

Revitalising Agricultural Education and Training in South Africa

Consensus Study Concise



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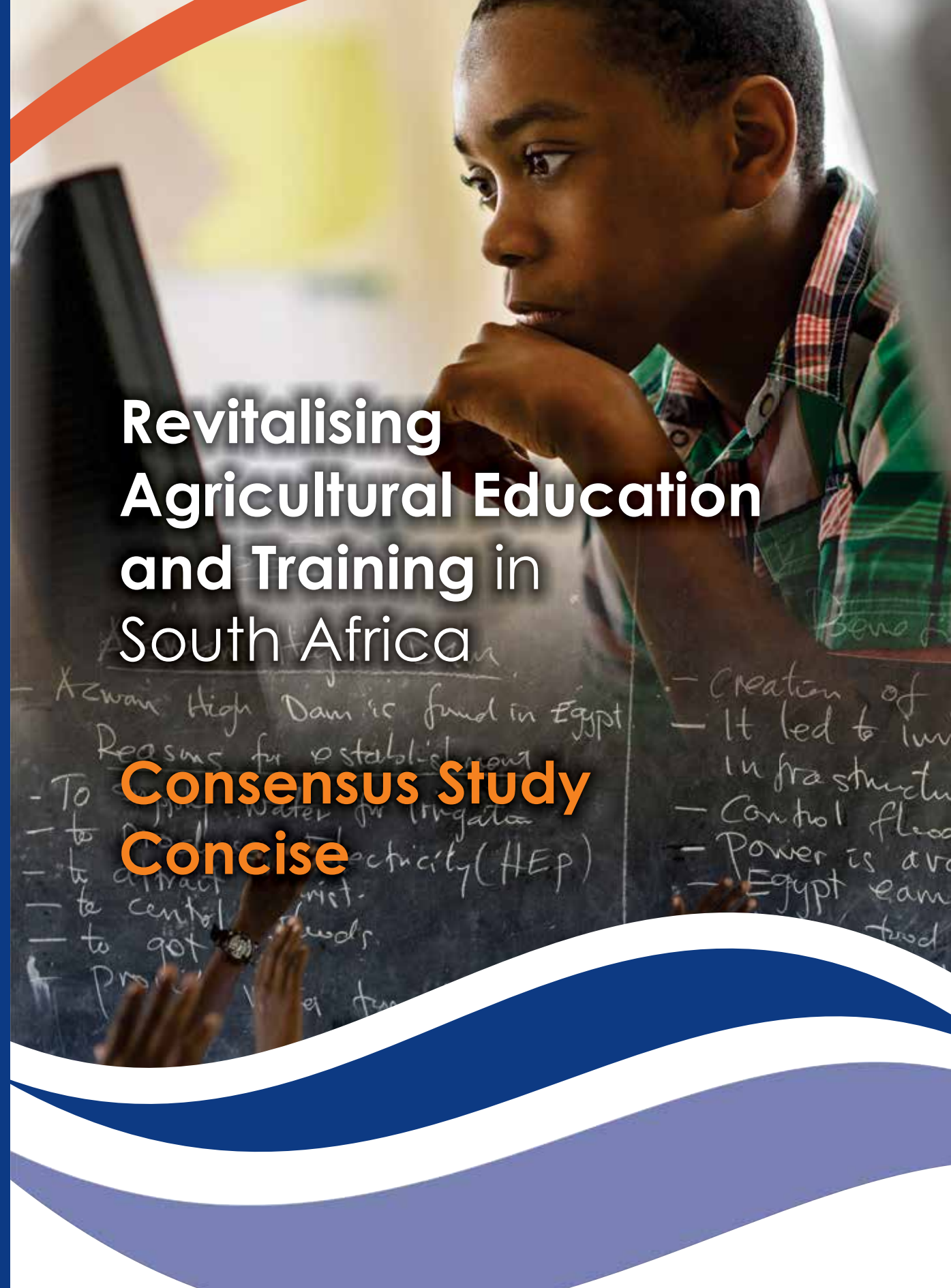
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The Academy of Science of South Africa (ASSAf) was inaugurated in May 1996. It was formed in response to the need for an Academy of Science consonant with the dawn of democracy in South Africa: activist in its mission of using science and scholarship for the benefit of society, with a mandate encompassing all scholarly disciplines that use an open-minded and evidence-based approach to build knowledge. ASSAf thus adopted in its name the term 'science' in the singular as reflecting a common way of enquiring rather than an aggregation of different disciplines. Its Members are elected on the basis of a combination of two principal criteria, academic excellence and significant contributions to society.

The Parliament of South Africa passed the Academy of Science of South Africa Act (No 67 of 2001), which came into force on 15 May 2002. This made ASSAf the only academy of science in South Africa officially recognised by government and representing the country in the international community of science academies and elsewhere.

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FOREWORD



The Academy of Science of South Africa (ASSAf) has as a specific mandate the provision of evidence-based scientific advice to South African policymakers on matters of crucial scientific importance. Evidence-based study project activities thus form the core of the Academy's function.

This consensus study was initiated by the ASSAf Science, Technology, Engineering and Mathematics (STEM) Education Standing Committee, deriving from a deep concern about the status of agricultural education and training (AET) in the country. The study seeks to identify and address the challenges facing the AET sector in South Africa. It is a timely study given the important role that this sector needs to play in meeting the United Nations' Sustainable Development Goals.

The study aims to provide evidenced-based information and clear recommendations to policymakers and other relevant stakeholders with an interest in agricultural human capital development. Some of the key findings of the study include inadequate funding for practical-level training; weak linkages to industry for understanding training needs; poor quality and inadequate numbers of educators who are appropriately trained to teach agriculture at school level; and poor linkages in the research-teaching-extension nexus. The recommendations are wide-ranging and very practical. It is hoped that they will be used to influence policymakers and thereby result in an improvement in the quality of AET in South Africa.

Although specifically focused on South Africa – a collation and analysis of international practice within the South African context – the report is potentially a useful resource for other countries on the African continent seeking to strengthen their own AET systems.

The report was developed and guided to its successful conclusion by an 11-member study panel of experts, under the leadership of Prof Frans Swanepoel. It was peer-reviewed by three experts and will be made available in an open access and free format.

The ASSAf Council would like to extend its sincere appreciation to the panel for their expert contribution to the study and the attention with which they carried out their task.

Prof Jonathan Jansen
President: Academy of Science of South Africa

ACKNOWLEDGEMENTS



This study was a collaborative endeavour involving many people from start to finish. Although not an exhaustive list, we wish to thank the following people and organisations for their participation in one way or another to ensure the success of the study.

- The Council of ASSAf for their foresight in commissioning this evidence-based study and their ongoing support during the entire process.
- The Agricultural Research Council (ARC) as the primary sponsor of the study, and in particular Dr Shadrack Moephuli, Chief Executive Officer (CEO) of the ARC for his personal interest and support. De Beers Chairman's Fund for their financial support of the project. In particular, the Centre of Excellence in Food Security, co-hosted by the University of the Western Cape (UWC) and the University of Pretoria (UP), for facilitating a two-month writing secondment for the panel chairperson to the French Agricultural Research and International Cooperation Organisation (CIRAD). A special recognition to Dr Patrick Caron for hosting the chairperson of the panel at CIRAD for this period.
- The members of the study panel for their diligent commitment to ensuring the success of the project.
- Particular appreciation is extended to Ms Nienke Beintema, Mr Johann Boonzaaier, Dr Kirstin Davis, Mr Jan Greyling, Ms Joyene Isaacs, Mr Luvuyo Mabombo, Prof Linus Opara, Prof Johan van Rooyen and Prof Mandi Rukuni for their additional contributions in the form of commissioned papers which provided a much-needed perspective to the study report.
- Dr Melody Mentz, senior researcher appointed to the study, for her support and inputs into the project.
- All the persons, organisations and champions without whose generosity and time the study would not have been possible.
- The peer reviewers who made well-founded and valuable suggestions regarding the improvement of the draft of the study report.
- Ms Patricia Scholtz and LedCool for the editing and production of the study report.
- And finally, to the support staff, Ms Zuki Mpiyakhe (study director) and Prof Roseanne Diab, Executive Officer for their contribution and assistance throughout the project.

Prof Frans Swanepoel
Chair: ASSAf AET Study

EXECUTIVE SUMMARY



Agriculture is a key component of the South African economy. Agriculture delivers more jobs per Rand invested than any other productive sector, and remains critical in the face of rural poverty and food insecurity. While the primary agricultural sector contributes about 3% to the country's gross domestic product (GDP), if the entire value chain of agriculture is taken into account, its contribution to GDP reaches about 12%. (Department of Agriculture Forestry and Fisheries (DAFF), 2013. Abstract of Agricultural Statistics. Republic of South Africa) Although the country can maintain the ability to meet national food requirements, more than 7 million citizens experience hunger, while 22.6% of households have inadequate access to food (Stats SA, 2016).

South Africa's agricultural sector faces several challenges – above and beyond the implications of climate change. These include the declining accessibility to quality water sources, the impact of unsustainable food production practices, competition with other industries for the use of arable land, and the failure to effectively address land redistribution.

The sector continues to grapple with its haunting historical legacy. Although the intentions and objectives of policy reform in agriculture over the past 20 years have been quite deliberate in seeking redress, continuous changes and lack of systematic follow-through in implementation have limited the effectiveness of the identified pathways to an equitable sector and society.

Among the primary challenges faced by the sector are the challenges experienced in the broader agricultural education and training (AET) system.

An analysis of the targets set forth in the National Development Plan (NDP) places agriculture firmly on the agenda for the next 15 years (NPC, 2011). Specifically, and in relation to AET, the NDP calls for:

- The creation of an additional one million jobs in the agriculture, agro-processing, and related sectors.
- Increased investment in agricultural technologies, research, and the development of adaptation strategies.
- Expanding the college system with a focus on improving quality.
- Improved skills development and training in the agricultural sector, including entrepreneurship training. This should include the training of a new cadre of extension officers.
- Investigation into whether extension and agricultural services are appropriately located at provincial level.
- Innovative means for agricultural extension and training by the state in partnership with industries.

Additional targets of indirect relevance to AET include increasing enrolment at universities, increasing the number of students eligible to study towards mathematics and science-based degrees, increasing the percentage of PhD-qualified staff in the higher education sector, producing more than 100 doctoral graduates per million per year (from the current 30 to 35 per million per year). Furthermore, the aim is to expand science, technology, and

innovation outputs by increasing research and development spending by government, and through encouraging industry towards increased support.

Whilst on the one hand, AET is firmly on the agenda, on the other hand the implication is that the agricultural sector will be competing for resources with a range of other subject-matter areas; to do so, the AET system needs to articulate its impact areas beyond agricultural production and consider the training of persons who participate in the total agricultural value chain and related sectors.

Key Objectives of the Study

The following key objectives were identified for the study:

- Provide a situation analysis of South African AET.
- Identify the challenges faced at each level and provide a set of recommendations to address these challenges.
- Assess the relevance of curricula to current global challenges of food security, climate change, and poverty alleviation.
- Determine where agriculture graduates get employed after graduation and the roles they play in society.
- Relate findings to best international practices and compare with the situation and needs elsewhere in Africa.
- Provide a set of recommendations to address the identified challenges.

In order to address these objectives, four key questions were posed: (i) where are we now, (ii) where do we want to be, (iii) what would be the road(s) to transformation, and (iv) what conditions will make it work?

Approach

Through the deliberations of the panel at its inaugural meeting, it was agreed that the most appropriate path to achieving the objectives and answering the key questions of the consensus study, was to adopt a two-phased approach; each phase including several commissioned studies to inform the development of the report and the panel's final recommendations.

The Phase I studies provided a comprehensive understanding of the current situation in the AET system. Based on the findings of these studies, a series of more focused, in-depth studies were commissioned for Phase II, resulting in a total of ten papers and/or inputs. An overview of the studies and their respective methodologies is presented in the full report <http://hdl.handle.net/20.500.11911/85>.

Findings

The findings from the consensus study are organised conceptually according to the ideal AET system identified in the full report: <http://hdl.handle.net/20.500.11911/85>.

KEY FINDING 1

There are numerous, continued challenges facing AET

These challenges are largely historical, identified early on in South Africa's democracy, and there is an urgent, pressing need to address these issues. This must be done cognisant of the fact that the public education and training system has been in a state of fairly constant reform since 1994. Now is an opportune time for transformation (not more reform for the sake of reform) as the system as it relates to AET is highly fluid.

KEY FINDING 2

AET currently operates within a largely disenabling environment

2.1. Governance and coordination: The system is in dire need of substantial governance reform directed towards greater integration, cooperation, and accountability to maximise the returns on available finances, human capital, and physical infrastructure. A coherent vision of the future agricultural system(s) toward which South African agriculture must move is needed to inform the focus and direction of the future AET system and the governance thereof.

2.2. The case of the agricultural colleges: The colleges have usually been administered and governed by the relevant line department or provincial department, and have not been formally part of the higher education system. This is being revised, with some colleges being moved directly to the Department of Higher Education and Training (DHET). Despite this Cabinet-approved decision, there is still uncertainty about the full implications.

Attempts were made by the study panel to meet with the respective parties to understand fully the situation and to position the panel to make recommendations regarding this important component of the AET system. The engagement was not sufficiently robust to allow for such recommendations to be made. A Joint Technical Task Team (JTTT) to investigate the matter has been appointed by the DHET. Since the JTTT was appointed in late 2016, significant progress had not been made at the time of finalising the study report.

KEY FINDING 3

Relevant institutions and adequate resources are needed to sustain an effective, efficient AET system

3.1 Articulation and integration: Although supported in principle and allowed for within the National Qualification Framework (NQF), there is very little articulation between the various components of the AET system, with key blockages hindering the realisation of a fully integrated system.

The transition from school to post-school education is one such key blockage point. Agricultural subjects at high school may ironically be a disadvantage to students trying to enter higher education, and mathematics is the biggest single blockage in the pipeline, as most science and commerce-related programmes, as

well as vocational programmes at colleges and universities of technology, require mathematics passes. Agricultural curricula at school level need to feed into the system. There is no legal framework to encourage or require systemic relations between universities and colleges of agriculture. The lack of clarity and progress around the agricultural colleges and their positioning within DHET has significant ripple effects on the quality of educational provision and the potential for enhanced articulation.

- 3.2 Reversing the inverted pyramid:** South Africa's post-school inverted pyramid negatively impacts the delivery of AET in the country. Too many institutions focus on academic programmes and too few prepare people for the intermediate and lower levels of skills. This situation is unsustainable when taking into consideration the NDP targets.

Significant growth in enrolments and high-quality graduates are required in the technical and vocational education and training (TVET) colleges for South Africa to 'flip' its inverted pyramid. The important role of the colleges and the potential role of the proposed community colleges are key levers in addressing the situation. Practical and feasible solutions, which are innovative and forward-looking, should be encouraged in order to address the situation.

Complex social and economic factors drive the current over-emphasis on university-level training. Proposed solutions to address the matter must focus on ensuring quality of education, exposure to cutting-edge practical training, and employability of graduates, in order to be successful. This will require innovative collaboration between the components of the AET system and the private sector.

- 3.3 Funding and resource allocation:** Funding for education is a highly contested issue across institutions in South Africa. The need for greater funding for AET was raised at all stakeholder workshops, particularly the need for increased funding to enable institutions to provide practical, vocationally relevant training.

The capacity of schools to effectively deliver agricultural science as a subject is limited by a lack of funding and the absence of appropriate infrastructure for practical training. Funds which are available are not efficiently distributed or effectively managed.

Funding support was identified as a key factor to draw students into AET in post-school education. Access to funding for students, particularly in the colleges where the National Student Financial Aid Scheme (NSFAS) is not accessible, is critical.

The AET system will need to engage in non-traditional approaches for funding for practical-level training, including building linkages to industry and the private sector. In the light of the current turmoil and uncertainty with regard to funding from government, the sector cannot afford to be short-sighted in this.

KEY FINDING 4

An adequate number of appropriately trained graduates are not currently being produced by AET

- 4.1 Relevance and responsiveness of curricula:** There is no shortage of registered qualifications in the field of agriculture in the NQF. To date, the focus has been primarily on production; yet, skills for the agricultural supply chain come from a wider range of disciplines than the specific agriculture-focused qualifications. There is an urgent need for improved relevance in the curricula.

Although there are exceptions, students are primarily educated for commercial agriculture, with little focus on smallholder farmers (SHF) or on the social and human dimensions of agriculture. Linked to the need for relevance, is the need for multi and transdisciplinary approaches to curricula that address modern-day topics, find solutions to grand challenges, such as climate change, and drive economic development.

Training fails to meet the needs of industry and bridge the skills-knowledge-practice gap. Navigating the modern-day world of work requires the development of the so-called T-shaped skills, where depth in discipline-specific knowledge is balanced by a breadth of soft skills. Taking into consideration the important role that entrepreneurship is expected to play in South African economic development, T-shaped skills must be positioned as essential supplements to disciplinary knowledge, rather than add-on components.

Industry stakeholders have specifically expressed a clear need for the inclusion of more practical exposure, internships, and industry placements; the need for the development of combined skill sets; and improved communication between the industry and tertiary education providers regarding AET programmes.

- 4.2 The AET system is in dire need of quality, qualified educators:** The quality of educators, as well as the number of teachers appropriately trained to teach agriculture at school level and in vocational contexts is of serious concern. It will become increasingly difficult to appropriately train adequate numbers of students without addressing the need to replenish and build the cadre of agricultural educators.

The need for an increase in qualified educators is, however, not limited to any one specific component of the AET system; rather, the need for improved skills is critical across the board from school level to PhD level.

- 4.3 Diversity and transformation in the context of access and meaningful participation:** Within higher education, the profile of academics in terms of race remains predominantly white, with at least five out of ten academics with a PhD in a science field being white in 2014. However, the share of whites has decreased over the period 2010 to 2014 (HEMIS, 2016). The discrepancy is most pronounced at the PhD level, with a clear evening out at the Masters and Bachelors level. Initiatives to enable and support black academics to pursue their PhD in the sciences thus remain a high priority.

There are also distinct gender gaps in the agricultural sciences, with significantly lower numbers of female staff in this group; women hold only about 30% of the doctoral qualifications in 2014. The share of female staff has in general increased from 2010 to 2014 (HEMIS, 2016).

Neither the profile of enrolments nor of graduates has shifted over the period 2010 to 2014 with respect to the level of qualification. In 2014, 44% and 40% of the students in the agricultural sciences continue to be enrolled in BSc and certificate or diploma-level qualifications, respectively.

In 2014, white students accounted for only 34% of the total enrolled students in agricultural sciences. Their shares declined at all qualification levels over the period 2010 to 2014. In contrast to the profile of staff, the proportion of female students enrolled in the agricultural sciences has equalled the proportion of male students, whilst graduation of female students exceeded male students, albeit slightly, in 2014 (HEMIS, 2016).

- 4.4 Professionalisation of extension work:** Within the framework of the Natural Scientific Professions Act (No 27 of 2003), the latest fields of practice published under *Government Gazette* Notice 36 of 2014 by the Minister of Science and Technology include extension science as a field of practice. Thus, only registered persons may practise in a consulting, extension, or advisory capacity. The process of professional registration of extensionists with the South African Council for Natural Scientific Professions (SACNASP) was launched in the second half of 2014. The study panel welcomes this development.

The Natural Scientific Professions Act also calls for continuous professional development (CPD). Persons registered as professionals are required by their code of conduct to practise strictly within their area of competence and to maintain and enhance this competence. The study panel views this development as a key opportunity for the sector.

- 4.5 Use of information and communications technology (ICT) and social media:** Across all provinces and levels of education there was little evidence for the use of ICT and social media in education and extension, despite the numerous opportunities these present.

The lack of ICT engagement at educational level translates into poor skills and weak engagement with these technologies in the professional workspace, which is a disadvantage for students.

- 4.6 Agriculture as first choice and career pathways:** Agriculture is not a career of first choice. This creates challenges for effective sourcing of high-quality students for post-school studies. Within higher education there are very clearly articulated career pathways within academia. There is, however, limited understanding or awareness of the vast number of agri-business and entrepreneurship careers that exist along the entire food and nutrition value chain. This lack of awareness is evident at both school and higher education level.

KEY FINDING 5

Linkages and feedback mechanisms need to be intentionally strengthened

- 5.1 The knowledge triangle:** The linkages between research, teaching, and extension are poor, and there is a need for better coordination within this research-teaching-extension knowledge triangle.
- 5.2 Research and research support:** Greater cooperation between the Agricultural Research Council (ARC) and the National Research Foundation (NRF) is urgently needed. These organisations have a similar vision and mission as it relates to capacity development, but a greater level of formalised cooperation towards a more focused contribution to AET is required.
- 5.3 Research and education to extension:** International evidence suggests that fostering agricultural innovation through enhanced research support and entrepreneurship can become a key driver of development. However, this cannot be realised without effective innovation transfer, diffusion, and uptake. In the context of AET this process is facilitated in a very large part by extension and rural advisory services.

The study panel considered the plausibility of implementing a land-grant type model in South Africa. Several case studies in the United States (US), Brazil, India, and Kenya were considered. Each case study was selected for the comparability of context to South Africa, as well as to illustrate how various adaptations of the land-grant model have been implemented globally.

Initial findings support the assertion that adapted, context-sensitive land-grant type models have high potential for success in the South African context. Revising institutional arrangements at governmental level to achieve direct reporting of those responsible for research, education, and extension is difficult to achieve in many African countries, including South Africa. It likely would involve parliamentary action, with divisive and complex politics in budget-constrained environments. The cases of Brazil and Kenya have demonstrated that different organisational structures are workable to achieve the same level of coordination and relevance if steps are taken to ensure that the needed communication, transparency, and trust are in place.

However, creating institutions with integrated organisational charts that link undergraduate and graduate instruction, research, and extension programmes is not sufficient to overcome poor communication and management; an enabling environment, leadership, and good policy also are essential.

- 5.4 Opportunities for regional partnerships and collaboration:** South African institutions have experiences to share in terms of reforms and developments that craft a well-integrated, self-productive, self-regenerating system of education, research, and advisory services. The current consensus study is an exemplar in the respect that it reflects candidly on the system and envisions a transformed future. The very process of conducting the consensus study can serve as a learning opportunity for other countries seeking to undertake similar processes.

Various opportunities for contribution and collaboration within the region were identified in the study. South African institutions should seek to identify ways in which they can participate in continental partnerships that can strengthen AET in the country and contribute to African development. Key role players with significant reputation and leverage should be engaged. Networks, such as the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), provide a platform for this type of highly impactful collaboration.

South African AET institutions should seek ways of providing spaces for more open flow of people, knowledge, and resources among other African countries.

Concluding reflection: Challenges in the South African Innovation System

Since the adoption of the White Paper on Science and Technology (DACST, 1996), the National System of Innovation (NSI) has made progress in several areas. However, various challenges still need to be addressed. Each of the challenges identified by the National Advisory Council on Innovation (NACI) in the South African NSI is relevant to the AET context, and in this respect the AET system represents a microcosm of the South African NSI.

Two further points must be noted. First, agriculture (and the agri-food value chain) has been identified by NACI as one of the key priorities in the NSI as it relates to the water-energy-food security nexus. Working towards an efficient AET system is therefore an urgent national priority. Second, the strong overlap between the key challenges identified by the study panel and the NACI situational analysis affirms the findings of the consensus report and enables prioritisation in addressing the current challenges.

Recommendations

The study panel notes that Recommendations 1 and 2 are core and fundamental to the transformation of the AET system. Without the implementation of these two recommendations, changes will be incremental, uncoordinated, and unlikely to catalyse the scale of change needed. Conversely, the panel is of the conviction that should all the recommendations be implemented, the synergistic gains will be far greater than any individual effort. It therefore stands to reason that the recommendations are closely related and highly integrated.

1

KEY ACTORS MUST ACKNOWLEDGE THE SEVERITY OF THE CONTINUED CHALLENGES IN AET AND THE URGENT NEED FOR CHANGE

The panel recommends that ASSAf should put forth the findings of the consensus study to the Minister of Science and Technology with the request to bring the urgent need for change to the attention of Cabinet.

The panel further recommends that the findings of the study be broadly communicated to key stakeholders in government. These include (but are not limited to) the Ministries of Science and Technology; Agriculture, Forestry and Fisheries; Higher Education and Training; Basic Education; Trade and Industry; as well as all the provincial departments of agriculture.

2

ESTABLISH A MINISTERIAL COMMITTEE FOR AGRICULTURAL EDUCATION AND TRAINING

The panel believes that it is necessary to establish a National Council for Agricultural Education and Training (NCAET) which ensures the inclusion and participation of the linked departments whose policy and programmes need to be synergised with the AET system. A recommendation for a similar statutory body was made in 2003, and has not been implemented – with consequences to the system.

However, the panel appreciates that there is currently a moratorium on establishing new statutory bodies, and therefore recommends that a Ministerial Committee for AET be established as a matter of urgency to look into the critical areas highlighted in this report.

The purpose of the committee will be to oversee activities related to AET for a period of three years, with the goal of addressing the core challenges in the system – most specifically to guide the system towards greater integration, cooperation and accountability.

After this period, an evaluation of progress should be commissioned to determine the effectiveness of the committee. If there is a lack of drastic and significant change, it will be necessary to give consideration to the establishment of the initially proposed statutory NCAET.

3

EXPEDITE THE WORKING OF THE JOINT TECHNICAL TASK TEAM

The panel strongly recommends that the workings of the JTTT on the agricultural colleges be expedited, and that sufficient resource allocations be appropriated to enable its progress. The JTTT should report directly to and work closely with the Ministerial Committee for AET.

4

COMMISSION A DETAILED STUDY ON ARTICULATION PATHWAYS AND CURRICULUM INNOVATION

Once the Ministerial Committee for AET has proposed and approved a coordinated governance framework, a clear matrix of human capital needs (Recommendation 1) and related qualifications, in the context of a well-structured AET Human Capital System, should be developed.

The study panel recommends that based on the human capital needs matrix, an in-depth case study on articulation pathways and curriculum innovation be commissioned to demonstrate practically how a fully articulated system, which leverages ICT innovations and a multi-disciplinary conceptualisation of agriculture, could be designed.

The outcome of the case study will allow for a foresight and modelling exercise which should examine alternatives for implementation and pilot testing (Recommendation 5).

5

INVEST IN A PILOT PROJECT TO TEST THE FEASIBILITY OF AN ADAPTED LAND-GRANT MODEL WHICH EMPHASISES INNOVATIVE CURRICULUM DESIGN AND DELIVERY

The outcome of the articulation pathways and curriculum innovation study (Recommendation 4) will allow for a foresight and modelling exercise to be conducted, which proposes alternatives for implementation and pilot testing of a fully articulated micro-AET system at provincial level, based on an adapted land-grant model.

Innovative approaches to curriculum design and delivery should be piloted within this project, drawing lessons from successful international models (such as EARTH University) and using cutting-edge ICTs.

The panel recommends that the Ministerial Committee for AET (or its successor, the NCAET) be responsible for the oversight and coordination of the pilot study feasibility analysis and the pilot study implementation.

6

STRENGTHEN THE AGRICULTURAL (FOOD VALUE CHAIN) RESEARCH ENVIRONMENT

Greater formalised cooperation between the ARC and NRF is urgently needed. The study panel recommends the establishment of a joint working group to coordinate and integrate efforts between these institutions towards achieving a strengthened agri-food value chain research environment, including funding postgraduate education and research through the development of a resource allocation model to support AET high-level training. Activities in this regard can begin immediately.

There is a need to strengthen the link between research at universities and the activities of the ARC. Increased engagement between the NRF-ARC joint working group and the South African Agriculture and Life Sciences Deans' Association (SAALSDA) can facilitate increased collaboration on high-relevance research projects. The study panel therefore recommends that SAALSDA receives additional support to strengthen its activities.

7

TRAIN THE TRAINERS

Training the trainers is an important priority in sustaining a strong AET system. Specifically, persons engaged in the extension and rural advisory services component of the sector are influenced by AET in multiple ways; they are beneficiaries of AET through the training they receive, but then themselves become educators and facilitators of knowledge. For this reason, the training of extension workers should receive substantial focus, as they have the potential to be the primary agents through which innovation is translated from the laboratory into practice.

In this context, the study panel recommends: (i) the establishment of a bursary fund for persons training to be educators in AET, with an internship service component of at least two years to retain skills; and (ii) more purposeful use of Sectoral Education and Training Association (SETA) funding for reskilling and upskilling extension workers, in line with the professional registration and for continuous professional development.

8

FOSTER LINKAGES THAT INCENTIVISE COLLABORATION, PROMOTE INNOVATION, AND DIVERSIFY THE FUNDING BASE

The study panel recommends that the Ministerial Committee constitute a special working group to investigate and propose strategies to increase the collaboration and partnership between AET and related industry and business partners, in order to promote inclusive innovation in the agri-food value chain. These partnership agreements should consider platforms for internships and practical training opportunities for students in the AET system (Recommendation 9), and should propose an incentive-based structure for industry and business partners to increase participation.

High-net worth persons with an interest in the agriculture and food sector can play an important role in funding AET. Opportunities of this nature should be explored and pursued in the South African context.

9

INCREASE THE ATTRACTIVENESS OF VOCATIONAL TRAINING THROUGH A COMBINATION OF INCENTIVE STRUCTURES

Skills-based training, particularly around high-demand skills, clearly has a fundamental role to play in economic growth, reducing (youth) unemployment, and improved livelihoods. The study panel recommends that the Ministerial Committee sets up a task team to develop a holistic model for vocational AET that takes into consideration successful global models, as well as the governance reform required in South Africa. The task team should develop proposals on how to creatively and efficiently incentivise investment and participation in vocational training by industry, business, students, and educators.

10

MONITORING, EVALUATION, AND LEARNING FOR UNDERSTANDING TRANSFORMATIONAL CHANGE

In South Africa, there is an urgent need for the development of responsive informational and monitoring data on the AET system. The Minister has assigned NACI the task of developing and hosting a science, technology and innovation (STI) data portal for the NSI, a central repository that will be important in the establishment of research and strategic intelligence. The panel recommends that the Ministerial Committee collaborates with NACI, as well as a monitoring and evaluation expert to develop AET-specific indicators which feed into and align with the broader national data portal. Collaboration with the NRF's new division for Strategy, Planning and Partnerships should also be explored to enhance foresight capabilities, including strategic planning, modelling and analysis of

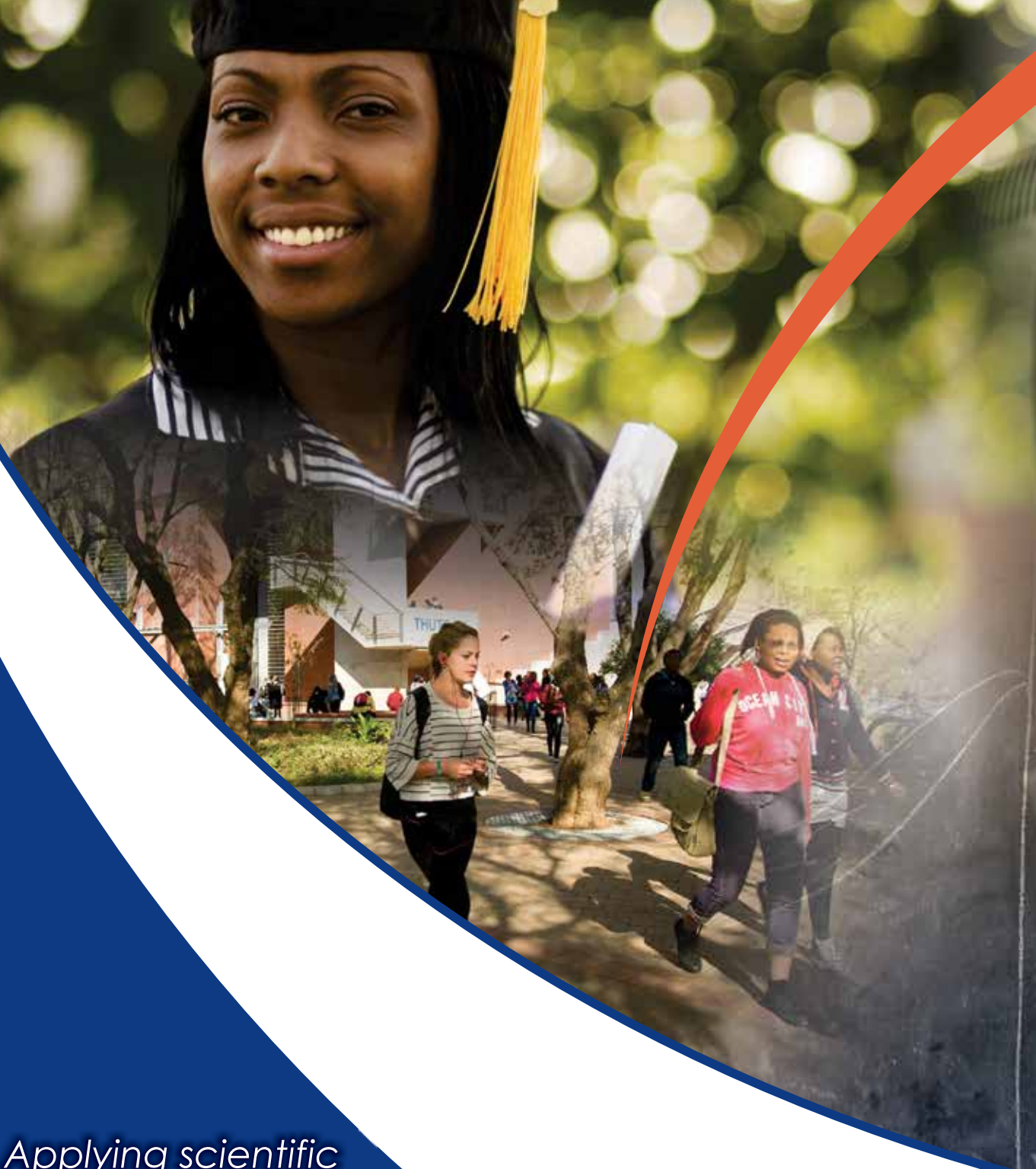
"critical technology needs" to support sustainable agriculture as a means of systematic analysis and interpretation of data and perspectives to better understand trends and future challenges to enhance AET.

An important component of this will be to design and conduct a national tracer study to understand graduate employment in the sector.

NOTES



- Benefits of Aswan Dam
- Creation of jobs.
 - It led to improvement of infrastructure.
 - Control floods.
 - Power is available.
 - Egypt earns foreign exchange.
 - More food is produced.
 - The Dam is useful.
- Problems
- outbreak of bone diseases.
 - Reduction of fertility during dry seasons.
 - people had to be moved.
 - Salinization.
 - Poor transport.



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