charged with certain functions and operate within clearly defined terms of reference and continue to assist the Council's governance function on the following principles:

Ethical standards

In terms of its Code of Conduct, the ARC states its core values as: "The ARC is an organisation of **integrity**, which manages resources in a **responsible** and **accountable** manner through harnessing the **creativity** of its personnel to achieve excellence in its field of expertise."

The ARC has embarked on implementing its Code of Conduct across the organisation, in a manner that would result in ethical standards being embedded in the culture of the ARC.

Internal control systems

To enable the ARC to meet its responsibility to provide reliable financial information, the ARC maintains accounting systems and practices adequately supported by a system of internal controls. These controls are designed to provide reasonable assurance that transactions are concluded in accordance with management authority and that the assets are adequately safeguarded.

The Internal Audit Function monitors the effectiveness and efficiency of the internal control systems, report their findings and make recommendations to management and the Audit Committee of the Council and monitor whether corrective action has been taken. These controls focus on critical risk areas in line with the principles of the cost of control versus the benefit thereof.

Stakeholders

The ARC has introduced structures of corporate governance on different strategic levels to manage the interface with its various stakeholders.

In accordance with the King II report on compliance and the Science, Engineering and Technology Institute

Review, the organisational strategy has been revised to cover all farming sectors. Progress with respect to the implementation of these recommendations is reflected throughout the report.

The strategic plan has been re-aligned to reflect the focus areas of the national policies and strategies of the country. ARC continues to provide technical support to National Departments, Provincial Departments and stakeholders in the agricultural industry.

Employees

The ARC has a variety of structures for employee participation in respect of issues that affect them directly. These structures were established to ensure the disclosure of relevant information, consultation and negotiations on issues of mutual interest as referred to in the relevant Labour Legislation. A significant percentage of ARC employees are Unionised.

Remuneration

The remuneration of Council members is determined in accordance with section 10 of the Agricultural Research Act, 1990 (Act No 86 of 1990) as well as National Treasury. Council determines the levels of remuneration of executive management with reference to market trends and affordability.

The Human Resources Committee of the Council oversees all strategic human resources practices and interventions on behalf of the Council. All recommendations by the Committee are finally approved by the full ARC Council. Council approved the remuneration of the independent Audit committee members.

Environment, health and safety

The ARC strives toward compliance to all environmental, health and safety legislation in its activities. The majority of the activities of the ARC

do not pose a significant threat to the environment. The ARC also has a corporate policy to address all environmental risks as a component of its risk management system.

Risk Management

Risk Management is one of the general responsibilities of the ARC Council as Accounting Authority and one of the main functions of the Executive Management Committee (EMC).

Council approved an updated Risk Management Strategy for implementation by Management.

Risk management in the ARC is an ongoing process and is focused on identifying, assessing, managing and monitoring all known forms of significant risk across all business units. This has been in place for the year under review and up to the date of approval of the annual report and financial statements. ARC systems have been put in place to review aspects of economy, efficiency and effectiveness. Management is involved in a continuous process of improving procedures to ensure effective mechanisms for identifying and monitoring risks, such as skills, technology, contracting, HIV/AIDS, reputation, Parliamentary Grant, legislative compliance, professional liability and general operating risks. Equal consideration is given to matters of safety, health and the environment as to the more obvious risks, such as financial risks.

There is a documented and tested process in place, which will allow the ARC to continue its critical business process in the event of a disastrous incident impacting on its activities.

Strategic Direction

The ARC Council at its Strategic Session in on 4 and 5 December 2008 approved a new Strategic direction for the ARC. The Strategic Direction took into account the Strategic objectives of the ARC, which have been refined.

Annual Financial Statements and Performance Report

31 March 2010

ANNUAL FINANCIAL STATEMENTS AND PERFORMANCE REPORT	112
<i>APPROVAL OF ANNUAL FINANCIAL STATEMENTS</i>	<i>114</i>
<i>REPORT OF THE AUDITOR-GENERAL</i>	<i>115</i>
<i>PERFORMANCE REPORT</i>	<i>120</i>
<i>STATEMENT OF RESPONSIBILITY</i>	<i>138</i>
<i>STATEMENT OF FINANCIAL PERFORMANCE</i>	<i>139</i>
<i>STATEMENT OF FINANCIAL POSITION</i>	<i>140</i>
<i>STATEMENT OF CHANGES IN NET ASSETS</i>	<i>141</i>
<i>CASH FLOW STATEMENT</i>	<i>142</i>
<i>NOTES TO THE ANNUAL FINANCIAL STATEMENTS</i>	<i>143</i>



ANNUAL FINANCIAL STATEMENTS

31 MARCH 2010

Country of incorporation	South Africa
Nature of business	Conduct research, develop technology, and to transfer technology that promotes agriculture and industry.
Registered office	1134 Park Street Hatfield 0083
Business address	1134 Park Street Hatfield 0083
Postal address	P O Box 8783 Pretoria 0001
Legal form	Public entity established in terms of Agricultural Research Act, 1990 (Act 86 of 1990)
Controlling entity	South African Government (Department of Agriculture)
Ultimate controlling entity	South African Government (Department of Agriculture)
Bankers	Standard Bank of South Africa
Auditors	Auditor-General of South Africa
Secretary	Craig Matthews

AGRICULTURAL RESEARCH COUNCIL

APPROVAL OF ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010

ARC COUNCIL'S RESPONSIBILITY FOR ANNUAL FINANCIAL REPORTING

The preparation of the financial statements that fairly presents the state of affairs of the ARC as at year-end and the operation results is the responsibility of the Council which is the Accounting Authority of the ARC. The Auditor's responsibility is to report on the annual financial statements. In preparing the financial statements the following forms the regulatory reporting environment and considerations have been taken to ensure compliance thereof:

- The Agricultural Research Act 1990 (Act No 86 of 1990) as amended, has been adhered to;
- The Public Finance Management Act 1999 (Act No 1 of 1999) as amended, has been adhered to; and
- South African Statements of Generally Recognised Accounting Practices have been adopted.

To enable the Council to discharge its annual financial reporting responsibility:

- Management continuously design and implement standards and systems of internal control to provide reasonable assurance as to the integrity and reliability of the annual financial statements and to safeguard, verify and maintain the accountability of the ARC's assets;
- Management must ensure the implementation of good corporate governance practices;
- Appropriate accounting policies, supported by reasonable and prudent judgments and estimates, are applied on a consistent and going concern basis; and
- The Audit Committee, Finance and Investment Committee and Internal Auditors review the financial and internal control systems, accounting policies, reporting and disclosure.

Based on the information received from Management and reports from the Internal and External Auditors, nothing has come to the attention of the Council to indicate a material breakdown in the systems of internal control during the year under review.

APPROPRIATENESS OF GOING CONCERN

The financial statements presented, are prepared on the assumption that ARC is a going concern and will continue in operation for the foreseeable future. The ARC Council has reviewed the organisation's financial budgets for the period 31 March 2011 and is satisfied that adequate resources exist to continue business for the foreseeable future. The Council believes that the going concern basis is appropriate and confirms that there is neither the intention nor the need to liquidate or curtail materially the scale of ARC's operations. The Council is of the opinion that the ARC is financially sound and will continue to operate as a going concern.

APPROVAL OF ANNUAL FINANCIAL STATEMENTS

The annual financial statements for the year ended 31 March 2010 are set out on pages 139 to 190 and were approved by the Council of the ARC on 30 July 2010. In the Council's opinion, the annual financial statements fairly reflect the financial position of the ARC at 31 March 2010 and the results of its operations and cash flows for the year then ended.



Mr. JWA Godden
Chairperson Council



Dr S R Moephuli
President and CEO

AGRICULTURAL RESEARCH COUNCIL

AUDITOR-GENERAL'S REPORT

FOR THE YEAR ENDED 31 MARCH 2010

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE FINANCIAL STATEMENTS OF THE AGRICULTURAL RESEARCH COUNCIL FOR THE YEAR ENDED 31 MARCH 2010

REPORT ON THE FINANCIAL STATEMENTS

INTRODUCTION

I have audited the accompanying financial statements of the Agricultural Research Council, which comprise the statement of financial position as at 31 March 2010, and the statement of financial performance, statement of changes in net assets and the cash flow statement for the year then ended, and a summary of significant accounting policies and other explanatory information, as set out on pages 138 to 190.

THE ACCOUNTING AUTHORITY'S RESPONSIBILITY FOR THE FINANCIAL STATEMENTS

The accounting authority is responsible for the preparation and fair presentation of these financial statements in accordance with South African Standards of Generally Recognised Accounting Practice (SA Standards of GRAP) and in the manner required by the Public Finance Management Act of South Africa, 1999 (Act no. 1 of 1999). This responsibility includes: designing, implementing and maintaining internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

AUDITOR-GENERAL'S RESPONSIBILITY

As required by section 188 of the Constitution of South Africa and section 4 of the Public Audit Act of South Africa, 2004 (Act no. 25 of 2004), and section 22 (1) of the Agricultural Research Act, 1990 (Act No. 86 of 1990), my responsibility is to express an opinion on these financial statements based on my audit.

I conducted my audit in accordance with International Standards on Auditing and General Notice 1570 of 2009 issued in Government Gazette 32758 of 27 November 2009. Those standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

AGRICULTURAL RESEARCH COUNCIL

AUDITOR-GENERAL'S REPORT

FOR THE YEAR ENDED 31 MARCH 2010

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

OPINION

In my opinion, the financial statements present fairly, in all material respects, the financial position of the Agricultural Research Council as at 31 March 2010, and its financial performance and its cash flows for the year then ended in accordance with South African Standards of Generally Recognised Accounting Practice (SA Standards of GRAP) and in the manner required by the Public Finance Management Act of South Africa.

EMPHASIS OF MATTER

I draw attention to the matter below. My opinion is not modified in respect of this matter:

Irregular expenditure

As disclosed in note 23 to the financial statements, irregular expenditure to the amount of R3,210,588 was incurred, as a result of non-compliance with the supply chain management policies and principles.

REPORT ON OTHER LEGAL AND REGULATORY REQUIREMENTS

In terms of the PAA of South Africa and General notice 1570 of 2009, issued in Government Gazette No. 32758 of 27 November 2009 I include below my findings on the report on predetermined objectives, compliance with the PFMA, the Agricultural Research Act, 1990 (Act No. 86 of 1990) and financial management (internal control).

FINDINGS

Predetermined objectives

Non-compliance with applicable legislation

Public Finance Management Act

Lack of effective, efficient and transparent systems and internal controls regarding performance management

The accounting authority did not ensure that the Agricultural Research Council has and maintains an effective, efficient and transparent system and internal controls regarding performance management, which

AGRICULTURAL RESEARCH COUNCIL

AUDITOR-GENERAL'S REPORT

FOR THE YEAR ENDED 31 MARCH 2010

describe and represent how the entity's processes of performance planning, monitoring, measurement, review and reporting will be conducted, organised and managed, as required in terms of section 51(1)(a) (i) of the PFMA.

Inadequate quarterly reporting on performance information

Inspection of the ARC's quarterly reports revealed the following shortcomings:

- The quarterly performance information reports were not part of the quarterly reports submitted to the executive authority.

The ARC therefore did not facilitate effective performance monitoring and evaluation, as required by Treasury Regulation 30.2.1.

Usefulness of reported performance information

The following criteria were used to assess the usefulness of the planned and reported performance:

- Consistency: Has the entity reported on its performance with regard to its objectives, indicators and targets in its approved business plan, i.e. are the objectives, indicators and targets consistent

between planning and reporting documents?

- Relevance: Is there a clear and logical link between the objectives, outcomes, outputs, indicators and performance targets?
- Measurability: Are objectives made measurable by means of indicators and targets? Are indicators well defined and verifiable, and are targets specific, measurable, and time bound?

The following audit findings relate to the above criteria:

- Four targets were reported on that were not consistent with the business plan.
- One performance measure and target did not have a clear and logical link.
- Targets were not set in the business plan for five indicators.
- Two targets were not measurable.
- Two indicators were not well defined.

Reliability of reported performance information

The following criteria were used to assess the usefulness of the planned and reported performance:

- Validity: Has the actual reported performance

AGRICULTURAL RESEARCH COUNCIL

AUDITOR-GENERAL'S REPORT

FOR THE YEAR ENDED 31 MARCH 2010

occurred and does it pertain to the entity i.e. can the reported performance information be traced back to the source data or documentation?

- Accuracy: Amounts, numbers and other data relating to reported actual performance has been recorded and reported appropriately.
- Completeness: All actual results and events that should have been recorded have been included in the reported performance information.

The following audit findings relate to the above criteria:

- For the reported target regarding information disseminated, that was material by nature, 44% of the reported target was not complete on the basis of the source information or evidence provided to support the reported target.

INTERNAL CONTROL

I considered internal control relevant to my audit of the financial statements and the report on predetermined objectives and compliance with the PFMA and the Agricultural Research Act of 1990 but not for the purposes of expressing an opinion on the effectiveness of internal control. The matters reported below are limited to the deficiencies identified during the audit.

• Leadership

The internal policies and procedures of the ARC did not adequately address the processes pertaining to the planning, monitoring, managing and reporting of performance information at the overall performance management level.

• Financial and performance management

Sufficient appropriate audit evidence with regard to the reported performance information of strategic objective 1 to 4 could not be obtained, as the information system used for generating performance information was not appropriate to facilitate the preparation of accurate and complete actual performance information.

OTHER REPORTS

• Investigations

As disclosed in note 28 of the financial statements, the following investigations are taking place:

AGRICULTURAL RESEARCH COUNCIL

AUDITOR-GENERAL'S REPORT

FOR THE YEAR ENDED 31 MARCH 2010

An investigation is in process to probe payroll fraud by an ex-payroll administrator of the ARC. Criminal charges have been laid against the official. The investigation was still ongoing at reporting date.

An internal audit investigation was completed regarding an ex-administrator submitting expenses from fictitious companies for payments to the former employee. ARC was in the process of laying criminal charges against this ex administrator. The investigation was still ongoing at reporting date.

Auditor-General

Pretoria

31 July 2010



AUDITOR-GENERAL
SOUTH AFRICA

Auditing to build public confidence

ARC Performance Report for 2009/2010

INTRODUCTION

This performance report is presented in conformity with the Performance Information Policy as approved by Council during the financial year 2009/10. It serves as the basis upon which the ARC reports upon the implementation of the strategic plan for the period 2007/08 to 2011/12 as contained in the business plan for financial year 2009/10. In general, the ARC succeeded in obtaining set targets per strategic objective in line with the financial resources entrusted to us.

Overall, the performance of ARC in the last three financial years 2007/08 to 2009/10 has been in accordance with all the respective business plans as approved at that time. Further, it should be noted that performance has been limited to available resources, in particular, financial allocations as approved through the parliamentary grant and external income. Other limitations to performance have been within the context of infrastructure, people capacity (expertise and numbers) and other related resources. These limitations are in general external to the organisation, but impact upon the ARC's ability to fully attain performance in accordance with its mandate as per the Agricultural Research Act, 1990 (Act no. of 1990, as amended).

In general, the ARC has met and exceeded its performance targets as set against the approved business plan for financial year 2009/10. However, there have been constraints that in some cases have adversely impacted upon the realisation of performance targets. For example, there are instances where certain skills were found to be scarce, thus impacting upon the timeous recruitment to deliver on some outputs. In other cases certain activities had to be postponed due to a variety of reasons (e.g. resignations, equipment failure etc).

Briefly the following resource constraints serve as a limitation on the ability of the ARC to fully deliver on its mandate as stipulated in Act:

a) Human resources:

The ARCHR Strategy places emphasis on the human capital attraction, retention and development that is responsible for implementing strategic priorities.

The strategy focuses among others on the development of human resources in all aspects – organisational alignment, employment equity and diversity management, the integrated remuneration strategy, the review, development and improvement of HR policies and procedures, the implementation of performance management

on all levels, the improvement of HR management information and data.

To maintain a harmonious and peaceful work environment, ARC management through its negotiating team meets regularly with organised labor as set down in the main collective agreement. Through this partnership, salary negotiations during the period under review were concluded successfully without any work stoppage and strikes.

A skills audit was also conducted to determine the skills and competency needs of staff as new challenges demand that staff perform optimally to meet the needs identified. Our aim is to invigorate the progress of skills development driven by programme priorities rather than the compliance requirements of the Skills Development Act. The Work Place Skills Plan (WPSP) for 2009/10 financial year and the Implementation Report for the 2008/09 financial year were submitted to Department of Labour.

During the reporting period the ARC was unable to fill some vacant posts because of limited financial resources. This was exacerbated by resignations of some key researchers. The net effect has been a slight downturn in achieving some of the performance indicators. The lack of critical mass of scientists and engineers; which may be due to poor skills base for recruitment and the country's skewed distribution of expertise, continues to adversely impact upon the organisation's potential to adequately meet its objectives as per mandate in the Act.

ARC will, however, constantly research trends in government, public and private sectors, nationally and internationally, in the areas of remuneration and rewards to ensure that the organisation is permanently adaptable to challenges of attraction and retention of competent and skilled personnel as well as addressing market trends to respond sufficiently to staff poaching.

b) Infrastructure

- Two main factors continue to impact upon the ARC's performance in this area:
- Ageing infrastructure with high maintenance costs that reduces the effectiveness and efficiency of use of the financial resources. Further, this creates a risk on timely achievement of specific

targets due to risk of equipment failure.

- Ageing (obsolete) equipment linked to specific research laboratories (buildings) that may be difficult to replace due to developments in technology; thus adversely impacting upon the cost of research and presenting a risk to performance.
- Changes in regulatory systems that require adaptation to new equipment to meet minimum requirements. This adversely impacts upon the organisation's ability to deliver on its mandate as financial resources are required to obtain new equipment.
- The current ICT infrastructure does not meet business requirements and too much dependency on contractors.

c) Finance

- During the reporting period the ARC was saddled with unfunded and insufficiently funded mandates from the Department of Agriculture, Forestry and Fisheries (DAFF), which are mainly the national public good assets that continue to adversely impact upon the financial performance of the organisation. The net result has been sub-optimal services to clients and in some instances discontinued services.
- Parliamentary grant allocations have not been commensurate with associated operational cost requirements. The inadequate grant allocations received has limited the ability of ARC to meet some of its obligations as stipulated within its mandate.
- Inadequate parliamentary grant received has limited the ARC's ability to attain targeted external income from private sources, particularly within the agricultural sector.
- Lack of financial resources has adversely impacted upon the ability to competitively recruit qualified and skilled scientists and technicians.
- Limited financial resources adversely impacted upon the ARC's ability to complete some research and development projects as well as technology transfer projects.
- Limited financial resources adversely impacted upon the ability to replace or acquire new equipment.

Although there were constraints towards the attainment of set targets as indicated above, the organisation has implemented mitigation actions during the course of the year. Such actions have

enabled the ARC to perform within the limited resources and achieve the targets as outlined below in this report.

ANALYSIS OF PERFORMANCE

The ARC has successfully achieved its objectives as outlined in the Business Plan for the financial year

2009/10. In some instances the organisation has exceeded expectations on performance in various areas that have been reported under each strategic objective. Where variances exist, reasons have been outlined. Additional details of performance are reflected within the narratives outlined in the annual report pages 15 to 17. Performance against targets set per strategic objectives 1 to 6 as reported below:

ARC Scientific outputs (2009/10)

PERFORMANCE MEASURE/INDICATOR	ANNUAL TARGET	ARC ACTUAL
Scientific publications and presentations	185	229
Methods developed	316	123
New and improved products developed	200	48
Germplasm, collections and genetic stock development and maintenance	65220	68951
Services rendered	13650	245023
Information dissemination	770	1722
IP generated	51	27
Newly accredited laboratories	3	4
Number of Beneficiaries	700	2216

STRATEGIC OBJECTIVE 1: Generate, Develop and apply new Knowledge and Technology			
	TARGETS	ACTUALS	COMMENT
Scientific publications and presentations	40	44	The results obtained lent themselves to have more than one publication and therefore resulted in a higher output
Methods developed	60	66	
New and improved products developed	20	11	The development of the products could not be completed due to reprioritisation to strategic objective 2
Germplasm, collections and genetic stock development and maintenance	1800	1490	The locations for collections did not have the anticipated number of accessions
Services rendered	1000	14	The level of work received from clients was lower due to the economy
Information dissemination	65	256	Greater opportunities had arisen to disseminate the information
IP generated	20	0	The work had not progressed due to lower level of funding

STRATEGIC OBJECTIVE 2: Sustainable use and management of natural resources			
	TARGETS	ACTUALS	
Scientific publications and presentations	35	56	The results obtained lent themselves to have more than one publication and therefore resulted in a higher output
Methods developed	1	6	The results obtained lent themselves to have more than one method to be developed
New and improved products developed	10	15	The development of the products were higher due to reprioritisation from strategic objective 1
Germplasm, collections and genetic stock development and maintenance	26070	48753	The locations for collections had more than the anticipated number of accessions
Services rendered	80	16350	The number of disease outbreaks lead to greater number of clients and samples being analysed
Information dissemination	120	325	Greater opportunities had arisen to disseminate the information
IP generated	2	0	The work had not progressed due to lower level of funding

STRATEGIC OBJECTIVE 3: Enhance nutrition food security and safety			
	TARGETS	ACTUALS	COMMENT
Scientific publications and presentations	40	75	The results obtained lent themselves to have more than one publication and therefore resulted in a higher output
Methods developed	230	32	The level of activity was reduced due to lower levels of funding
New and improved products developed	160	21	The level of activity was reduced due to financial and human resource constraints
Germplasm, collections and genetic stock development and maintenance	28050	11375	The locations for collections had less than the anticipated number of accessions
Services rendered	3570	61543	The number of disease outbreaks lead to greater number of clients and samples being submitted
Information dissemination	385	752	Greater opportunities had arisen to disseminate the information
IP generated	25	27	
Number of Beneficiaries	700	2216	The number of beneficiaries attending the sessions were higher than anticipated and the ARC accommodated the higher request

STRATEGIC OBJECTIVE 4: Enhance the ability of the agricultural sector to manage and mitigate agricultural risks			
	TARGETS	ACTUALS	COMMENT
Scientific publications and presentations	70	54	The results obtained did not allow for the publications to be in peer reviewed journals
Methods developed	25	19	Expected results not attained
New and improved products developed	10	1	The level of activity was reduced due to financial and human resource constraints
Germplasm, collections and genetic stock development and maintenance	9300	7333	The number of unique hybrids that were developed were lower than anticipated
Services rendered	9000	167116	A larger than anticipated request for plants were obtained
Information dissemination	200	389	Greater opportunities had arisen to disseminate the information
IP generated	4	0	The work had not progressed due to lower level of funding
Newly accredited laboratories	3	4	The concentration on quality had allowed the ARC to have an additional lab to be accredited

STRATEGIC OBJECTIVE 5: TECHNOLOGY TRANSFER						
KEY RESULT AREA	PROGRAMME	PERFORMANCE MEASURE / INDICATOR	YEARLY TARGET	TARGET RESULTS	REASON FOR VARIANCE	
KRA 5.1: BUSINESS GENERATION	Programme A: Public entities	New and repeat business secured (MoAs)	50% of External Income	42,4%	Focus of effort in this KRA was on building relationships and communicating the ARC's services to potential clients through engagements and proposal writing. Good relationships have been built with especially DST and DRDLR and further relationship building is on track with the Department of Correctional Services	
	Programme B: Private sector	New business secured (MoAs)	49.5% of External Income	53,2%	Negotiations for license agreement for patent held with (ID Lelystad/Simbar continue	
	Programme C: International business opportunities	New business secured (MoAs)	0.5% of External Income	4,3%	More effort spent on identifying risks and mitigation responses. Also spent on re-formulating future direction of the ARC's involvement in incubators	
KRA 5.2: COMMERCIALISATION	Programme A: Licence management	Income generated from licenses and other IP	R 10.5 million	R9 996 334,00	Commercialisation of ITSC new varieties for which terms sheets had been drafted have been complicated and solutions are being sought	
				Targets not achieved	VOPI and Infruitec Nietvoorbij facilities investigated for suitability for DNA fingerprinting provision and found inadequate. Business plan for development of capability in draft	
		Audit procedure in place	31 October 2009		Negotiations with RAPS on license agreement fell through due to failure of technology to meet their specifications	
		At least one audit conducted	31 March 2010		Negotiations for potential licenses for new ARC sweet potato varieties in progress with McCain foods It was established that this would be too expensive for the APC and resource mobilisation continues. Initial discussions with PlantBio and will be continued with TIA	

STRATEGIC OBJECTIVE 5: TECHNOLOGY TRANSFER					
KEY RESULT AREA	PROGRAMME	PERFORMANCE MEASURE / INDICATOR	YEARLY TARGET	TARGET RESULTS	REASON FOR VARIANCE
	Programme B: Incubation & SMME development	Strategic documents developed	30 September 2009	Draft documents developed and presented to organisation for discussion	
		MoU's entered into with appropriate partners to execute plans	31 March 2010	EgoliBio MoU signed	
		Number of incubators initiated/negotiated	6	Negotiation on two incubators – Cotton and fruit juices initiated with possible funders	
		Number of existing incubators supported	4	MMI and Timbali incubators supported with respect to governance	Two other incubators that had been targeted for support were functional as fully fledged incubators and are now the subject of fund raising for proper establishment (juice making – referred to above)
		Number of new SMMEs supported	1	0	This was not initiated for the reasons outlined above
	Programme C: Optimising revenue from ARC products	Increased sales revenue	10% from 2008/09 (R19 946 500,00)	R13,174,173 (decline)	Revenue decreased from last year. This is due to the economic downturn
	Programme D: New venture creation	Feasibility assessment reports	One by 31 December 2009	Concept for the establishment of a commercialisation entity drafted and circulated during November. Feasibility report not achieved	It emerged that this required more extensive consideration and professional services are being sought
				Co-operation agreements with 2 industry structures; Citrus Research International and Winetech have been drafted and discussed	These will lead to the establishment of joint structures for the commercialisation of jointly owned IP

STRATEGIC OBJECTIVE 5: TECHNOLOGY TRANSFER

KEY RESULT AREA	PROGRAMME	PERFORMANCE MEASURE / INDICATOR	YEARLY TARGET	TARGET RESULTS	REASON FOR VARIANCE
KRA 5.3: TRAINING AND INFORMATION DISSEMINATION	Programme A: Training	80 different courses developed and delivered in 250 events of training'	250 events	149	Marketing materials and establishment of systems was the focus of effort
		<ul style="list-style-type: none"> Agricultural Research for Development policy document approved 	'ARD policy document approved and ARD training integrated in at least two community-based' projects	Bethanie and Winterveld Communities	MOU with Western Cape PDA finalised and awaits signature
		<ul style="list-style-type: none"> Projects initiated with Agricultural Colleges 	Projects with at least one Agricultural College initiated by 28 February 2010 None	Discussed with Eisenberg College but not initiated. Target not met System to measure this organisation wide not in place hence difficult to measure. Estimated amount is R344 679, 98 10 Bethanie representatives	
		<ul style="list-style-type: none"> Income generated from training and advisory services 	There was no target set for this indicator		Since this was the first year this would be measured and reported as such, there was no target set. The achievement in this financial year would be used as baseline on which to base targets for future years
		Number of Land and Agrarian Reform Program beneficiaries trained	There was no target set for this indicator		The number of beneficiaries would be difficult to set as a target as these vary from community to community and are not always apparent upfront. This should have read 'number of LARP training programmes negotiated and initiated'

STRATEGIC OBJECTIVE 5: TECHNOLOGY TRANSFER					
KEY RESULT AREA	PROGRAMME	PERFORMANCE MEASURE / INDICATOR	YEARLY TARGET	TARGET RESULTS	REASON FOR VARIANCE
	Programme B: Information dissemination	<ul style="list-style-type: none"> ARC technology information database 	By 30 November 2009	Information packaging Framework developed	
		Call-centre initiated and capacity developed		Marketing information booklets for ARC training programme produced for distribution	The establishment of a call centre was the target
		Electronic subscription services and number of subscribers		Feasibility reports on Call-centre and Electronic Service Subscriptions presented	The establishment of a subscription service was the target
		Number of platforms used (farmers' days, open days, TV & radio, presentations, Internet, exhibitions)	6 platforms used	All 6 platforms used: 342 Farmers Days 12 Open Days 154 Radio and TV 409 Presentations 4 Internet postings 10 exhibitions	
		Number of tools (pamphlets, articles, presentations, CDs / DVDs, manuals)	200	11000 pamphlets were distributed	
KRA 5.4: IP MANAGEMENT	Programme A: IP awareness	<ul style="list-style-type: none"> Proportion of science personnel exposed to IP awareness sessions 	100%	Four workshops held, one by an international expert	The measure is the number of new filings and registrations. It is not advisable to set a number as a target as this is dependant on the outputs of R&D, which are often serendipitous. An increase in the size of the portfolio is preferable as an indication that the organisation is appropriating its R&D output effectively

STRATEGIC OBJECTIVE 5: TECHNOLOGY TRANSFER						
KEY RESULT AREA	PROGRAMME	PERFORMANCE MEASURE / INDICATOR	YEARLY TARGET	TARGET RESULTS	REASON FOR VARIANCE	
KRA 5.5: ECONOMIC SERVICES & BIOMETRY	Programme B: ARC IP portfolio management	<ul style="list-style-type: none"> Report on new filings and registrations Increase size of ARC IP portfolio as measured by new filings / registration applications 	50	<p>One new PBR granted to the ARC (African sunset)</p> <p>Two new filings for patent, one in the US patent office</p> <p>Maintenance fees paid for various ARC owned IP</p>	The target was too high and could not be met as setting had not taken into account the rate of disclosures from institutes which the target depends on	
	Programme A: Business environment analysis	<p>Economic outlook reports</p> <p>Ex ante impact assessment on 2 prioritised products</p>	2, by 30 June 2009 and by 31 December 2009	2	Organisational input will be sought to enable prioritisation in next financial year. Target was over-ambitious and not well-formulated	
		<p>Ex post impact assessment on 2 prioritized programmes</p> <p>Viability reports</p>	2 by 30 November 2009	One study on Iachanalia has been initiated	Due to the involved nature of impact assessment studies and the need to build ARC capacity in this competence through strategic partnering, this target was not met. Strategic partners have been identified and enrolled and the Iachanalia study is work in progress	
	C. Ad hoc decision support system	Number of feasibility studies to support ARC proposals	2, by 30 September, and by 15 January 2010	14	Over-ambitious target setting. These are very involved and require more capacity than is available. Only very basic information was provided to institutes to assist them in business planning based on the new research agenda but these cannot be reported as viability reports really	
		Number of feasibility studies to support ARC proposals	Number of consultations		At the time of business planning, the economics unit was not yet in existence. The 2009/10 financial year was used to communicate and establish a baseline for the services rendered by the unit	

STRATEGIC OBJECTIVE 5: TECHNOLOGY TRANSFER						
KEY RESULT AREA	PROGRAMME	PERFORMANCE MEASURE / INDICATOR	YEARLY TARGET	TARGET RESULTS	REASON FOR VARIANCE	
KRA 5.6: KNOWLEDGE MANAGEMENT & LIBRARY SERVICES	D. Biometry services	Number of consultations to internal and external clients	600 consultations	2565 (Internal) 553 (External)		
		Proportion of ARC peer-reviewed scientific publications supported by Biometry	80%	54	An accurate measuring system for this will be introduced in the next reporting period due to the unit team leader being appointed very late into the financial year	
		Proportion of successful research proposals supported by Biometry	60%	79	An accurate measuring system for this will be introduced in the next reporting period due to the unit team leader being appointed very late into the financial year	
	Programme A: Knowledge management	Knowledge Management strategy	Completed by 30 November 2009	Strategy not developed	Lack of capacity due to budgetary constraints	
	Programme B: Library information services	User satisfaction as measured through the Employee Satisfaction Survey	80% positive response	Survey conducted		

STRATEGIC OBEJECTIVE 6: ACHIEVE ORGANISATIONAL GROWTH AND SUSTAINABILITY						
Key Result Areas	PROGRAMME	PERFORMANCE MEASURE/ INDICATOR	YEARLY TARGETS	ACTUAL	DEVIATION	REASONS FOR VARIANCE
6.1 Human Capital Utilisation	Program A: Performance Management	Functional Performance Management System	100% of employees performance managed in compliance with ARC employee performance management system by 30 June 2009	99% of employees performance contracts have been signed		1% of Union members refused to sign the performance contracts and 1 % still outstanding
		Processing of performance assessments	100% by 31 March 2010	96% achieved and the balance comprise of new employees and resignations.		
	Programme B: Optimal Human Capital Utilisation	Effective talent management	Talent Management framework implemented BY 30 June 2009	The HRD strategy developed and implemented		Final draft Talent & Retention strategy was presented to the HR Committee of Council but not yet approved.
		Comprehensive and integrated expertise database	Functional database by 30 July 2009	Developed a PDP portal Critical and Scarce Skills Audit Report conducted		.
	Programme C: Asset Management	Functional ARC-wide database of assets and facilities available for internal cooperation on projects.	30 July 2009	30 July 2009	0	Functional database of assets implemented.
		Improved organisational performance	10% increase in peer-reviewed scientific publications against the 2007/08 baseline	An accurate measuring system will be implemented		

STRATEGIC OBEJECTIVE 6: ACHIEVE ORGANISATIONAL GROWTH AND SUSTAINABILITY						
Key Result Areas	PROGRAMME	PERFORMANCE MEASURE/ INDICATOR	YEARLY TARGETS	ACTUAL	DEVIATION	REASONS FOR VARIANCE
6.2 Optimisation of Resources	Programme A: Credit Management Programme B: External income	Value of debt to ARC outstanding for more than 90 Days Growth in external income	0 R150m	R14m R22m	(R14m) (R128m)	30% debtors outstanding paid after the 1 st of April 2010. Efforts are being made to recover other debtors through legal channels. Global economic recession had an impact on ARC's ability to generate additional income from both government departments and non-government funders.
		High levels of ICT service delivery	75% satisfaction as measured in Employee Satisfaction Survey	Employee Satisfaction Survey not conducted due to budgetary constraints, therefore there is no measurement tool to determine target achievement		
6.3 Governance	Programme A: Increase in BBBEE procurement Programme B: Adherence to good corporate governance	15% Matters of emphasis identified in the external audit of financial year 2009/10	11% 0	(4%) 1		
		Audit qualification for the financial year 2009/10	0	0	Process to reduce irregularities has been implemented	
		ARC Compliance management system	Functional system by 30 July 2009	Compliance to Skills Development Act and Employment Equity Act		

STRATEGIC OBEJECTIVE 6: ACHIEVE ORGANISATIONAL GROWTH AND SUSTAINABILITY						
Key Result Areas	PROGRAMME	PERFORMANCE MEASURE/ INDICATOR	YEARLY TARGETS	ACTUAL	DEVIATION	REASONS FOR VARIANCE
		ARC Business Continuity Plan	<ul style="list-style-type: none"> Devise a scope of work for the undertaking of a more comprehensive business impact assessment across the ARC, which was more inclusive of ICT processes. Develop an ARC Business Continuity Management (BCM) framework. 	<p>A more comprehensive proposal was requested and received.</p> <p>A first draft BCM framework was completed.</p>		None
			Completion of the ARC-wide compliance assessment by ARC Company Secretary and Legal Advisor	The ARC-wide compliance assessment was completed		None
			Present results of comprehensive business impact assessment proposal and draft BCM framework to Corporate Enterprise Risk Management Committee (CERMC).	The assessment proposal and BCM framework was presented and approved at CERMC, in February 2010.		None
			Commence with tender process to appoint a service provider to undertake a business impact assessment across the ARC.		Target not achieved	As the ARC will be appointing a new Internal Audit Service provider, it was proposed that the business impact assessment should be undertaken by the newly appointed service provider.

STRATEGIC OBJECTIVE 6: ACHIEVE ORGANISATIONAL GROWTH AND SUSTAINABILITY						
Key Result Areas	PROGRAMME	PERFORMANCE MEASURE/ INDICATOR	YEARLY TARGETS	ACTUAL	DEVIATION	REASONS FOR VARIANCE
			<ul style="list-style-type: none"> Consolidate and review compliance results obtained from legal compliance assessment; Risk analyse, i.e. impact and likelihood rating, consolidated compliance results; Assignment of compliance controls, by ARC compliance owners; and Functional compliance management system 	All quarter targets were achieved.	None	<ul style="list-style-type: none"> Consolidate and review compliance results obtained from legal compliance assessment; Risk analyse, i.e. impact and likelihood rating, consolidated compliance results; Assignment of compliance controls, by ARC compliance owners; and Functional compliance management system
6.4 ARC Image and Culture	Programme A: Image	Improve ARC image externally	75% satisfaction as measured in Customer Satisfaction Survey	Various Print Advertising; Technical articles; Editorials & Publications related to the agricultural industry Exhibitions; Workshops & Lectures profiling ARC products and services		
		Effective communication internally	100% internal communication reach	Various communications on issues affecting employee were disseminated; internal staff events held to encourage staff engagement.	80% satisfaction as measured in Employee Satisfactory Survey	Customer Satisfaction Survey not conducted due to budget constraints; therefore there is no measurement tool to determine target achievement

STRATEGIC OBJECTIVE 6: ACHIEVE ORGANISATIONAL GROWTH AND SUSTAINABILITY						
Key Result Areas	PROGRAMME	PERFORMANCE MEASURE/ INDICATOR	YEARLY TARGETS	ACTUAL	DEVIATION	REASONS FOR VARIANCE
	Programme B: Communication	Effective communication externally	75% satisfaction as measured in Customer Satisfaction Survey 75% media coverage every quarter	Media Releases & Technical articles for print & broadcast were disseminated on agricultural research activities.		Media Monitoring service was not procured due to budget constraints, therefore there is no tool available to measure media coverage and target achievement
		Effective customer relations	60% satisfaction as measured in Customer Satisfaction Survey	Stakeholder, International Relations & Collaboration initiatives concluded including WEMA; IMAS, Namibian MOU & Brazilian delegation.		
	Programme C: Customer Relations	Culture underpinned by values and progressive leadership	100% of employee are familiar with ARC values 60% satisfaction as measured in Employee Satisfaction Survey	Regional Road shows & staff address sessions were held to instill corporate values.		
	Programme D: Culture	Improve ARC image internally	80% employee satisfaction about ARC image as measured in Employee Satisfaction Survey	Celebration of national days with staff; All SEMIs hosted for the financial year.		

One thing is clear, as we move into 2010 and beyond, the challenges will be ever greater. The economic conditions over the next year and beyond will place tremendous pressures on us to deliver on our mandate and retaining competent and skilled personnel with the advent of OSD (Occupational Specific Dispensation Policy) in government.

Meanwhile, no effort is spared in attaining performance targets set, as well as needing to respond to the new performance framework introduced in the organisation. So the pressure to continue transforming and meeting stake-holders expectations will not go away.

AGRICULTURAL RESEARCH COUNCIL

STATEMENT OF RESPONSIBILITY

FOR THE YEAR ENDED 31 MARCH 2010

The Council which is the Accounting Authority of the Agricultural Research Council (ARC) is responsible for the preparation, integrity and fair presentation of the annual financial statements of the ARC.

The annual financial statements for the year ended 31 March 2010 presented on pages 139 to 190 have been prepared in accordance with:

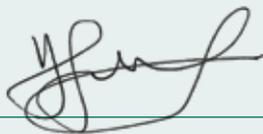
- The Agricultural Research Act No. 86 of 1990 as amended;
- The Public Finance Management Act No. 1 of 1999;
- Standards of Generally Recognised Accounting Practice; and
- South African Statements of Generally Accepted Accounting Practice.

They are based on appropriate accounting policies which have been consistently applied and which are supported by reasonable and prudent judgements and estimates. The ongoing concern basis has been adopted in preparing the annual financial statements. The Council has no reason to believe that the ARC will not be an ongoing concern in the foreseeable future based on forecasts and available cash resources.

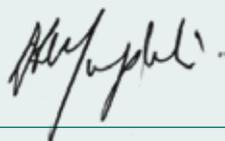
The Council is also responsible for the ARC's system of internal controls. These are designed to provide reasonable, but not absolute, assurance as to the reliability of the annual financial statements and to adequately safeguard, verify and maintain accountability of assets. These controls are monitored throughout the ARC by management and employees, in an attempt to address the segregation of authority and duties with available resources. Processes are in place to monitor internal controls, to identify material breakdowns and implement timely corrective action.

The Council and ARC Management treat corporate governance matters seriously and whenever any instances of non compliance to regulation are uncovered or reported, appropriate disciplinary measures in terms of policy and legislation are instituted

The annual financial statements were approved by the Council on 30 July 2010 and are signed on its behalf:



Mr JWA Godden
Chairperson Council



Dr S R Moephuli
President and CEO

AGRICULTURAL RESEARCH COUNCIL

STATEMENT OF FINANCIAL PERFORMANCE

FOR THE YEAR ENDED 31 MARCH 2010

	Notes	2010 R	2009 R
Revenue			
Parliamentary Grant		532 850 000	469 993 339
Other operating revenue		298 199 677	290 601 925
Total revenue	2.1	831 049 677	760 595 264
Expenses			
Personnel		490 214 951	467 038 673
Administrative and other expenses		264 752 723	296 292 901
Depreciation		17 794 186	14 253 105
Finance costs		6 308	171 323
Total expenses		772 768 168	777 756 002
(Loss)/Gains on sale of property and equipment		(12 196)	1 078 318
Surplus/(Deficit) for the year	3	58 269 313	(16 082 420)

AGRICULTURAL RESEARCH COUNCIL

STATEMENT OF FINANCIAL POSITION

AS AT 31 MARCH 2010

	Notes	2010 R	Restated 2009 R
ASSETS			
Non-current assets		651 139 933	651 553 890
Investments	7	2 010 632	2 236 410
Equipment	8	168 084 558	177 291 792
Land and buildings	8	481 044 743	472 025 688
Current assets		166 748 540	116 911 301
Cash and cash equivalents	4	73 457 347	34 966 404
Receivables	5	79 962 446	63 869 431
Inventories	6	13 328 747	18 075 466
Total assets		817 888 473	768 465 191
LIABILITIES			
Non-current liabilities		70 646 943	92 269 943
Employee benefits	13	27 173 000	28 796 000
Deferred income: Revenue grant	11	43 473 943	63 473 943
Current liabilities		187 786 874	174 657 319
Payables	10	128 201 813	130 581 808
Leave accrual	12.1	49 585 061	44 075 511
Bonus provision	12.2	10 000 000	-
Total liabilities		258 433 817	266 927 262
Net assets		559 454 656	501 537 929
NET ASSETS			
Capital fund	14	108 905 191	108 905 191
Insurance reserve		2 570 838	3 370 386
Accumulated surpluses	15	447 978 627	389 262 352
Total net assets		559 454 656	501 537 929

AGRICULTURAL RESEARCH COUNCIL

STATEMENT OF CHANGES IN NET ASSETS

FOR THE YEAR ENDED 31 MARCH 2010

	Contributed capital R	Restated Accumulated surpluses R	Insurance reserve R	Restated Total equity R
Balance at 31 March 2008				
As previously stated	108 905 191	159 484 478	4 515 347	272 905 016
Re statement (note 26)		(5 304 088)		(5 304 088)
Change in Accounting policy (note 30)		250 019 421		250 019 421
Restated balance	108 905 191	404 199 811	4 515 347	517 620 349
Utilised during the year		1 144 961	(1 144 961)	-
Deficit for the year		(16 082 420)		(16 082 420)
Restated balance at 31 March 2009	108 905 191	389 262 352	3 370 386	501 537 929
Utilised during the year			(352 586)	(352 586)
Transfer to surplus		446 962	(446 962)	-
Surplus for the year		58 269 313		58 269 313
Balance at 31 March 2010	108 905 191	447 978 627	2 570 838	559 454 656

AGRICULTURAL RESEARCH COUNCIL

CASH FLOW STATEMENT

FOR THE YEAR ENDED 31 MARCH 2010

	Notes	2010 R	Restated 2009 R
CASH FLOWS FROM OPERATING ACTIVITIES			
Receipts		789 302 704	759 054 483
Sales of goods and services	20(c)	270 777 182	280 494 227
Grants		512 850 000	469 993 339
Interest received		5 675 522	8 496 586
Dividends received		-	70 331
Payments		(733 193 557)	(722 946 430)
Employee costs		(490 214 951)	(467 038 673)
Suppliers		(242 972 298)	(255 736 434)
Interest paid		(6 308)	(171 323)
Net cash flows from operating activities	20(b)	56 109 147	36 108 053
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchase of property and equipment	8	(17 720 590)	(62 100 030)
Proceeds from sale of property and equipment		102 386	1 855 313
Net cash outflow from investing activities		(17 618 204)	(60 244 717)
Net increase/(decrease) in cash and cash equivalents		38 490 943	(24 136 664)
Cash and cash equivalents at the beginning of year	20(a)	34 966 404	59 103 068
Cash and cash equivalents at end of year	20(a)	73 457 347	34 966 404

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010

1. ACCOUNTING POLICIES

The annual financial statements incorporate the principal accounting policies set out below. Except for accounting policy on government grants, the accounting policies have been applied consistently throughout the period, and are consistent with those of the previous year.

1.1 Adoption of new and revised standards

In the current period, ARC has adopted all the relevant new and revised Standards and Interpretations issued by the International Accounting Standards Board (the IASB), the International Reporting Interpretations Committee (IFRIC) of the IASB and Statements issued by the Accounting Standards Board (ASB) that are relevant to its operations and effective for accounting periods beginning on or after 1 January 2008. Except for GRAP 23, the adoption of these new and revised Standards and Interpretations did not result in any adjustments.

Standards and Interpretations issued, but not yet effective

At the date of authorisation of these annual financial statements, the following Standards and Interpretations were in issue but not yet effective:

New statement	Description	Effective date -annual periods commencing on or after
GRAP 18 (AC 145)	Operating segments	01 January 2009
IAS 14 (AC 115)	Segment Reporting	01 April 2009
GRAP 21	Impairment of non Cash Generating Assets	TBA
GRAP 23	Revenue from non exchange transactions (Taxes and Transfers)	TBA
GRAP 24	Presentation of Budget Information in Financial Statements	TBA
GRAP 25 (AC 116)	Employee benefits	TBA
GRAP 26	Impairment of Cash Generating Assets	TBA
GRAP 103	Heritage Assets	TBA
GRAP 104 (AC 144)	Financial Instruments	TBA
IFRIC 17 (AC 450)	Distribution of Non cash Assets to Owners	01 July 2009
IFRIC 18 (AC 451)	Transfer of Assets from Customers	01 July 2009

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.1 Adoption of new and revised standards (continued)

Statement	Description	Effective date -annual periods commencing on or after
Amendments to		
IFRS 1 (AC 138)	Cost of investment on first-time adoption	01 January 2009
IFRS2 (AC 139)	Vesting conditions and cancellations	01 January 2009
IFRS 7 (AC 144)	improving disclosures about financial instruments	01 January 2009
IAS 27 (AC 132)	Removal of cost method definition	01 January 2009
IAS 32 (AC 125 and IAS 1 (AC 138	Puttable financial instruments and obligations arising on liquidation	01 January 2009
IAS 39 (AC 133)	Eligible hedged items	01 July 2009
Revision to		
IFRS 1 (AC 138)	First time Adoption of International Financial Reporting Standards	01 July 2009
IFRS 3 (AC 140)	Business combinations	01 July 2009

The Council anticipate that the adoption of these Standards and Interpretations in future periods will not have a material impact on the financial statements.

1.2 Basis of preparation

The annual financial statements have been prepared on the historical cost basis except where otherwise stated, and in accordance with the Public Finance Management Act 1999 (Act 1 of 1999) as amended, the South African Statements of Generally Accepted Accounting Practices (SA GAAP) including any interpretations of such Statements issued by the Accounting Practices Board and the Standards of Generally Recognised Accounting Practices (GRAP). The effective Standards of GRAP for the accrual basis of accounting issued by the Accounting Standards Board that replaced the equivalent GAAP Statements were as follows:

Standard of GRAP	Replaced Statement of GAAP
GRAP 1: Presentation of financial statements	AC 101: Presentation of financial statements
GRAP 2: Cash flow statements	AC 118: Cash flow statements
GRAP 3: Accounting policies, changes in accounting estimates and errors	AC 103: Accounting policies, changes in accounting estimates and errors
GRAP 4: The effects of Changes in Foreign Exchange Rates	AC 112: The effects of Changes in Foreign Exchange Rates
GRAP 5: Borrowing Costs	AC 114: Borrowing Costs
GRAP 6: Consolidated and Separate Financial Statements	AC 132: Consolidated and Separate Financial Statements

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

GRAP 7: Investment in Associates	AC 110: Investment in Associates
GRAP 8: Interest in Joint Ventures	AC 119: Interest in Joint Ventures
GRAP 9: Revenue from Exchange Transactions	AC 111 Revenue
GRAP 10: Financial Reporting in Hyperinflationary Economies	AC 124: Financial Reporting in Hyperinflationary Economies
GRAP 11: Construction contracts	AC 109: Construction contracts
GRAP 12: Inventories	AC 108: Inventories
GRAP 13: Leases	AC 105: Leases
GRAP 14: Events After the Reporting Date	AC 107: Events After the Balance Sheet Date
GRAP 16: Investment Property	AC 135: Investment Property
GRAP17: Property, Plant and Equipment	AC 123: Property, Plant and Equipment
GRAP 19: Provisions, Contingent Liabilities and Contingent Assets	AC 130: Provisions, Contingent Liabilities and Contingent Assets
GRAP 100: Non-current Assets Held for Sale and Discontinued Operations	AC 142: Non-current Assets Held for Sale and Discontinued Operations
GRAP 101: Agriculture	AC 137: Agriculture
GRAP 102: Intangible assets	AC 129: Intangible assets

Terminology differences:

Standard of GRAP	Replaced Statement of GAAP
Statement of financial performance	Statement of comprehensive income
Statement of changes in net assets	Statement of changes in equity
Net assets	Equity
Surplus/deficit	Profit/loss
Accumulated surplus/deficit	Retained earnings
Contributions from owners	Share capital
Distributions to owners	Dividends
Cash flow statement	Statement of cash flows

1.3 Government grants, deferred income and capital fund

Government grants are recognised when it is probable that future economic benefits will flow to the public entity and these benefits can be measured reliably. The grants are recognised as income to the extent that there are no further obligations arising from the receipt of the grants.

Government grants received for the purpose of giving immediate financial support with no future related costs are recognised as revenue in the period in which they become receivable. Government grants relating to specific expenditure are recognised in the year during which the expenses are incurred.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

Government grants related to assets are stated in the statement of financial position. The capital fund represents the cost of land at the date of its transfer to the ARC

Specific asset Government grants relating to property, plant and equipment are treated as deferred income and released to statement of financial performance when the conditions attached to the grant are met. General capex allocation is recognised when the grant accrues to ARC.

1.4 Equipment, land and buildings

Buildings in the course of construction for production, rental or administrative purposes, or for purposes not yet determined, are carried at cost, less any recognised impairment loss. Cost includes professional fees, acquisition costs, construction and, for qualifying assets, borrowing costs are capitalised in accordance with the ARC accounting policy. These assets are depreciated on the same basis as other buildings and depreciation commences when the assets are ready for their intended use. Buildings under construction are not depreciated. Buildings available for use are accounted for at cost less accumulated depreciation and accumulated impairments.

Equipment is stated at cost less accumulated depreciation and any accumulated impairment losses.

Depreciation is charged so as to write off the cost of assets to its residual value over their estimated useful lives, using the straight-line method. Property, plant and equipment is depreciated when it is in a location and condition for it to be operating in the manner it is intended. If the residual value exceeds the book value depreciation will be stopped

Depreciation is calculated on a straight line basis over the useful life of the asset as follows:

Building	40-50 years
Machinery and farming equipment	15-20 years
Office furniture and equipment	5-10 years
Motor vehicles and aircrafts	4-7 years
Computer equipment	3-5 years
Laboratory equipment	15-20 years
Land is not depreciated.	-

Gains and losses on disposal are included in the statement of financial performance and are determined by comparing net sales proceeds with carrying amount.

The assets' residual values, useful lives and methods of depreciation are reviewed and adjusted if appropriate at each financial year-end.

The carrying amount of property plant and equipment is derecognised on disposal or when no future economic benefits are expected from its use or disposal.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1.5 Impairment of non-financial assets

At each reporting date, the ARC reviews the carrying amounts of its tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where it is not possible to estimate the recoverable amount of an individual asset, the ARC estimates the recoverable amount of the cash-generating unit to which the asset belongs.

Recoverable amount is the higher of fair value less point of sale costs to sell and value in use. Fair value is determined by reference to the market. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

If the recoverable amount of an asset (or cash-generating unit) is estimated to be less than its carrying amount, the carrying amount of the asset (cash-generating unit) is reduced to its recoverable amount. An impairment loss is recognised immediately in Statement of Financial Performance.

Where an impairment loss subsequently reverses, the carrying amount of the asset (cash-generating unit) is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset (cash-generating unit) in prior years. A reversal of an impairment loss is recognised immediately in Statement of Financial Performance, unless the relevant asset is carried at a revalued amount, in which case the reversal of the impairment loss is treated as a revaluation increase.

1.6 Leases

Leases are classified as finance leases whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee. All other leases are classified as operating leases.

Assets held under finance leases are recognised as assets of the ARC at their fair value at the inception of the lease. The assets are capitalised if the minimum lease payments are 85% or more of the assets' fair value at inception of the lease. The corresponding liability to the lessor is included in the statement of financial position as a finance lease obligation.

Lease payments are apportioned between finance charges and reduction of the lease obligation so as to achieve a constant rate of interest on the remaining balance of the liability.

Finance charges are charged to surplus or deficit, unless they are directly attributable to qualifying assets, in which case they are capitalised in accordance with the ARC's general policy on borrowing costs (see below). Leased assets are depreciated over lesser of the useful life and the lease period.

Rentals payable under operating leases are charged to surplus or deficit on a straight-line basis over the term of the relevant lease. Benefits received and receivable as an incentive to enter into an operating lease are also spread on a straight-line basis over the lease term.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

The determination of whether an arrangement is, or contains a lease, is based on the substance of the arrangement at inception date of whether the fulfilment of the arrangement is dependent on the use of a specific asset or assets or the arrangement conveys a right to use the asset. The classification of the lease is determined using GRAP 13 (Leases).

1.7 Inventories

Consumable stores are valued at the lower of weighted average cost and current replacement cost. The total value of contracts in progress is included in inventory (refer note 6). Livestock is valued at the lower of cost or net realisable value. Cost of work in progress, finished goods and contracts in progress includes direct costs and an appropriate allocation of overheads based on normal production levels.

Farm produce resulting from research, is not accounted for as inventories and the income resulting from the sale of these products is brought to account in the year in which it is sold. Excess farm produce harvested for resale is treated as inventory and valued at fair value less estimated point of sale costs.

Vaccines for foot-and-mouth disease are not valued, as no markets normally exist for these vaccines. According to an agreement, strategic quantities must be provided to the government free of charge. If markets are obtained in future years, the income will be recognised in the year in which the inventory is realised.

Net realisable value represents the estimated selling price less all estimated costs of completion and costs to be incurred in marketing, selling and distribution.

1.8 Contracts

Contract work in progress is stated at cost plus surplus recognised to date, less a provision for foreseeable losses and less progress billings.

1.9 Revenue recognition

Revenue represents the grants from the Government as well as external earnings which comprise revenue from contracts' services rendered and excess produce sold.

1.9.1 Parliamentary grant

Parliamentary grants are recognised as revenue when it is probable that future economic benefits will flow to the public entity and these benefits can be measured reliably. The grants are recognised to the extent that there are no further obligations arising from the receipt of the grants.

1.9.2 Research revenue

When the outcome of research can be estimated reliably, research revenue and research costs associated with the research are recognised with reference to the stage of completion of the research at the reporting date. An expected loss on research is recognised in the statement of financial performance immediately.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

When the outcome of research cannot be estimated reliably, revenue is recognised only to the extent of research costs incurred for which it is probable the costs will be recovered. Research costs are recognised as expenses in the period they are incurred.

1.9.3 Excess farm produce revenue

Revenue is recognised when significant risks and rewards of ownership are transferred to the buyer, when costs can be measured reliably and when receipt of the future economic benefits is probable.

1.9.4 Investment income

Investment income comprise of interest income and is accrued on a time proportion basis, taking into account the principal outstanding and the effective interest rate over the period to maturity.

1.9.5 Dividends income

Dividends income comprise of dividends accrued. The dividends income is recognised when the shareholders right to receive income is established.

1.10 Provisions

Provisions are recognised when the ARC has a present legal or constructive obligation as a result of a past event, and it is probable that the ARC will be required to settle the obligation and the amount can be estimated reliably. Provisions are measured at the Council's best estimate of the expenditure required to settle the obligation at the reporting date, and are discounted to present value where the effect is material.

1.11 Cash and cash equivalents

For the purpose of the cash flow statement, cash and cash equivalents comprise cash on hand and deposits held on call with banks, all of which are available for use by the ARC. Cash equivalents comprise of highly liquid investment that are convertible to cash with insignificant risk of changes in value and with original maturities of less than three months.

1.12 Employee benefits

1.12.1 Short-term employee benefits

The cost of all short-term employee benefits is recognised during the period in which the employee renders the related service. The provisions for employee entitlements to wages, salaries, annual leave represent the amounts for which the ARC has a present obligation to pay as a result of employees' service provided to the reporting date. The provisions have been calculated at undiscounted amounts based on current wage and salary rates.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1.12.2 *Long-term employee benefits*

- Long service leave

The liability for employees' entitlements to long service leave represents the present value of the estimated future cash outflows resulting from employees' services provided to the reporting date. In determining the liability for employee benefits, consideration has been given to future increases in wage and salary rates, and ARC's experience with staff turnover.

- Retirement benefits

Pension fund

The ARC contributes to one defined benefit plan and two defined contribution plans. The contributions to the defined contributions plans are charged against income as incurred.

The projected unit credit method is used to determine the present value of the defined benefit obligations, the related current service cost and, where applicable, past service cost.

Actuarial gains and losses are recognised as income or expense when the net cumulative unrecognised actuarial gains and losses for each individual plan at the end of the previous reporting period exceeded 10% of the higher of the defined benefit obligation and the fair value of the plan assets at that date.

These gains and losses are recognised over the expected average remaining working lives of the employees participating in the plans.

Past service costs are recognised as an expense on a straight-line basis over the average period until the benefits become vested. To the extent that the benefits are already vested, past service costs are recognised immediately.

Post-retirement medical benefits

The ARC provides post-retirement medical benefits to qualifying employees. The expected costs of these benefits are determined using an accounting methodology similar to that for defined benefit pension plans, with actuarial valuations carried out every year. Contributions are made to the relevant funds over the expected service lives of the employees entitled to those funds. The estimated cost of providing such benefits is charged to the statement of financial performance on a systematic basis over the employees' working lives within the ARC.

Actuarial gains and losses are recognised as income or expense when the net cumulative unrecognised actuarial gains and losses for each individual plan at the end of the previous reporting period exceeded 10% of the higher of the defined benefit obligation and the fair value of the plan assets at that date.

The amount recognised in the statement of financial position represents the present value of the post-retirement medical aid contribution as adjusted for unrecognised actuarial gains and losses and reduced by the fair value of the plan assets. Any asset resulting from this calculation is limited to unrecognised actuarial losses and the present value of available refunds and reductions in future contribution plans.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

Gratuity benefits

Income tax payable on gratuities at retirement of employees who were members of the State Pension Fund, and became members of the ARC Pension Fund as a result of their transfer to the ARC, is charged to expenses. These costs are recognised over the service period of the employees entitled to those benefits. Costs are assessed in accordance with the advice of qualified actuaries.

1.13 Insurance reserve

In terms of the ARC policy to cover a portion of vehicle, non-vehicle, stated benefits and fire and allied perils insurance claims, a risk assessment is made annually in conjunction with the insurance brokers, in order to determine the extent of the self-insured amount to be credited to the reserve.

In determining the amount to be credited, the principle of maximum insurance cover at the lowest possible cost is applied.

The portion of claims borne by the ARC is accounted for against the reserve. Any shortfalls on the reserve are written off against accumulated surplus in the year in which it originated and any surplus is carried over to the following year.

1.14 Research and development

Research and development costs are recognised as an expense when incurred. In terms of ARC's mandate, development costs incurred during research and development are not capitalised as they do not satisfy the definition of an intangible asset as contemplated in GRAP 102 (Intangible Assets).

1.15 Financial instruments

Details of the significant accounting policies and methods adopted, including the criteria for recognition, the basis of measurement and the basis on which income and expenses are recognised, in respect of each class of financial asset. Trade date is the date which ARC commits to the purchase or sale. Financial liability and equity instrument are disclosed below:

Financial assets

Investments are recognised and derecognised on trade date where the purchase or sale of an investment is under a contract whose terms require delivery of the investment within the timeframe established by the market concerned, and are initially measured at fair value, plus transaction costs, except for those financial assets classified as at fair value through profit or loss, which are initially measured at fair value.

Financial assets are classified into the following specified categories: financial assets 'at fair value through profit or loss' (FVTPL), 'held-to-maturity' investments, 'available-for-sale' (AFS) financial assets and 'loans and receivables'. The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.15 Financial instruments (continued)

Effective interest method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts (including all fees on points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial asset, or, where appropriate, a shorter period. Income is recognised on an effective interest basis for debt instruments other than those financial assets designated as at FVTPL.

Financial assets at FVTPL

Financial assets are classified as at FVTPL where the financial asset is either held for trading or it is designated as at FVTPL.

A financial asset is classified as held for trading if:

- it has been acquired principally for the purpose of selling in the near future; or
- it is a part of an identified portfolio of financial instruments that the Entity manages together and has a recent actual pattern of short-term profit-taking; or
- it is a derivative that is not designated and effective as a hedging instrument.

A financial asset other than a financial asset held for trading may be designated as at FVTPL upon initial recognition if:

- such designation eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise; or
- the financial asset forms part of a entity of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the Entity's documented risk management or investment strategy, and information about the entitling is provided internally on that basis; or it forms part of a contract containing one or more embedded derivatives, and IAS 39 (AC 133) Financial Instruments: Recognition and Measurement permits the entire combined contract (asset or liability) to be designated as at FVTPL

Financial assets at FVTPL are stated at fair value, with any resultant surplus or deficit recognised in surplus or deficit. The net gain or deficit recognised in surplus or deficit incorporates any dividend or interest earned on the financial asset. Fair value is determined in the manner described in note 21.

Held-to-maturity investments

Bills of exchange and debentures with fixed or determinable payments and fixed maturity dates that the Entity has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are subsequently recorded at amortised cost using the effective interest method less any impairment, with revenue recognised on an effective yield basis.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.15 Financial instruments (continued)

Available-for-sale financial assets

Unlisted shares and listed redeemable notes held by the Entity that are traded in an active market are classified as being AFS and are stated at fair value. Fair value is determined in the manner described in note 21. Gains and deficit arising from changes in fair value are recognised directly in equity in the investments revaluation reserve with the exception of impairment deficit, interest calculated using the effective interest method and foreign exchange gains and deficit on monetary assets, which are recognised directly in surplus or deficit. Where the investment is disposed of or is determined to be impaired, the cumulative gain or deficit previously recognised in the investments revaluation reserve is included in surplus or deficit for the period.

Dividends on AFS equity instruments are recognised in surplus or deficit when the Entity's right to receive the dividends is established. The fair value of AFS monetary assets denominated in a foreign currency determined in that foreign currency and translated at the spot rate at the statement of financial position date. The change in fair value attributable to translation differences that result from a change in amortised cost of the asset is recognised in surplus or deficit, and other changes are recognised in equity.

Loans and receivables

Trade receivables, loans, and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as loans and receivables. Loans and receivables are subsequently measured at amortised cost using the effective interest method, less any impairment. Interest income is recognised by applying the effective interest rate, except for short-term receivables when the recognition of interest would be immaterial.

Impairment of financial assets

Financial assets, other than those at FVTPL and finance lease assets, are assessed for indicators of impairment at each balance sheet date. Financial assets are impaired where there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial asset, the estimated future cash flows of the investment have been impacted.

For unlisted shares classified as AFS, a significant or prolonged decline in the fair value of the security below its cost is considered to be objective evidence of impairment.

For all other financial assets, including redeemable notes classified as AFS and finance lease receivables, objective evidence of impairment could include:

- significant financial difficulty of the issuer or counterparty; or
- default or delinquency in interest or principal payments; or
- it becoming probable that the borrower will enter bankruptcy or financial re-organisation; or
- a significant or prolonged decline in an equity instrument below its cost.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.15 Financial instruments (continued)

For certain categories of financial asset, such as trade receivables, assets that are assessed not to be impaired individually are subsequently assessed for impairment on a collective basis. Objective evidence of impairment for a portfolio of receivables could include the Entity's past experience of collecting payments, an increase in the number of delayed payments in the portfolio past the average credit period of 60 days, as well as observable changes in national or local economic conditions that correlate with default on receivables.

For financial assets carried at amortised cost, the amount of the impairment is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest rate.

The carrying amount of the financial asset is reduced by the impairment loss directly for all financial assets with the exception of trade receivables, where the carrying amount is reduced through the use of provision for doubtful debts account. When a trade receivable is considered uncollectible, it is written off against the provision for doubtful debts account. Subsequent recoveries of amounts previously written off are recognised as income in the statement of financial performance. Changes in the carrying amount of the allowance account are recognised in surplus or deficit.

With the exception of AFS equity instruments, if, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed through surplus or deficit to the extent that the carrying amount of the investment at the date the impairment is reversed does not exceed what the amortised cost would have been had the impairment not been recognised.

In respect of AFS equity securities, impairment losses previously recognised through surplus or deficit are not reversed through surplus or deficit. Any increase in fair value subsequent to an impairment loss is recognised directly in equity.

Derecognition of financial assets

The Entity derecognises a financial asset only when the contractual rights to the cash flows from the asset expire; or it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity. If the Entity neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, the Entity recognises its retained interest in the asset and an associated liability for amounts it may have to pay. If the Entity retains substantially all the risks and rewards of ownership of a transferred financial asset, the Entity continues to recognise the financial asset and also recognises a collateralised borrowing for the proceeds received.

Financial liabilities

Financial liabilities are classified as either financial liabilities 'at FVTPL' or 'other financial liabilities'.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.15 Financial instruments (continued)

Financial liabilities at FVTPL

Financial liabilities are classified as at FVTPL where the financial liability is either held for trading or it is designated as at FVTPL. A financial liability is classified as held for trading if:

- it has been incurred principally for the purpose of repurchasing in the near future; or
- it is a part of an identified portfolio of financial instruments that the Entity manages together and has a recent actual pattern of short-term profit-taking; or
- it is a derivative that is not designated and effective as a hedging instrument.

A financial liability other than a financial liability held for trading may be designated as at FVTPL upon initial recognition if:

- such designation eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise; or
- the financial liability forms part of an entity of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the Entity's documented risk management or investment strategy, and information about the grouping is provided internally on that basis; or
- it forms part of a contract containing one or more embedded derivatives, and IAS 39 (AC 133) Financial Instruments: Recognition and Measurement permits the entire combined contract (asset or liability) to be designated as at FVTPL.

Financial liabilities at FVTPL are stated at fair value, with any resultant gain or loss recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest paid on the financial liability. Fair value is determined in the manner described in note 21.

Other financial liabilities

Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs. Other financial liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis. The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments through the expected life of the financial liability, or, where appropriate, a shorter period.

Derecognition of financial liabilities

The Entity derecognises financial liabilities when, and only when, the Entity's obligations are discharged, cancelled or they expire.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.16 Foreign currency

Transactions in foreign currencies are recorded at the rate of exchange ruling at transaction date. Monetary assets and liabilities denominated in foreign currencies are translated at the rate of exchange ruling at the reporting date. Gains and losses arising on translation are credited to or charged against income.

1.17 Borrowing costs

Borrowing costs directly attributable to the acquisition, construction or production of qualifying assets, which are assets that necessarily take a substantial period of time to get ready for their intended use or sale, are added to the cost of those assets, until such time as the assets are substantially ready for their intended use or sale.

To the extent that fixed rate borrowings are used to finance a qualifying asset and are hedged in an effective fair value hedge of interest rate risk, the capitalised borrowing costs reflect the hedged interest rate.

Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying assets is deducted from the borrowing costs eligible for capitalisation.

All other borrowing costs are recognised in the statement of financial performance in the period in which they are incurred.

1.18 Critical accounting policies with key management judgement

Certain of the critical accounting policies require the use of judgement in their application or require estimates of inherently uncertain matters. Although the accounting policies are in compliance with South African Statements of Generally Accepted Accounting Practice and Statements of Generally Recognised Accounting Practice (GRAP), a change in the facts and circumstances of the underlying transactions could significantly change the implication of the accounting policy and the resulting financial statement impact.

Listed below are those policies that the Council believe are critical and require the use of complex judgement in their application:

Post retirement medical benefits

The accounting for post retirement medical and end of service benefits requires the Council to make certain assumptions that have a significant impact on the expenses and liabilities that are recorded for these employment

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.18 Critical accounting policies with key management judgement (continued)

benefits. The expected long-term rates as recorded in note 13 are based on historical performances, current and long-term outlooks and the actuarial statistics compiled and updated by the actuarial industry on an ongoing basis.

Because of the typically long-term nature of the entity's obligations in its post employment benefit schemes, and the short term volatility of financial markets, the Council recognises any impact of a modification of such assumptions over the expected remaining active life of beneficiaries.

Plant and equipment

Residual values and estimated useful lives are assessed on an annual basis. The residual values of vehicles are estimated on published second hand vehicle values as well as trading history. The residual values of all other assets are estimated to be zero.

Currency

These annual financial statements are presented in South African Rands since that is the currency in which the majority of the institution's transactions are denominated.

The following are approximate rates in Rands at reporting date for selected currencies:

	2010	2009
Euro:	9.92	12.51
US Dollar:	7.37	8.93

Impairment of trade and other receivables

The impairment of trade and other receivables was based on a combination of specifically identified doubtful debtors and providing for older debtors.

Contract revenue

Contract revenue is recognised on the percentage of completion method. Completion percentages are estimates by the contract researchers and by scientific estimate as a percentage.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

1. ACCOUNTING POLICIES (continued)

1.19 Irregular, fruitless and wasteful expenditure

Irregular expenditure means expenditure incurred in contravention of, or not in accordance with, a requirement of any applicable legislation, including:

- The Public Finance Management Act 1999 (Act No 1 of 1999) as amended, or
- Any legislation providing for procurement procedures in Government.

Fruitless and wasteful expenditure means expenditure that was made in vain and could have been avoided had reasonable care been exercised.

All irregular, fruitless and wasteful expenditure is accounted for as expenditure in the statement of financial performance and where recovered, it is subsequently accounted for as income in the statement of financial performance.

1.20 Offset

Transactions are offset when such offsetting reflects the substance of the transaction or event. Where a legally enforceable right of offset exists for recognised financial assets and financial liabilities, and there is an intention to settle the liability and realise the asset simultaneously, or to settle on a net basis all related financial effects are offset.

1.21 Related Parties

The entity operates in an economic environment currently dominated by entities directly or indirectly owned by the South African Government. As a result of the constitutional independence of all three spheres of the South African Government, only parties within the national sphere of the South African Government will be considered to be related parties.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

	Notes	2010 R	Restated 2009 R
2. REVENUE			
2.1 Revenue			
Parliamentary grant	(2.2)	532 850 000	469 993 339
Non exchange		532 850 000	469 993 339
External earnings	(2.3)	292 524 155	255 722 488
Interest received		5 675 522	8 496 586
Dividends received		-	70 331
Accounts clean up	(27)	-	26 312 520
Exchange		298 199 677	290 601 925
Total revenue		831 049 677	760 595 264
2.2 Parliamentary grant			
Grant received during the financial year		512 850 000	491 121 053
Allocated portion of deferred capital/ revenue grant	11	20 000 000	(21 052 632)
Allocated to income received in advance		-	(75 082)
		532 850 000	469 993 339
2.3 External earnings			
Gross revenue		361 030 025	333 745 154
Less: Received in advance (note 10)		(68 505 870)	(78 022 666)
		292 524 155	255 722 488

The external earnings are generated from research projects performed on behalf of Government departments, industry partners and private customers.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

3. (DEFICIT)/SURPLUS FOR THE YEAR

Surplus for the year is arrived at after taking the following into account:

	2010	2009
	R	R
Other administrative expenses		
· Realised loss/(profit) on foreign exchange differences	230 324	256 018
· Auditors' remuneration	3 147 670	3 045 500
- Audit fees	3 063 670	2 968 500
- Travelling and accommodation expenses	84 000	77 000
· Councillors' emoluments (see note 19)	215 203	346 205
- For services as members	215 203	346 205
· Operating lease payments	15 427 162	14 997 411
- Land and buildings	1 410 021	1 525 148
- Vehicles and equipment	14 017 141	13 472 263
· Finance costs – suppliers	6 308	171 323
· Provision for stock obsolescence	189 278	-
· Movement in the provision for bad debts	3 388 428	5 005 139
· (Gains)/Loss on sale of property and equipment	12 196	(1 078 318)
Depreciation	17 794 186	14 253 105
Machinery and farming equipment	2 363 912	2 018 279
Office furniture and equipment	2 073 825	1 253 888
Motor vehicles and aircraft	2 426 650	1 378 614
Computer equipment	3 464 930	3 125 881
Laboratory equipment	7 464 869	6 476 443

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

4. CASH AND CASH EQUIVALENTS

	2010	2009
	R	R
Cash and cash equivalents comprise of:	73 457 347	34 966 404
Current account	18 749 983	19 326 160
Short-term bank deposits	54 707 364	15 640 244

5. RECEIVABLES

	79 962 446	63 869 431
Trade debtors	55 328 736	37 058 774
Other debtors	27 884 684	33 924 469
Provision for bad debts	(4 510 170)	(7 898 598)
Staff debtors	923 299	459 470
Deposits	335 897	325 316

Trade receivables are interest bearing and are generally on 30-60 days' terms. Trade receivables are stated at cost which approximates their fair value.

As at the end of the year, the trade receivables ageing was as follows:

Current	34 222 547	23 347 028
30 to 59 days	5 519 328	4 076 465
60 to 89 days	1 385 250	1 111 763
90 to 119 days	3 217 524	370 588
120 to 149 days	447 376	370 587
150+ days	10 536 711	7 782 343
Balance at the end of the year	55 328 736	37 058 774

Of the receivables balance at the end of the year, R 19,3 million is due from the largest customer. There are no other customers who represent more than 5% of the total balance of trade receivables.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

5. RECEIVABLES (continued)

As at 31 March 2010, receivables at nominal value of R 4 510 170 (2009 R 7 898 598) were impaired and provided for. Receivables that have passed due and not impaired represent slow paying clients. Movement in the provision for impairment of receivables were as follows:

	2010	2009
	R	R
Balance at the beginning of the year	7 898 598	12 903 737
Raised during the year	-	630 170
Utilised during the year	(3 388 428)	(5 635 309)
Balance at the end of the year	4 510 170	7 898 598

The receivable's impairment was estimated based on irrecoverable amounts and reference to the past default.

The concentration of credit risk is limited due to customer base being large and unrelated. Accordingly council members believe that there is no further credit provision required in excess of the current allowance for doubtful debts.

6. INVENTORIES

	13 328 747	18 075 466
Consumable stores	9 078 530	9 093 560
Livestock	900 413	827 676
Work-in-progress	91 797	515 060
Finished goods	3 258 007	7 639 170

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

7. INVESTMENTS (Held through profit and loss)

	2010 R	2009 R
Listed investments shares		
KWV Group Limited		
510 410 (2009: 510 410) Shares of R0.000025 each		
Market value: R 3.80 (2009: R4.00 per share)	-	1 939 558
Capevin (KWV unbundling)		
502634 shares Market price R 3.35	1 683 824	-
KWV Holdings LTD (KWV unbundling)		
2054 shares Market price R10.25	21 054	-
 Unlisted investments shares		
De Dooms Winery 9880 Shares at R 0.55 each (2009, 2 470 shares at R 1.00 each)	5 434	5 434
 Lutzville 1999 Co-operative Limited		
107 000 Shares of R0.01 each (2009 107 000)	1 070	1 070
 Lutzville Vineyard Co-operative		
44 867 (2009: 44 867) Shares of R1.00 each	44 867	44 867
 Lutzville Vineyard Co-operative		
1 070 000 (2009: 1 070 000) Shares of R0.01 each	10 700	10 700
 Karino Citrus Co-operative Limited		
7 414 (2009: 14 428) Shares of R1.00 each	7 414	7 414
 Hex Valley Coolrooms		
16 092 (2009: 16 092) Shares of R0.50 each	8 046	8 046
 Mcgregor Co-operative Limited		
152 320 (2009: 152 320 of R0.10) Shares of R1.00 each	152 320	152 320
 Lanko Co-operative Limited		
21 063 (2009: 21 063) Shares of R1.00 each	21 063	21 063
 Burpak Limited 1 948 (2009: 1 948) Shares of R1.00 each	1 948	1 948
 Kango Co-operative Limited 3 755 (2009: 3755) shares of R 0.20 each	751	751
 Members levy fund		
Lutzville Vineyard Co-operative	22 112	20 474
Mcgregor Co-operative society	16 606	-
Lanko Co-operative Limited	9 827	11 790
Karino Citrus Co-operative Limited	3 596	10 975
 Total Investments	2 010 632	2 236 410

The Council is of the opinion that the unlisted investments approximate their fair values.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

8. PROPERTY AND EQUIPMENT

31 March 2010

RESTATED

Carrying amount:

	Land R	Building R	Machinery & Farming Equipment R	Office Furniture & Equipment R	Motor Vehicles and Air craft R	Computer Equipment R	Laboratory Equipment R	Total R
Opening balance	121 225 726	350 799 962	38 399 015	10 226 078	10 193 614	13 011 492	105 461 594	649 317 480
Cost	121 225 726	444 903 640	52 296 029	29 862 431	32 981 164	56 779 270	151 037 956	889 086 216
Accumulated depreciation	-	(94 103 678)	(13 897 014)	(19 636 353)	(22 787 550)	(43 767 778)	(45 576 362)	(239 768 736)
Additions at cost	-	9 019 054	2 681 871	758 713	27 068	1 202 819	4 031 066	17 720 590
Disposals at carrying amount	-	-	(1 022)	(102)	(15)	(9 697)	(103 749)	(114 585)
Depreciation for the year	-	-	(2 363 912)	(2 073 825)	(2 426 650)	(3 464 930)	(7 464 869)	(17 794 186)
Carrying amount:								
Closing balance	121 225 726	359 819 016	38 715 952	8 910 864	7 794 017	10 739 683	101 924 042	649 129 300
Cost	121 225 726	453 922 706	55 017 768	31 404 287	32 841 494	64 638 055	155 720 734	914 770 771
Accumulated depreciation	-	(94 103 690)	(16 301 816)	(22 493 424)	(25 047 477)	(53 898 372)	(53 796 692)	(265 641 471)
Useful life		40-50 yrs	15 -20 yrs	5-10 yrs	4-7 yrs	3-5 yrs	15 -20 yrs	

Details of land and buildings are contained in a register and are available for inspection at the central office of the ARC.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

31 March 2009	Restated Land R	Restated Building R	Restated Machinery & Farming Equipment R	Restated Office Furniture & Equipment R	Restated Motor Vehicles and Air Craft R	Restated Computer Equipment R	Restated Laboratory Equipment R	Restated Total R
Carrying amount:								
Opening balance	121 225 726	328 198 437	33 335 708	9 554 668	10 101 304	13 340 358	86 491 350	602 247 549
Cost	121 225 726	422 302 115	45 602 593	32 708 533	33 364 347	56 203 587	126 794 800	838 201 700
Accumulated depreciation	-	(94 103 678)	(12 266 886)	(23 153 865)	(23 263 043)	(42 863 229)	(40 303 450)	(235 954 152)
Additions at cost	-	22 601 526	7 365 840	2 033 337	1 481 503	2 895 303	25 722 522	62 100 031
Disposals at carrying amount	-	-	(284 253)	(108 039)	(10 579)	(98 288)	(275 835)	(776 994)
Depreciation for the year	-	-	(2 018 279)	(1 253 888)	(1 378 614)	(3 125 881)	(6 476 443)	(14 253 105)
Carrying amount:								
Closing balance	121 225 726	350 799 963	38 399 015	10 226 078	10 193 614	13 011 492	105 461 594	649 317 480
Cost	121 225 726	444 903 640	52 296 029	29 862 431	32 981 164	56 779 270	151 037 956	889 086 216
Accumulated depreciation	-	(94 103 678)	(13 897 014)	(19 636 353)	(22 787 550)	(43 767 778)	(45 576 362)	(239 768 736)
Useful life		40-50 yrs	15 -20 yrs	5-10 yrs	4-7 yrs	3-5 yrs	15 -20 yrs	

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

9. IMPAIRMENT OF PROPERTY AND EQUIPMENT

9.1 Land and buildings

The majority of fixed properties were valued by independent valuers in the 2006/7 financial year. The land and buildings were fair valued at R1 036 005 000. The carrying amount of assets was reviewed at reporting date and no indication of impairment existed.

9.2 Equipment

The moveable assets of the ARC are depreciated over conservative estimates of useful life. No circumstances exist to indicate the impairment of the moveable assets.

10. PAYABLES

	2010	Restated
	R	2009
		R
	128 201 813	130 581 808
Trade payables	16 879 853	22 234 096
Sundry payables and accruals	35 415 273	25 532 049
Income received in advance	68 505 870	78 022 666
South African Revenue Services - Value Added Tax	7 400 817	4 792 997

Trade payables are non-interest bearing and are normally settled on 30 days. The interest is charged when the amount becomes overdue.

The entity's financial risk and management policies ensure that payables are paid within the credit timeframe.

Due to the short-term nature of the payables, management believes that the carrying amount approximate the carrying value.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

11. DEFERRED INCOME: REVENUE GRANT

Government grants received in the current year that will be recognised in future accounting periods.

	2010	Restated
	R	2009
		R
Balance at the beginning of the year	63 473 943	56 200 403
Received	-	21 052 632
Less: Allocated to statement of financial performance	(20 000 000)	-
Accounts clean up (Note 27)	-	(6 904 940)
Correction to income received in advance and other payable (Note 27)	-	(6 874 152)
Balance at the end of the year	43 473 943	63 473 943
Non-current portion	43 473 943	63 473 943

This grant relates to construction of the Exotic Disease and Wild Suide facilities.

12. LEAVE ACCRUAL AND BONUS PROVISION

	2010	2009
	R	R
12.1 LEAVE ACCRUAL		
Balance at the beginning of the year	44 075 511	37 310 245
Raised	10 285 649	10 721 229
Utilised	(4 776 099)	(3 955 963)
Balance at the end of the year	49 585 061	44 075 511

The leave pay obligation is the balance of employee leave days outstanding at year-end, reflected as a Rand value. The amounts are based on total cost of employment and leave days due.

12.2 BONUS PROVISION

Balance at the beginning of the year	-	-
Raised	10 000 000	-
Utilised	-	-
Balance at the end of the year	10 000 000	-

Bonus provision is amount that is payable to ARC staff members.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

13. EMPLOYEE BENEFITS

13.1 Retirement Funds

The ARC has made provision for pension and provident schemes covering substantially all employees. At the end of the financial year the following funds were in existence:

- ARC Pension fund (Categories A, B & C), operating as a defined benefit fund
- ARC Pension fund (Category D), operating as a defined contribution fund
- ARC Provident fund, operating as a defined contribution fund

The defined benefit fund covers 1.8%(2009: 1.50%) of the employees whilst 98.2 % (2009 98.5%) are covered by the two defined contribution funds.

Members pay a contribution of 7.5%. The employer's contribution of 16% is expensed when incurred. All funds are governed by the South African Pension Fund Act No. 24 of 1956.

13.2 Defined Benefit Fund

The defined benefit fund is actuarially valued at least every three years on the projected unit credit method. A statutory valuation was performed on 31 MARCH 2010. No material transactions or other material changes in circumstances have occurred since the valuation date necessitating additional bridging valuations.

Membership of the fund at 31 March and employer contributions for the year were as follows:

	Working members		Employer contributions	
	2010	2009	2010 R	2009 R
ARC Pension Fund (Options A to C)	23	45	404 595	541 000

Employer contribution for the next financial year are estimated at R 300 000. Estimates were made by the actuary based on the actuarial valuation as at 31 March 2010. Principal actuarial assumptions (expressed at weighted averages) were as follows:

	2010 %	2009 %
Pre-retirement discount rate	9.00	8.50
Post-retirement discount rate	5.50	5.75
Expected real after-tax return on fund's assets	8.00	9.00
Future general and merit salary increases	6.75	6.25
Expected rate of return on assets	9.22	9.00

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

13. EMPLOYEE BENEFITS (continued)

13.2 Defined Benefit Fund (continued)

ARC has a benefit pension plan, covering insignificant number of its employees, which require contributions to be made to an administered fund.

The following table summarises the components of the benefit expense recognised

	2010	2009
	R	R
Current service cost	(827 000)	(954 000)
Interest on the benefit obligation	(2 250 000)	(2 349 000)
Expected return on plan assets	3 209 000	4 830 000
Net benefit gain	132 000	1 527 000

Benefit asset/ (liability)

	2010	2009
	R	R
Defined obligation	(20 368 000)	(24 080 000)
Fair value of plan assets	33 825 000	39 774 000
	13 457 000	15 694 000
Unrecognised asset	(13 457 000)	(15 694 000)
Benefit asset/(liability)	-	-

The pension plan assets consist primarily of equity, interest-bearing stock, cash deposits and overseas financial assets.

Changes in the defined benefit obligation

Benefit obligation at beginning of the year	24 080 000	26 625 000
Service cost	827 000	954 000
Members contributions	209 000	246 000
Interest cost	2 250 000	2 349 000
Actuarial gain	7 509 000	(388 000)
Benefits paid	(14 393 000)	(5 542 000)
Risk premiums	(114 000)	(164 000)
Benefit obligation at end of the year	20 368 000	24 080 000

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

13. EMPLOYEE BENEFITS (continued)

13.2 Defined Benefit Fund (continued)

	2009	2008	2007	2006
Benefit obligation	(24 080 000)	(26 625 000)	(25 581 000)	(25 663 000)
Fair value - benefit asset	39 774 000	53 332 000	49 922 000	38 796 000
Unrecognised surplus	15 694 000	26 707 000	24 341 000	13 133 000

13.3 Defined contribution Funds

Membership of the fund at 31 March and employer contributions for the year were as follows:

	Working members		Employer contributions	
	2010	2009	2010 R	2009 R
ARC Pension Fund (Option D)	1236	1343	26 496 645	28 570 981
ARC Provident Fund	603	579	5 543 732	5 024 219

Due to the nature of these funds the accrued liabilities by definition equate the total assets under these funds.

Management estimated that ARC will contribute R 27 821 477 to option D pension fund and R 5 820 917 for the provident fund.

13.4 Post-retirement medical benefits

This includes current and past employees of ARC who are currently members of the medical aid fund. Membership to the fund is voluntary.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

13. EMPLOYEE BENEFITS (continued)

13.4 Post-retirement medical benefits (continued)

The Council attempted to restructure the defined medical aid scheme, in terms of which the ARC had obligations to provide certain post-medical aid benefits to ARC pensioners in terms of ARC service conditions, by renegotiating the benefit structuring from a medical subsidy to a guaranteed income (pension). This restructuring was not completed and the defined benefit obligation remained. ARC currently has no continuation members with effect from 1 April 2004.

The scheme is actuarially valued on an annual basis. The effective date of the most recent actuarial valuation was 31 March 2010. At that date, in the opinion of the actuary, the defined benefit plan was found to be in a sound financial position. The projected unit credit method has been used for purposes of determining the actuarial valuation.

The following table summarises the components of the net benefit expense recognised in the statement of financial performance and amounts recognised in the statement of financial position at 31 March 2010.

	2009	2008	2007	2006
Benefit obligation	(28 796 000)	(27 451 000)	(30 345 000)	(31 999 222)
Fair value - benefit asset	-	-	-	-
(Deficit recognised)	(28 796 000)	(27 451 000)	(30 345 000)	(31 999 222)

The principal assumptions in determining the post-retirement medical aid liability are as shown:

The amount included in the statement of financial position arising from the ARC's obligation in respect of post-retirement medical benefits is as follows:

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

13. EMPLOYEE BENEFITS (continued)

13.4 Post-retirement medical benefits (continued)

	2010	2009
	R	R
Present value of obligations	27 173 000	28 796 000
Fair value of plan assets	-	-
Post-retirement benefit obligation	27 173 000	28 796 000
Net discount rate applied	9.25%	9.00%
Membership of the fund at 31 March	643	696
Amounts recognised in respect of the scheme are as follows:		
Transfer of liability	-	-
Current service cost	936 000	990 000
Interest cost	2 216 000	2 212 000
Annual expense / (gain)	3 152 000	3 202 000
Changes in the benefit obligation		
Opening balance	28 796 000	27 451 000
Service cost	936 000	990 000
Interest cost	2 216 000	2 212 000
Expected benefit settlements	(8 537 000)	(8 337 000)
Adjustment to benefit settlement	4 969 000	6 155 000
Interest adjustment to benefit settlement	447 000	585 000
Expected liability as at 31 March 2009/10	28 827 000	29 056 000
Real interest rate change	(710 000)	1 467 000
Change in mortality assumptions	364 000	-
Unexpected changes in membership	(1 065 000)	(1 581 000)
Miscellaneous items	(243 000)	(146 000)
Closing balance	27 173 000	28 796 000

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

14. CAPITAL FUND

The capital fund represents the cost of land transferred to the ARC by Government. (Also refer note 1.3).

15. ACCUMULATED SURPLUSES

In terms of the Agricultural Research Act, 1990 (Act No. 86 of 1990) as amended, this reserve may be utilised, only with the prior approval of the Minister for Agriculture and Land Affairs in concurrence with the Minister of Finance. This reserve is not substantiated by cash reserves, which makes it inaccessible to the ARC.

16. OPERATING LEASE COMMITMENTS

The ARC leases certain of its equipment in terms of operating leases. The ARC does not have the option to acquire the assets at the termination on the lease. There are no escalation or renewal terms clauses or restrictions imposed by the leases. The ARC is not charged any contingent rentals.

The future minimum lease payments under non-cancellable operating leases are as follows:

2010

	Up to 1 year	1 to 2 yrs	2 to 5 yrs	Total
Commitment	11 168 788	5 889 177	288 458	17 346 423

2009

	Up to 1 year	1 to 2 yrs	2 to 5 yrs	Total
Commitment	5 581 714	3 258 439	1 298 702	10 138 854

17. CONTINGENT LIABILITIES

There are contingent liabilities in respect of

- Guarantees on municipal and electricity accounts
- Pending labour dispute
- Surplus generated from commercial activities
- Litigation

	2010	2009
	R	R
	1 075 360	968 360
	1 073 011	461 000
	58 269 313	-
	760 248	870 218
	61 177 932	2 299 578

The guarantee on municipal and electrical accounts relate to the City of Tshwane municipality to ensure a continued service to the ARC- Onderstepoort Veterinary Institute. The timing of these contingent liabilities is not known and ARC does not expect any reimbursement of the contingent liabilities

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

18. COMMITMENTS

	2010	2009
	R	R
18.1 CAPITAL COMMITMENTS		
Biosystematics building	2 351 688	6 158 847
Water distillation	-	120 454
	<u>2 351 688</u>	<u>6 279 301</u>

The ARC received a grant from the Department of Science and Technology which was ring-fenced for use to relocate national assets to a more suitable environment. The procurement process has been finalised and commitments have been made.

At year end ARC had placed an order for water distillation to be used.

18.2 OTHER COMMITMENTS

HP	-	17 956 975
Photocopiers	-	995 027
	<u>-</u>	<u>18 952 002</u>

Other commitments are made of operating commitments signed after year-end.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

19. REMUNERATION FOR THE YEAR

Council Members: 1 April 2009 to 31 March 2010

Designation

	Fees	Subsistence & Travel	Total Cost
	R	R	R
Ms. J Davidson (Chairperson) (1 Sep 06 - 30 Nov 09)	85 568	1 023	86 591
Ms A Geldenhuys (1 Sep 06 - 30 Nov 09)	6 333	4 146	10 479
Mr J H Mc Bain (1 Sep 06 - 30 Nov 09)	42 732	584	43 316
Prof P M Kuzwayo (1 Sep 06 - 30 Nov 09)	14 777	1 968	16 745
Ms A D Young (1 Sep 06 - 30 Nov 09)	6 333	1 518	7 851
Dr M Madikizela (1 Sep 06 - 30 Nov 09)	10 555	993	11 548
Dr M S Liphadzi (1 Sep 06 - 30 Nov 09)	2 111	93	2 204
Ms I Wilken (1 Sep 06 - 30 Nov 09)	4 222	58	4 280
Prof M M Sibara (1 Sep 06 - 30 Nov 09)	16 888	445	17 333
Prof M J Kahn (1 Sep 06 - 30 Nov 09)	12 666	2 189	14 855
Mr N.R Mlonzi (1 Sep 06 - 30 Nov 09)	-	-	-
Ms M Pyoos (1 Sep 06 - 30 Nov 09)	-	-	-
Dr M Visser (03 Nov 2008 - 30 Nov 2009)	-	-	-
	202 185	13 017	215 202
Audit Committee			
Ms K K Moloto	24 622	117	24 739
Mr R Wesseloo (Chairperson)	33 055	1 372	34 427
Ms M Claassens	9 467	321	9 788
Mr V K Naicker	26 422	233	26 655
	295 751	15 060	310 811

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

19. REMUNERATION FOR THE YEAR (continued)

Council Members: 1 April 2008 to 31 March 2009

Designation	Fees	Subsistence & Travel	Total Cost
	R	R	R
Ms. J Davidson (Chairperson)	114 905	6 124	121 029
Ms A Geldenhuys	12 266	6 544	18 810
Mr J H Mc Bain	46 174	1 317	47 491
Prof P M Kuzwayo	16 754	1 707	18 461
Ms A D Young	27 176	9 561	36 737
Dr M Madikizela	16 888	2 376	19 264
Dr M S Liphadzi	16 888	695	17 583
Ms I Wilken	10 555	125	10 680
Prof M M Sibara	29 287	-	29 287
Prof M J Kahn	10 555	3 264	13 819
Mr N.R Mlonzi	12 694	350	13 044
Dr E M Chabula (01 Sep 06 – 30 Apr 08)	-	-	-
Ms M Pyoos	-	-	-
Dr M Visser (Appointed 03 Nov 2008)	-	-	-
	314 142	32 063	346 205
Audit Committee			
Ms K K Moloto	8 310	421	8 731
Mr R Wesseloo (Chairperson)	12 532	716	13 248
Ms M Claassens	6 066	1 133	7 199
Mr V K Naicker	6 199	642	6 841
	347 249	34 975	382 224

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

19. REMUNERATION FOR THE YEAR (continued)

Executive Managers: 1 April 2009 to 31 March 2010

Designation	Salaries R	Pension R	Subsistence & Travel R	Total Package R
Dr S R Moephuli (President and CEO)	1 638 485	89 250		1 727 735
Mr M T Netsianda	1 101 978	63 079	5 420	1 170 477
Mr G M Maluleke	1 122 204	50 461	-	1 172 665
Ms A Canca	899 936	54 648	2 639	957 223
Prof M Jeenah	1 539 225	45 540	19 627	1 604 392
	6 301 828	302 978	27 686	6 632 492

Executive Managers: 1 April 2008 to 31 March 2009

Designation	Salaries R	Leave Payments R	Subsistence & Travel R	Bonus R	Total Package R
Dr S R Moephuli (President and CEO)	1 700 000	-	5 378	315 000	2 020 378
Dr P Lukhele-Olorunju (01 July 02 - 31 Mar 08)	155 000	322 934	-	-	477 934
Dr S Masia (01 Aug 02 - 31 Jul 08)	430 955	85 424	-	-	516 379
Ms S Ginindza (Mthembu) (01 May 03 - 31 May 2008)	271 042	78 970	-	-	350 012
Mr M T Netsianda	1 108 050	-	11 977	126 342	1 246 369
Mr G M Maluleke	1 108 050	-	1 250	-	1 109 300
Ms A Canca (Appointed 01 Apr 08)	900 000	-	7 030	-	907 030
Prof M Jeenah (Appointed 01 Feb 09)	250 000	-	-	-	250 000
	5 923 097	487 328	25 635	441 342	6 877 402

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

20. NOTES TO THE CASH FLOW STATEMENT

a) Cash and cash equivalents

Cash and cash equivalents consist of cash on hand and balance with banks and investments in money market instruments. Cash and cash equivalents included in the cash flow statement comprise the following statement of amounts indicating financial position:

	2010	2009
	R	R
Current account	18 749 983	19 326 160
Short-term bank deposits	54 707 364	15 640 244
	<u>73 457 347</u>	<u>34 966 404</u>

b) Reconciliation of net cash flows from operating activities to surplus

	2010	Restated
	R	2009
	R	R
(Deficit)/Surplus	58 269 313	(16 082 420)
Non-cash movements:		
Depreciation	17 794 186	14 253 105
Change in working capital		
(Decrease)/Increase in provision for bad debts	(3 388 428)	(5 005 139)
(Decrease)/Increase in payables	(2 379 995)	5 947 450
Increase in bonus provision	10 000 000	
Loss/(Gain) on sale of property and equipment	12 196	(1 078 318)
Decrease/(Increase) in inventories	4 746 719	(3 640 256)
Increase/(Decrease) in leave pay accrual	5 509 550	6 765 266
(Increase)/Decrease in receivables	(12 704 586)	21 461 325
Other movements		
(Decrease)/Increase in deferred income revenue	(20 000 000)	12 150 991
Decrease/(Increase) in investments due to fair valuation	225 778	(8 952)
Decrease/(Increase) in provisions relating to employee costs	(1 623 000)	1 345 000
Insurance aggregate	(352 586)	
Net cash flows from operating activities	56 109 147	36 108 052

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

20. NOTES TO THE CASH FLOW STATEMENT (continued)

c) Sale of goods and services

	2010	Restated
	R	2009
		R
Gross external earnings (note 2.3)	361 030 025	338 622 605
Received in advance – prior year (note 10)	(78 022 666)	(73 583 775)
Trade and other debtors– current year (note 5)	(83 213 420)	(70 983 243)
Trade and other debtors – prior year (note 5)	70 983 243	91 316 091
Sale of goods and services	270 777 182	280 494 227

21. FINANCIAL INSTRUMENTS

21.1 Category of financial instruments and maturity profile

2010

Assets	Notes	0-1 Years	>1 year	Total
		R	R	R
At fair value through profit or loss:				
Investments	7	-	2 010 632	2 010 632
Loans and receivables:				
Cash and cash equivalents	4	73 457 347	-	73 457 347
Trade and other receivables	5	79 962 448	-	79 962 446
Liabilities				
At amortised cost:				
Payables	10	(59 695 943)	-	(59 695 943)
Leave accrual	12.1	(49 585 061)	-	(49 585 061)
		44 138 788	2 010 632	46 149 420
Percentage profile (%)		95.64%	4.36%	100.00%

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

21. FINANCIAL INSTRUMENTS (continued)

21.1 Category of financial instruments and maturity profile (continued)

2009		0-1 Years	>1 year	Total
Assets	Notes	R	R	R
At fair value through profit or loss				
Investments	7	-	2 236 410	2 236 410
Loans and receivables:				
Cash and cash equivalents	4	34 966 404	-	34 966 404
Trade and other receivables	5	63 869 431	-	63 869 431
Liabilities				
At amortised cost:				
Payables	10	(52 559 142)	-	(52 559 142)
Leave accrual	12.1	(44 075 511)	-	(44 075 511)
		2 201 182	2 236 410	4 437 592
Percentage profile (%)		49.60%	50.40%	100.00%

21.2 Capital risk management

As the ARC is not exposed to debt, there is no meaningful debt to equity ratios such as gearing ratios to be disclosed.

21.3 Financial risk management objectives

The Council members monitor and manage the financial risks relating to the operations of the entity through internal risk reports which analyse exposures by degree and magnitude of risks. These risks include market risk (including currency risk, fair value interest rate risk and price risk), credit risk, liquidity risk and cash flow interest rate risk.

Compliance with policies and exposure limits is reviewed by the internal auditors on a continuous basis. The entity does not enter into or trade financial instruments, including derivative financial instruments, for speculative purposes.

21.4 Market risk

The entities activities are of such a nature that it does materially not expose the ARC to financial risks of changes in foreign currency exchange rates and interest rates as referred to below. Market risk exposures are closely monitored by the Council members. Market risk arises on international trade.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

21. FINANCIAL INSTRUMENTS (continued)

21.4 Market risk (continued)

There has been no change to the entity's exposure to market risks or the manner in which it manages and measures the risk. The market risk is managed by not taking any volatile instruments as the ARC activities do not materially expose ARC to market risk.

21.5 Foreign currency risk management

The ARC incurs currency risk as a result of purchases and sales in foreign currencies, hence exposure to exchange rate fluctuations arise. The currencies in which the Council primarily deals are US Dollars and Euro's. No forward cover is taken out for these transactions. The Council members consider the foreign currency risk to be insignificant.

21.6 Interest rate risk management

ARC is exposed to interest rate risk as it places funds at both fixed and floating interest rates. The risk is managed through the fact that the surplus funds are invested at fixed and floating interest rates with reputable banks.

The following demonstrates the sensitivity to a reasonable change in interest rates, with all being constant and the impact on net surplus:

	2010	2009
	R	R
South African Rand (ZAR):		
Increase by 50 base points	367 287	174 832
Decrease by 50 base points	(367 287)	(174 832)

The following table identifies the period until those financial instruments that are sensitive to interest rate risk reprice. ARC surplus funds are invested in terms of its investments policy as approved by its Council:

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

21. FINANCIAL INSTRUMENTS (continued)

21.6 Interest rate risk management (continued)

	Effective interest rate as at 31 MARCH 2010	6 months or less R	Total R
2010			
Current cash balances	6.00%	18 749 983	18 749 983
Short-term cash deposits	8.00%	54 707 364	54 707 364
		73 457 347	73 457 347
2009			
Current cash balances	7.27%	19 326 160	19 326 160
Short-term cash deposits	10.00%	15 640 244	15 640 244
		34 966 404	34 966 404

21.7 Other price risks

ARC is exposed to price risk on its purchases. Prices for future purchases and sales of goods and services generally established on normal commercial terms direct with suppliers and customers. The risk is managed by the application of procurement policy that encourages obtaining goods and services at best prices. The Council members consider the price risk to be insignificant.

21.8 Credit risk management

Credit risk refers to the risk that counterparty would default on its contractual obligations resulting in financial loss to the entity. The entity has adopted a policy of only dealing with creditworthy counterparties and obtaining sufficient collateral, where appropriate, as a means of mitigating the risk of financial loss from defaults.

Trade receivables consist of a large number of customers. Ongoing credit evaluation is performed on the financial condition of accounts receivable. Included in accounts receivable is an amount of R28 million (2009: R34 million) as a result of revenue recognition on the percentage of completion of contracts. These amounts will only be invoiced to the customers within the next 12 months based on the contract terms.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

21. FINANCIAL INSTRUMENTS (continued)

21.8 Credit risk management (continued)

Financial assets which potentially subject the ARC to concentrations of credit risk consist principally of cash short-term deposits placed with high credit quality financial institutions. Trade receivables are presented net of an allowance for doubtful receivables. Currently, only two of the entity's largest debtors exceed 5% of the total trade receivables balance as disclosed in note 5. The ARC does not have any significant exposure to any other individual customer or counter party.

The carrying amounts of financial assets included in the statement of financial position represent the ARC's maximum exposure to credit risk in relation to these assets.

ARC does not hold collateral or any credit enhancements to cover its credit risk.

21.9 Liquidity risk management

Liquidity risk refers to the risk that an entity will encounter difficulty in meeting obligations associated with financial liabilities. The Council members are satisfied that the entity will be able to settle their financial liabilities (payables and leave pay accrual) in the normal course of business. Liquidity risk is managed by cash forecasting.

21.10 Fair value of financial instruments

The fair value of financial assets and financial liabilities are determined as follows:

- the fair value of financial assets and financial liabilities with standard terms and conditions and traded on active liquid markets is determined with reference to quoted market prices; and
- the fair value of other financial assets and financial liabilities (excluding derivative instruments) is determined in accordance with generally accepted pricing models based on discounted cash flow analysis using prices from observable current market transactions and dealer quotes for similar instruments.

The Council members consider that the carrying amounts of financial assets and financial liabilities recorded at amortised cost in the financial statements approximate their fair values.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

22. RELATED PARTIES

During the year the entity in the ordinary course of business entered into various transactions with related parties. Transactions entered into and balances outstanding between these parties are as follows:

2010

Name of entity	Nature of transaction	R
Transactions		
Eskom	Electricity payments	7 534 013
Telkom SA Limited	Telephone payments	6 372 266
Unemployment insurance fund	UIF payments	5 397 516
South African Revenue Services	PAYE and SDL payments	65 577 631
South African Revenue Services	VAT	69 335 402
Department of Science and Technology	Parliamentary Grant	47 936 449
Department of Agriculture	Parliamentary Grant	512 893 860
Balances		
Eskom	Electricity accrual	(341 417)
Telkom SA Limited	Telephone accrual	(57 405)
South African Revenue Services	PAYE and SDL accrual	(5 171 191)
Department of Agriculture	Research services	19 328 691
Unemployment insurance fund	UIF accrual	(440 031)
South African Revenue Services	VAT	7 400 817

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

22. RELATED PARTIES (continued)

2009

Name of entity	Nature of transaction	R
Transactions		
Eskom	Electricity payments	4 081 043
Telkom SA Limited	Telephone payments	7 347 636
Unemployment insurance fund	UIF payments	5 378 485
South African Revenue Services	PAYE and SDL payments	66 094 938
South African Revenue Services	VAT	61 450 156
Department of Science and Technology	Parliamentary Grant	45 322 000
Department of Science and Technology	Other Revenue Grants	3 626 968
Department of Agriculture	Parliamentary Grant	514 556 000
Department of Agriculture	Other Revenue Grants	12 555 014
Balances		
Eskom	Electricity accrual	(268 380)
Telkom SA Limited	Telephone accrual	(642 115)
South African Revenue Services	Value added tax accrued	(4 792 997)
Department of Agriculture	Research services	2 240 796

The balances are payable and collectable within 30 days.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

23 IRREGULAR, FRUITLESS AND WASTEFUL EXPENDITURE

23.1 Irregular expenditure

	2010	2009
	R	R
Irregular expenditure-Goods and service	3 210 588	9 208 347
Condoned	-	(8 933 729)
Condoned – disciplinary action in progress	-	(274 618)
	3 210 588	-

Goods and services

The irregular expenditures relating to goods and services were incurred in 2009 and 2010 as a result of a ARC's personnel's non compliance to procurement policies and Public Finance Management Act 1 of 1999 (as amended by Act 29 Of 1999).

2009

Management has investigated the 2009 irregular procurement of goods and service and taken necessary actions i.e. apply for ratification, take disciplinary action and or recover from the employees.

From the investigation of 2009 irregular expenses, R8 933 729 were condoned without disciplinary action as none of the staff members was at fault. The R 274 618 was condoned and disciplinary action is in progress.

2010

Of the R 3 210 588 (2010) irregular expenses, R 1 017 509 relate to the expenses not covered in the procurement policy. The policy has subsequently being amended to cover such expenses. The other expenses are being investigated and management will take necessary actions i.e. apply for ratification, take disciplinary action and or recover from the employees.

24. TAXATION

ARC is exempt from income tax in terms of section 10(1) (a) of the Income Tax Act no.58 of 1962.

25. EVENTS AFTER THE BALANCE SHEET DATE

The Council members are not aware of any significant matters or circumstances arising since the end of the financial year.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

26. RESTATEMENT

There was a GRAP 17 (Property plant and equipment) application error in previous financial years. The annual useful life review required by the standard was performed incorrectly. This resulted in the depreciation understatement in the previous financial years. The financial statements of 2007 and 2008 have been restated to correct the error.

The effect of the restatement on the 2009 financial statements is summarised below.

	Rand
Effect on the financial position	
2006/2007 financial year	
GRAP 17 error	
Decrease in surplus 2006/7	(7 002 258)
Increase in accumulated depreciation 2006/7	7 002 258
There was an incorrect costs allocation between land and buildings in the asset register. This error resulted in cost relating to land being depreciated as buildings due to costs to land being included in building cost. The building costs were understated and land overstated on the general ledger.	
Cost allocation between land and buildings	
Increase in land 2007/08	(10 998 090)
Increase in buildings 2007/08	10 998 090
Depreciation on land cost allocated to building per asset register	
Decrease in accumulated depreciation 2007/08	(1 698 170)
Increase in surplus 2007/08	1 698 170
In 2007/08 and 2008/09 financial years, buildings construction costs were classified as machinery and farming equipment. This error resulted in the overstatement of machinery and farming equipment and an understatement of buildings. Additional costs incurred in the building construction were also incorrectly classified as addition to machinery and farming equipment.	
Construction of building	
Decrease in equipment 2007/08	(5 481 893)
Increase in buildings 2007/08	5 481 893
Decrease in additions to machinery and farming equipment 2008/09	(11 302 007)
Increase in addition to buildings 2008/09	11 302 007
Decrease in equipment 2008/09	(16 783 900)
Increase in buildings 2008/09	16 783 900

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

26. RESTATEMENT (continued)

26.1 Interest rate risk management (continued)

Lab equipment was also incorrectly classified as machinery and farming equipment in 2008/09 financial year. This resulted in the understatement of lab equipment and overstatement of machinery and farming equipment.

Lab equipment	
Decrease in additions to machinery and farming equipment 2008/09	(5 098 945)
Increase in additions to lab equipment 2008/09	5 098 945

Deferred revenue was incorrectly classified as payables.

Deferred revenue	
Decrease in payables 2007/08	(4 877 451)
Increase in deferred revenue 2007/08	4 877 451

Effect on annual financial statements

GRAP 17 error	7 002 258
Cost allocation between land and buildings - depreciation	(1 698 170)
Effect on accumulated depreciation (assets)	5 304 088

Net effect on opening accumulated surplus 2007/08	(5 304 088)
Effect on liabilities	-

27. ACCOUNTS CLEAN UP

During the 2007/08 financial year, the ARC started statement of financial position accounts clean up exercise. The clean up exercise identified entries without supporting documents and or explanations relating to 2007/08 financial year and prior years. During the 2008/09 financial year, significant entries had to be processed to the statement of financial performance as part of the statement of financial position accounts clean up. The necessary approval to write the entries to the income statement was obtained.

The 2008/09 financial year's revenue increased by R 26 312 520.04 from the clearing of the accounts.

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

It was also identified from the clean up exercise that some VAT returns were not submitted to SARS in the prior years. VAT reconciliations were performed and details were provided to SARS after which a refund of R 20 796 085.46 was received. Of this refund R 12 950 812.32 relates to a refund on overpayments for June 2007.

During the 2008/09 financial year net refunds of R 15 530 657.32 was written to the statement of financial performance as income and R 5 265 728.14 was processed against the VAT asset account.

28. FINANCIAL MISCONDUCT

One of the ex Payroll Administrators is suspected to have reactivated employees whose employment was terminated. This employee changed the bank accounts of these terminated employees to the bank accounts whose account holders are not known by the ARC. The amount paid to these accounts totalled to R 340 380.04, of this total an amount of R 40 973.27 has been recovered. Criminal charges have been laid against the suspect and investigations are in progress.

An ex-administrator submitted expenses from fictitious expenses from fictitious companies. Some of the genuine expenses were inflated by forging the amounts. R 204 139.83 was claimed through these fictitious companies and inflating expenses. ARC is in the process of laying criminal charges against this ex administrator.

During the 2008/09 financial year a Senior Accountant defrauded ARC by issuing cheques amounting to R 5 861 066.00. ARC has laid criminal charges against the employee. The full amount was recovered from the Senior Accountant's assets in the 2009/10 financial year.

29. RECONCILIATION TO BUDGET

	2010
	R
Net surplus/(deficit) per statement of financial performance -	58 269 313
Shortfall on external income	8 135 845
(Additional PG allocated)	(9 900 000)
Biosystematics PG	(20 000 000)
Savings on salaries	(10 255 049)
Savings on other expenses	(19 036 783)
Shortfall on investment income	3 794 478
Loss on sale of assets	12 196
Surplus per budget/Business plan	11 020 000

AGRICULTURAL RESEARCH COUNCIL

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)

30. CHANGE IN ACCOUNTING POLICY

The accounting policy on Capital grant was changed from recognising the grant as revenues in line with the systematic depreciation of the respective asset to recognising the grant as revenue immediately if the grant is unconditional.

2009	Effect
Deferred grant	(250 019 421)
Accumulated surpluses	250 019 421

AGRICULTURAL RESEARCH COUNCIL
NOTES TO THE ANNUAL FINANCIAL STATEMENTS
FOR THE YEAR ENDED 31 MARCH 2010 (CONTINUED)



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AGRICULTURAL RESEARCH COUNCIL

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