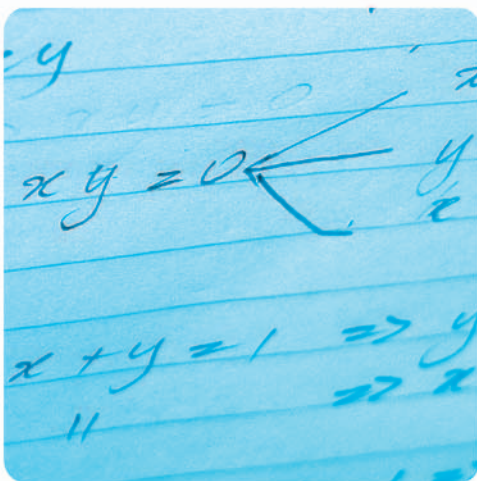
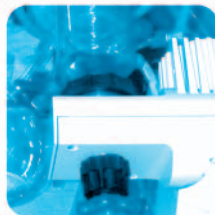


Faculty of Natural and Agricultural Sciences

Report 2008



Faculty of

**Natural and
Agricultural Sciences**

Report 2008

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Faculty of Natural and Agricultural Sciences
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Preface

From the Dean's Office

In 2008 the Faculty of Natural and Agricultural Sciences once again lived up to its vision to be acknowledged as a faculty that is at the forefront of the practice of natural and agricultural science where the highest levels of quality and credibility are reflected.

During the year the faculty not only remained one of the leaders in training and career development in the natural and agricultural sciences, but it also made a concerted effort to enlarge its international footprint and to establish itself internationally. This is evident in the visits of staff from the faculty to universities such as the USA-based University of Minnesota and Virginia Polytechnic Institute and State University (Virginia Tech) and the extension of international agreements between the University of the Free State (UFS) and these institutions. The faculty also had the privilege of hosting a high-level delegation from the University of Minnesota on the Main Campus in Bloemfontein in August 2008.

The turmoil in the international markets firstly led to very high oil prices, which spilt over to the grain markets and high food prices. This, in turn, led to high inflation levels and therefore high interest rates. Eventually the exchange rate also deteriorated against the major currencies. In the latter part of the year the whole situation was turned upside down with the collapse of the financial markets. The faculty did not escape this and the price of equipment for which orders were placed sky rocketed. Innovative skills had to be applied to remain on track with our equipment strategy.

Although 2008 was an exceptionally difficult year for the UFS and the institution had to bear the brunt of the Reitz video and the reaction of the national and international community, the faculty still managed to perform and expand its core business.

The faculty offers multi-disciplinary and holistic courses to send skilled and capable students into the South African workplace and to empower the labour force. Our general and extended programmes are continuously assessed and improved in order to improve our throughput rates and quality of teaching.

The staff at the faculty worked tirelessly this year to broaden our product offering and to provide our students with the best quality teaching in the country. I applaud their efforts of expanding capacity, developing programmes and strengthening re-



Prof. Herman van Schalkwyk.

lationships both within and outside the faculty and the university.

I also want to applaud the staff and students of the faculty with their achievements this year – whether it is on a personal level, in their capacity as staff member of their respective department/centre or for the faculty. To mention a few:

- Ms Estelle Heideman HIV/Aids coordinator of the Lengau Agricultural Development Centre, received a bursary to participate in a leadership programme in the United States of America (USA), which trains female leaders in South Africa who contribute to the prevention of HIV at a local, regional and national level;
- In the Department of Agricultural Economics, Prof. Johan Willemse, known for his contribution towards agriculture, was appointed on the non-executive board of Absa;

Staff in the dean's office



The staff working in the dean's office are, from the left, front: Ms Stefanie Naborn, Manager: Marketing and Liaison, Ms René Bloem, Secretary, Prof. Neil Heideman, Vice-Dean: Faculty of Natural and Agricultural Sciences; back: Mr Clasia Claassen, Assistant Administrative Officer, Mr Johan Kruger, Faculty Manager, Ms Lorinda Rust, Secretary, and Ms Mitzie Cloete, Typist/Clerical Assistant.

- Prof. James du Preez, Departmental Chair of the Department Microbial, Biochemical and Food Biotechnology, received the silver medal for exceptional published research awarded at the biennial conference of the South African Society for Microbiology hosted in Graham's Town. It was only the seventh time since 1986 that the medal was awarded;
- A study of the UFS about how the change in the packaging of DNA with cellular development is influenced by the expression of genes, in which Prof. Hugh Patterson played a leading role, was published in a leading peer-reviewed scientific journal *Proceeding of the National Academy of Sciences* of the USA (PNAS). The PNAS journal has an impact factor of 10, which means that studies published in this journal are referred to by ten other scientific studies within the scope of two years;
- Prof. Riaan Luyt, professor in Chemistry and head of the Natural Sciences Programme at the Qwaqwa Campus, received an honorary medal from the Polymer Institute of the Slovak Academy of Sciences during a conference hosted in the High Tatras mountains of Slovakia;
- Prof. Maryke Labuschagne from the Department of Plant Sciences was the recipient of the National Science and Technology Forum's (NSTF) research capacity-development award. A team consisting of Prof. Jan van der Westhuizen and Dr Susan Bonnet from the Department of Chemistry, Prof. Kenneth Swart and Prof. Thinus van der Merwe from FARMOVS-PAREXEL also

received the innovation award for an outstanding contribution to science, engineering and technology by either an individual or a team over the last ten years from the NSTF;

- Prof. Maryke Labuschagne received a second prestigious national award for her research when the 2008 Cereal Science and Technology - SA's (CST-SA) Award for research and development was awarded to her; and
- Prof. Ivan Horak, extraordinary professor at the university's Department of Zoology and Entomology, became the third person in the history of the UFS to receive the D.Sc. degree.

In closing I would like to thank the faculty's lecturing staff for their support and enthusiasm during the past year. However, none of these achievements would have been possible without the interest and hard work of the administrative staff.

During 2008 we have all worked together to live up to the faculty's motto: "There is no substitute for excellence!" This report covers the activities of the faculty in 2008. It is a reflection of a year's commitment from a team of highly skilled academic and support staff.

Prof. Herman van Schalkwyk
Dean: Faculty of Natural and Agricultural Sciences
University of the Free State

Faculty news

Successful visit from delegation of the University of Minnesota

A senior delegation from the University of Minnesota in the United States of America (USA) paid a very successful visit to the University of the Free State (UFS) in May 2008 to explore ways of strengthening already existing ties between the two institutions.

Teacher training, capacity building in health sciences and student preparedness were among the areas of cooperation that were investigated, within the context of the Strategic Academic Cluster initiative of the UFS. Poverty reduction strategies were also a strong focus area.

The Faculty of Natural and Agricultural Sciences has had a cooperation agreement with the University of Minnesota's Department of Applied Economics since 2002 and the exchange of staff



During the visit are, from the left: Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS, Prof. Robert Jones, Senior Vice-President: System Academic Administration at the University of Minnesota, Dr Meredith Quiad, Associate Vice-President and Dean: International Programmes, University of Minnesota, Prof. Teuns Verschoor, Acting Rector of the UFS and Prof. Ezekiel Moraka, Vice-Rector: Student Affairs at the UFS.

has been taking place on a regular basis. This agreement will be expanded and both institutions are now exploring the possibility of

applying it across faculties. Both institutions have committed seed funding to formalise the cooperation agreement.

50 years of Agriculture celebrated



The faculty celebrated 50 years of the teaching of agriculture at the UFS in November 2008. Part of the celebrations was a seminar with the theme "Challenges in a changing agricultural environment". Some of the guest speakers are, from the left: Mr Corwyn Botha, Chairman: Agri Business Chamber and Managing Director of the Cape Agri Group, Mr Motsepe Matlala, President of NAFU, Mr Hans van der Merwe, Executive Head: Agri SA, Prof. Herman van Schalkwyk: Dean: Faculty of Natural and Agricultural Sciences at the UFS, and Mr Sugar Ramakarane, Head: Department of Agriculture, Free State Province.

Winners of NSTF awards assist with recruitment of students



Here are, from the left: Dr Martin Ntwaeaborwa, senior lecturer at the Department of Physics and finalist in the category for black researchers, Prof. Kenneth Swart, FARMOVS-PAREXEL, Prof. Maryke Labuschagne, head of Plant Breeding at the UFS's Department of Plant Sciences and female recipient of the award for the development of research capacity over the past five to ten years, and Prof. Jan van der Westhuizen, Department of Chemistry at the UFS; front: Ms Kedibone Aphane, MRC. Prof. Swart and Prof. Van der Westhuizen were the leaders of the team who received the award for the development of innovation by a corporate organisation or institution.

Representatives of the South African Medical Research Council (MRC) visited the UFS to recruit students who want to study in the fields of sci-

ence, engineering and technology. To assist with the recruitment, the winners of awards made by the National Science and Technology Forum (NSTF) earlier this year,

made presentations to create an interest amongst students. The UFS had four finalists of whom two were the winners in their respective categories.

Young scientists learn what faculty can offer



Young science lovers gathered in Sasolburg for the annual Sasol TechnoX in August 2008. The faculty's exhibition captured the learners' attention through an interactive representation of the application fields of science. Delegates from the Departments of Mathematics and Applied Mathematics, Chemistry, Zoology and Entomology, as well as UFS Marketing stood ready to answer the questions of the 20 832 learners who attended the event. Pictured here is Theo Viljoen, M.Sc. student in Forensic Entomology, sharing interesting facts regarding insects with learners.

Two UFS academics appointed on the Land Bank Board



Prof. Herman van Schalkwyk (left), Dean: Faculty of Natural and Agricultural Sciences, and Mr Theo Potgieter from the UFS School of Management were appointed on the Land Bank Board in March 2008. Prof. van Schalkwyk was appointed as Director and Deputy Chairperson and Mr Potgieter as Director of the Board. The appointments were made by the Minister of Agriculture and Land Affairs, Ms Lulu Xingwana, and are effective for a period of four years.

UFS extends exchange agreement with USA university



Here are, from the left, front: Dr SK de Datta, Vice-Rector: International Affairs, VT, Prof. Herman van Schalkwyk, Dean of the Faculty of Natural and Agricultural Sciences, UFS, Dr Martin Ntwaeaborwa, senior lecturer at the Department of Physics, UFS; back: Prof. Jim McKenna, Department of Crop, Soil and Environmental Affairs, VT, Prof. Izak Groenewald, Director of the Centre for Sustainable Agriculture and Rural Development at the UFS and responsible for the faculty's international liaison, Dr Michael Bertelsen, VT's international office, Dr Aldo Stroebel, Head: Internationalisation at the UFS and Dr Liesel Herselman, senior lecturer at the Department of Plant Sciences, UFS.

A delegation from the faculty visited the Virginia Tech University (VT) in the USA in June 2008 to confirm and extend the existing student exchange agreements between the two institutions.

During the visit the agreement, which started in 1997, was extended for the next five years. More than 150 students from both institutions have already taken part in this exchange agreement and it is the most successful student exchange agreement that VT is involved in. Although agricultural students from the UFS initially took part in the agreement, it was extended to other departments in the faculty and also to the rest of the UFS.

Itjoriseng Project launched



The faculty launched the Itjoriseng Project on the Main Campus in Bloemfontein in March 2008. The aim of the project is to improve the skills of teachers in the subjects Mathematics and Physical Science for Grades 10–12. "Itjoriseng" is the Sotho word for "sharpen yourself". At the launch were, from the left: Mr Mzamo Jacobs, Director: Curriculum Development for Further Education and Training, Free State Department of Education, Mr Johan Kruger, Faculty Manager, Ms Elna Marais, Chief Education Specialist: Curriculum Development, Free State Department of Education, and Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS.

2007 Faculty report launched



The faculty once again produced another report in which the various departments and centres highlighted their activities for 2007. The report was so well received that a second edition had to be printed. Here are some of the departmental chairpersons during the launch of the report in June 2008.

Department of

Soil, Crop and Climate Sciences

“About 40% of our postgraduate students are from countries in Africa” - Prof. Chris du Preez.

Overview

The Department of Soil, Crop and Climate Sciences specialises in the disciplines of Agrometeorology, Agronomy, Horticulture and Soil Science, contributing to the agricultural programme of the Faculty of Natural and Agricultural Sciences. In addition to undergraduate and postgraduate teaching in the four disciplines, the department also delivers teaching contributions at the Centre for Sustainable Agriculture and Rural Development, Environmental Management, Disaster Management and the Department of Quantity Surveying and Construction Management at the University of the Free State (UFS).

Over the past few years the department has shown growth not only in the number of undergraduate students but also in the number of postgraduate students. In 2008 an average of 20 master's and 15 doctoral students were enrolled. Approximately 40% of these students come from countries like Botswana, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe. Six master's and five doctoral students graduated.

During 2008 the department managed to improve some of its infrastructure for teaching and research. Approximately R1 million was spent on the upgrading of some laboratories. Various improvements were also made to the department's experimental site on the



Prof. Chris du Preez.



West Campus of the UFS and at the Kenilworth Experimental Site.

Research in the department is aimed at various aspects of the soil-crop-atmosphere system. Approximately R3 million was spent on research in 2008, of which only 10% came from the Central Research Fund of the UFS. The rest of the funding came from institutions such as the National Research Foundation (NRF), Water Research Commission (WRC), Protein Research Trust (PRT), British Royal Society, New York Botanical Gardens, Omnia Fertilizer Ltd., Syngenta and Agraforum. Findings of this research are published in research articles and pre-

sented at conferences as displayed in the research outputs later on.

Agrometeorology received joint funding with the University of Nottingham from the NRF and the British Royal Society to host a workshop at the UFS on *Water use by under-utilized crops in semi-arid areas*. This was a ground-breaking visit which brought together scientists and practitioners from 12 countries including the United Kingdom (UK) and South Africa. The new ideas developed through the visit will lead to strongly-focused and long-term research opportunities.

During the workshop there were presentations from 16 scientists



Messrs Elias Yokwane (left), technician, Johan Barnard (middle), Ph.D. student, and Jason Sparrow (right), master's student, determining the drainage curve of soil at the Riet River Irrigation Scheme.

Mr Johan Barnard, (left) Ph.D. student, and Mr Jason Sparrow, master's student, preparing soil for a drainage curve determination at the Riet River Irrigation Scheme.

from a variety of disciplines as well as inputs from the SA-EU National Contact Point for Environment and the university's international office. Following the presentations, the participants (including 12 postgraduate students from the UFS) formed several breakaway groups to work out the details of the proposals. Two project proposals were formulated during the workshop. The first concerns the *Use of weather and seasonal climate forecasts for food security in sub-Saharan agriculture*. The aim is to produce a user-friendly decision support system with agronomic and epidemiological prediction facilities. This will link users with a database tailored to their region, with the current farming systems and agronomic practices and then updated on a weekly basis using appropriate technology.

The second proposal is about *Evaluation of climate-resilient crops to cope with climate variability and change*. The aim is to identify criteria to evaluate the species, to evaluate promising plant material

for traits of interest in field trials in the targeted climatic regions and to develop a decision support system that can provide validated information for use in dissemination activities. The possibility of working together on EU projects is the most probable further collaboration. The participants have now established contact with researchers in their own field as well as other related fields of interest and will now develop their own further collaboration.

Agrometeorology continued in several research projects with outside funding, amongst these two from the WRC: *Applications of rainfall forecasts for agriculturally related decision making in selected catchments* and *Water use of drought tolerant food crops*. Both are done in collaboration with the University of KwaZulu-Natal. The Canadian International Development Research Centre capacity building project in Zambia and Zimbabwe continued as planned. Prof. Walker visited her doctoral students and participated in a community level crops modelling exercise with small scale farmers at Monze and Sinazongwe in southern Zambia. Dr Stephen Crimp from Australia also visited the UFS in connection with this project and assisted students with weather/climate data and modelling exercises.

Research in weed science is ongoing in the section, with the effect of different formulations of alachlor on the bioactivity of this herbicide on sunflower being investigated. This work demonstrated conclusively that available cultivars differed in their sensitivity to the herbicide, and that this sensitivity was significantly affected by both the herbicide formulation being used and the soil type in which the crop was planted. The effects of various environmental factors on the sensitivity of the crop to this herbicide were also studied in pilot trials. This work will continue in an attempt to elucidate the cause of herbicide damage that has been noticed in the field. An investigation into the purported allelopathic effect of *Amaranthus cruentus* has com-



Ms Elzette Venter, honours student, determining the leaf area of maize.

menced, and will be continued during the coming year.

Agronomy research was also undertaken during the past year, and a number of research projects are currently in the planning stages. A study was initiated to establish the optimum plant population and water use of an ultra-fast maize hybrid under irrigation. This was done in an attempt to answer the question regarding the extent to which maize populations can be increased, or whether there are other plant configurations that would be more suitable at the high planting densities that are currently being seen under irrigation. In this trial different planting densities from 50 000 to 150 000 plants ha⁻¹ have been established at row widths of 0.225 to 0.9 m. This initial study will be expanded to include varieties with different growing season lengths and varying planting densities at a constant row width of 0.9 m.

Horticultural research was vested mainly in the training of students for advanced degrees, and on the effect of nitrogen fertiliser on the yield and quality of Swiss chard was investigated. This crop is very important in the poorer communities in particular where it plays an important role in the diet. It was found that yield increased with increasing levels of nitrogen, with no decrease even at an application rate of 800 kg N ha⁻¹, while time of application also affected yield. Nitrate content of the leaves was affected by the source of nitrogen used, with both ammonium nitrate and potassium nitrate increasing nitrate levels. This is an important finding as high nitrate levels may have a negative effect on human health.

The physiology team, under the leadership of Prof. Seef Pretorius, is engaged in long term research on natural product development for organic farming systems, seed treatments of economically important crops, yield enhancement and quality improvement of fruit, vegetable and field crops, development of alternative crops, and enhancement of systemically induced resistance of crop plants towards biotic and abiotic stress

factors. These aspects will be reported on in this order.

More than 3 000 wild plants have been screened for antifungal, anti-bacterial, bio-stimulatory and herbicidal activity. One product, a plant strengthening agent, was developed and commercialised during 2008. Over many seasons this product has shown the ability to induce resistance of monoculture crops to moderate biotic and abiotic stress conditions without jeopardising the potential yield. A second product, a natural fungicide, is in advanced stages of development. During the past season it was shown that the active compounds from two wild plants have direct antifungal properties against a wide range of plant pathogens, including rusts, and also have the ability to induce resistance to biotic stressors. The latter has recently been proven on gene level. A patent was registered in 2008 and trials to confirm the commercial potential are presently underway.

The direct treatment of seeds with either bio-stimulatory products or fertilizer prior to planting, or application of these chemicals mechanically at planting, with the aim of enhancing seedling vigour and plant stand, is gaining interest in South Africa. Research is still necessary to verify the economic potential of this approach. As a result a large number of laboratory and field trials, using a variety of fertilizer and bio-stimulants, were conducted during the past season. In some cases excellent results were obtained with a specific fertilizer mix in combination with a specific commercial bio-stimulant. Under field conditions plant stand as well as the final yield of wheat and maize were positively affected.

A vast number of statistical and commercial field trials using the patented natural bio-stimulatory product (reported last year) over several seasons confirmed the yield and quality-enhancing properties of this product in vegetables, fruit and field crops, especially under irrigation conditions. However, the yield results under rain-fed conditions were rather erratic. Conse-



Mr Tesfuney Weldemichael, Ph.D. student, determining wind velocity with an anemometer in maize.

quently, research was focused on finding solutions to this problem using wheat and maize. For this purpose an uptake enhancer, developed by the North-West University, was applied together with the product. As a result of the higher uptake of the active compounds, significant yield increases were demonstrated under dry land conditions when using the two products in combination.

The development of new crops is based on first identifying a commercial property, e.g. a nutritional property or any of the above-mentioned properties, to supply the rationale for establishing the agronomic requirements of the potential new crop. In this regard the two donor plants mentioned earlier show above average potential as new crops. This potential will be pursued after the antifungal product has been fully developed.

Crop protection against biotic stress factors via systemic induced resistance was investigated over the past 15 years. In the late 90s SYNGENTA commercialised a product, BION that induced resistance in crops to stress factors.



Doctoral students, Durton Nanja (left) from Zambia, and Ms Veronica Makuvaro from Zimbabwe, working on a crop model for a village in Monze, Zambia as part of an IDRC Capacity Building project to cope with climate change.

However, at that stage the agricultural community was probably not ready for this concept and the product was removed from the market. Lately, following ongoing press releases with regard to global warming, carbon dioxide level elevation and sporadic abiotic environmental stresses on the planet, there is renewed interest in this type of product, and BION has in fact returned to the market. In the mean time we have identified two molecules from wild plants that have an above average potential to contribute to systemically-induced resistance to both biotic and abiotic stress factors. The mechanism of action of these compounds has been partially elucidated physiologically and on gene level. The value of this discovery is that both molecules are organic, can be registered as suitable for organic plant production, and have the potential to be developed as natural products. A patent for both compounds was registered in 2008.

Research on irrigation and salinity of soils is entering a new phase

through the Free State Department of Agriculture funded project: *Application of electromagnetic induction technology for characterizing salinity and water logging in irrigated fields*. A salinity monitoring system was compiled by using electromagnetic induction and global positioning system technology. Prof. Leon van Rensburg is testing the system currently and at the same time he is training two members of the Oppermans community to use it properly.

The Water Cluster of the UFS provided funds to support Mr Ben Schoonwinkel in his study on water logging and the impact thereof on crop yields. This research links strongly with the current WRC-funded project *Managing salinity associated with irrigation in selected areas of South Africa*. The latter project is in its last year and a report will follow soon on best management practices of salinity under irrigation. Staff members involved are Profs Chris Du Preez, Leon Van Rensburg and Alan Bennie and Messrs Johan Barnard and Jason Sparrow.

The second phase of a research project on the fate of organic matter in cultivated plinthic soils reverted to perennial pasture progressed smoothly under the leadership of Prof. Wulf Amelung of the University of Bonn in Germany. Prof. Du Preez is a member of this team, which is financed by the Research Foundation of Germany. The planning of a third phase destined to start next year is in an advanced stage. In conjunction with this research, Prof. Du Preez and Ms Elmarie Kotzé investigated the influence of cultivation practices on the organic matter content of a plinthic soil in a long-term experiment of the Agricultural Research Council's (ARC) Small Grain Institute at Bethlehem, Eastern Free State.

Prof. Du Preez is also a member of a team conducting research on the modelling of non-point pollution of water by agriculture. Researchers from five universities, namely the universities of KwaZulu-Natal, Pretoria, Stellenbosch, Free State and the Western Cape as well as two ARC institutes (Soil, Climate and Water and Plant Protection)

have been incorporated due to the multi-disciplinary nature of the work. This project is managed by Sigma Beta Consulting Engineers and is nearing its completion.

Until recently, hydrological models either ignored the role of soil, or treated it as a uniform system. To address this aspect further, the WRC funded the pedology team consisting of Drs Le Roux, Van Huyssteen and Malcolm Hensley for another three years to bridge the gap known internationally as hydrogeology. The project entitled: *Hydropedological interpretation of soils in selected catchments with the aim of improving efficiency of hydrological models* is led by Dr Le Roux. Conceptual models of the hydrology of characteristic hillslopes in different catchments will be developed.

Dr Cornie van Huyssteen was the Vice-President of the Soil Science Society of South Africa (SSSSA). He also served as Chairman of the Soil Survey Society of South Africa and on the Editorial Committee of the *South African Journal of Plant and Soil*.

Dr Piet le Roux visited Kenya to attend a workshop on invitation of the Joint Research Commission of Soil Atlas for Africa. Ideas were exchanged on the publication of a Soil Atlas for Africa.

Prof. Du Preez was appointed to the Editorial Board of *Water SA* for a three-year term. He was also requested by the Department of Water Affairs and Forestry to serve on a team developing risk-based water quality guidelines for South Africa.

Prof. Sue Walker and Ms Linda de Wet attended a four week workshop entitled: *Qualitative research in practice*. They were both awarded a certificate in qualitative research from the Division: Student Development and Success at the UFS. Ms De Wet also attended two other workshops, namely *Adult learners, their characteristics and needs* by Prof. Julia Preece and *Agriculture market prospects* by Prof. Johan Willemse from the university's Department of Agricultural Economics. She also arranged a

NewStart Eco-gardening course using a water-saving irrigation system for interested staff on the campus, and attended a *Writing of learning outcomes* course.

Prof. Sue Walker was invited to the Regional Capacity Building Workshop on Climate Change Adaptation for Agriculture in East and Greater Horn part of Africa, funded by the Rockefeller Foundation. She presented several talks and facilitated the discussions around community participation and development of agrometeorology services and products from the seasonal climate forecasts. While in Nairobi, Prof. Walker also delivered the main opening address for the Greater Horn of Africa Climate Outlook Forum, at which the latest seasonal climate forecast was announced and discussed. This provided a good time to interact with climate scientists from this part of Africa and to gain some ideas of things that could be implemented in South Africa.

The highlight of the year for Agrometeorology was that Prof. Kees Stigter, a world renowned Agrometeorologist, spent four months as a visiting professor in the department. His visit began with interactions with both the South African Weather Services and the National Department of Agriculture in Pretoria. Then he was a guest speaker at the opening

of the Combined Conference of the South African Society of Crop Production, the Soil Science Society of Southern Africa, the Southern African Weed Science Society (SAWSS) and the Southern African Society for Horticultural Sciences (SASHS) held at Rhodes University in Grahamstown with a talk entitled *Panta Rhei: changes in agrometeorological adaptation strategies to climate change*.

The major contribution that Prof. Stigter made was that he presented two one-week training seminars. The first dealt with the theory and practices of agrometeorology services. It was attended by 48 people from five provinces in South Africa. The second was on the contribution of agrometeorology to sustainable agriculture and was also attended by 40 people. The majority of the participants are employed by the various provincial departments of agriculture and they serve in a section dealing with agricultural disaster management and early warning. These courses were funded by the national Department of Agriculture: Directorate Agricultural Disaster Risk Management.

Further, Prof. Stigter also interacted with the postgraduate students and delivered undergraduate classes on *Microclimate manipulation*. Due to his wealth of knowledge and experience

in Africa over 30 years he was able to advise and give insight to students busy with a whole range of agrometeorology projects – including in-field rainwater harvesting, soil evaporation, dissemination of weather and climate forecasts and others related to the development of agrometeorology services of all types. He has truly been an inspiration to the staff and students in Agrometeorology. ■

Research outputs

Research articles

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Engelbrecht, G.M., Du Preez, C.C. & Spies, J.J. 2008. Response of *Lachenalia* growing in soil to nitrogen fertilization during the pot plant phase. *South African Journal of Plant and Soil* 25: 92-98.

Kotze, E. & Du Preez, C.C. 2008. Influence of long-term wheat residue management on acidity and macronutrients in an Avalon soil. *South African Journal of Plant and Soil* 25: 14-21.

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Molete, S.F., Du Preez, C.C. & Marake, M.V. 2008. Relations between phosphorus retention parameters and some other properties of the benchmark soils in Lesotho. *South African Journal of Plant and Soil* 25: 99-104.

Staff

Professors: Profs. Chris du Preez, Seef Pretorius, Leon van Rensburg, Sue Walker

Affiliated Associate Professors: Prof. M Hensley

Senior Lecturers: Drs James Allemann, Piet le Roux, Cornie van Huyssteen

Lecturers: Drs Gert Ceronio, Gesine Engelbrecht, Mss Anneline Bothma-Schmidt, Linda de Wet, Elmarie Kotzé

Junior Lecturers: Mr Abraham Steyn

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Supervisors and doctoral students share a joke as they extract information from natural resource maps drawn by farmers in the Monze district of Zambia, as part of an IDRC Capacity Building project to cope with climate change. From the left are: Prof. Sue Walker, from the department, Dr Adelaide Munodawafa, Midland State University, Zimbabwe, Mr Prospard Gondwe, Ph.D. student, Dr John Dimes, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Bulawayo and Veronica Makuvaro, Ph.D. student.

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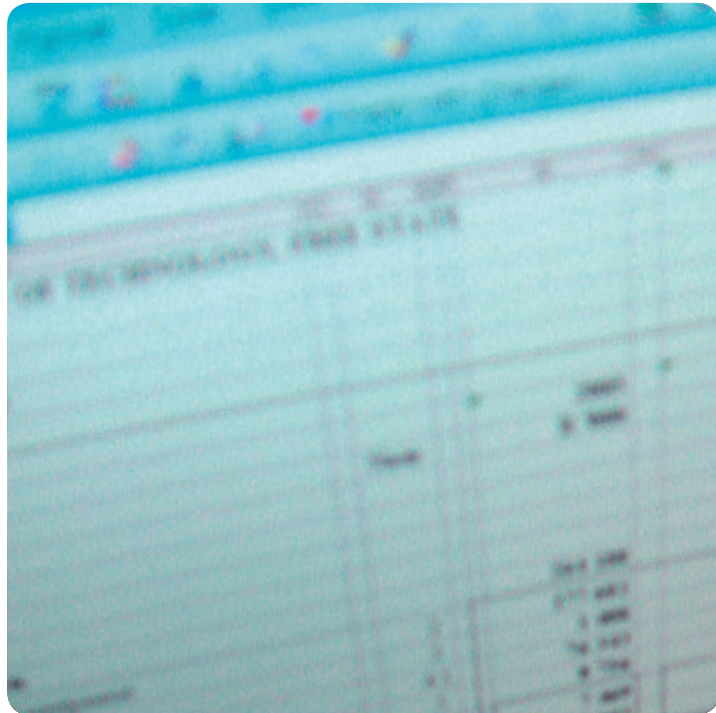
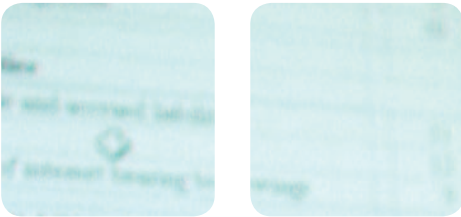
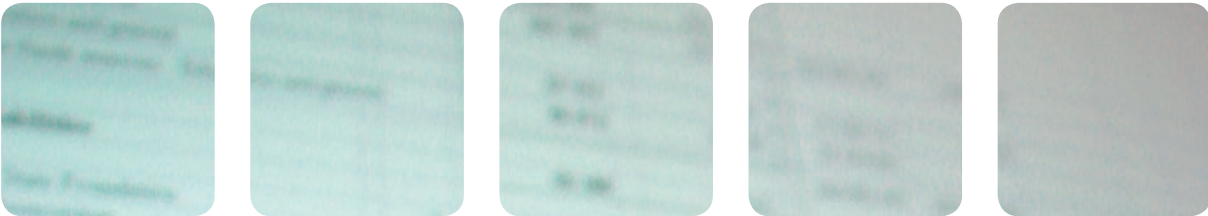
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Statistical data

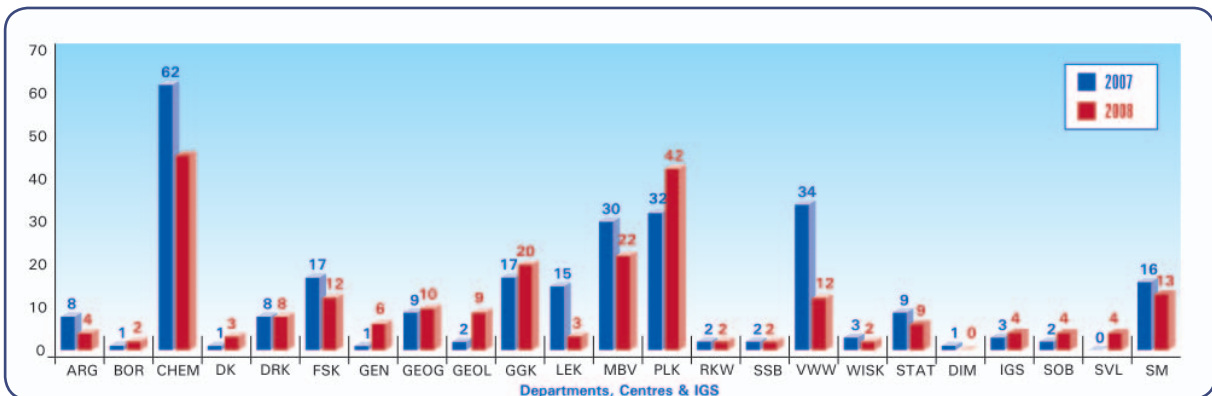


Research outputs: 2007-2008

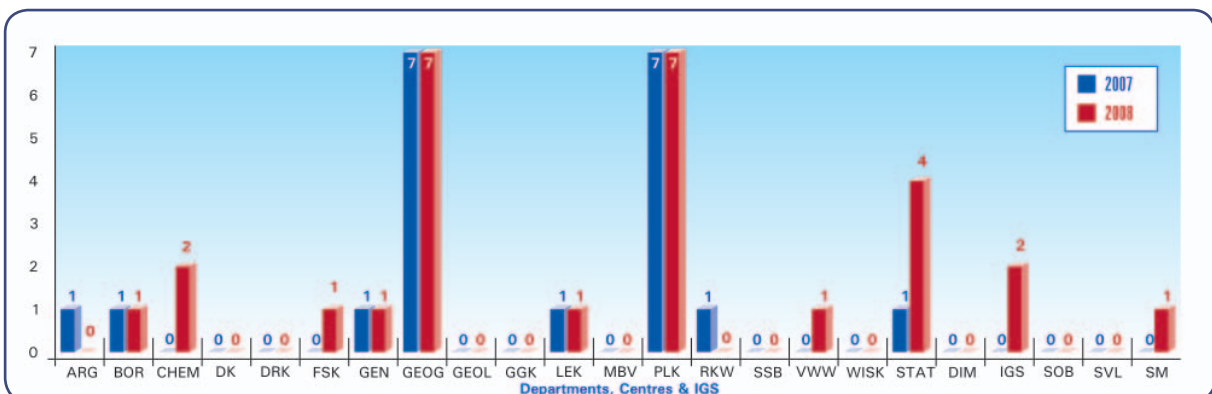
List of abbreviations

Abbreviation	Name	Abbreviation	Name
ARG	Department of Architecture	GGK	Department of Soil, Crop and Climate Sciences
BOR	Department of Quantity Surveying and Construction Management	IGS	Institute for Groundwater Studies
SOB	Centre for Environmental Management	LEK	Department of Agricultural Economics
CEM	Department of Chemistry	MBV	Department of Microbial, Biochemical and Food Biotechnology
SM	Centre for Microscopy	PLK	Department of Plant Sciences
SVL	Centre for Sustainable Agriculture and Rural Development	RKW	Department of Computer Science and Informatics
DK	Dean's Office	SSB	Department of Urban and Regional Planning
DRK	Department of Zoology and Entomology	SRB	Disaster Management Training and Education Centre for Africa (DIMTEC)
FSK	Department of Physics	VWW	Department of Animal, Wildlife and Grassland Sciences
GEN	Department of Genetics	STAT	Department of Mathematical Statistics and Actuarial Science
GEOG	Department of Geography	WISK	Department of Mathematics and Applied Mathematics
GEOL	Department of Geology		

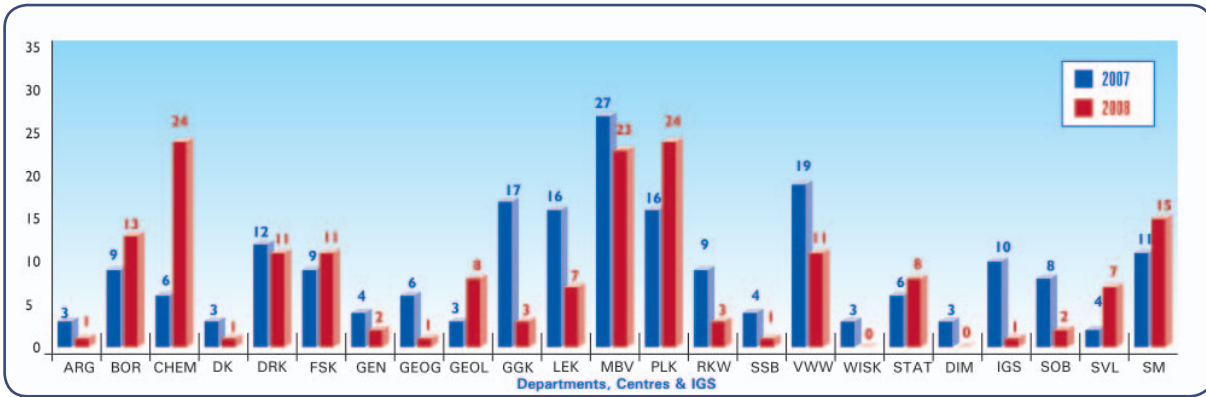
Accredited articles



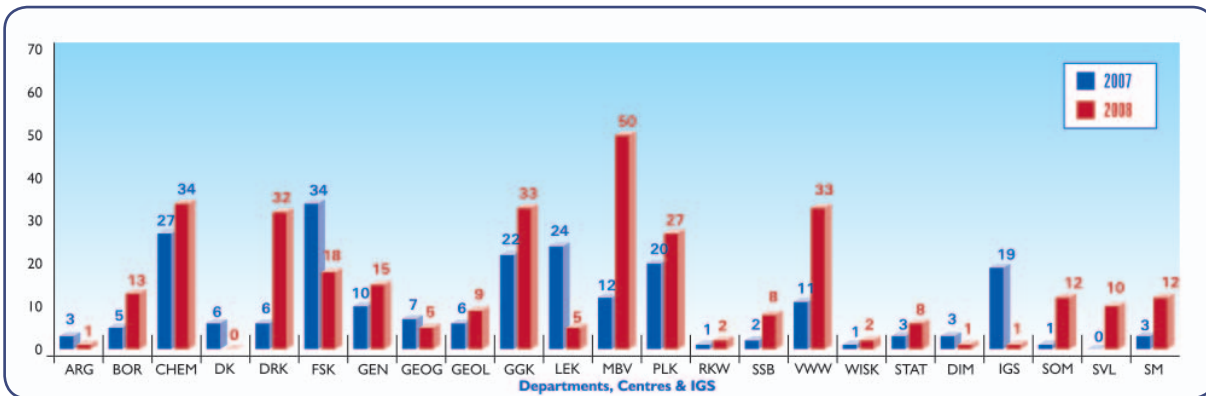
Books



International conferences



Local conferences



Student figures: 2007-2008

Student figures

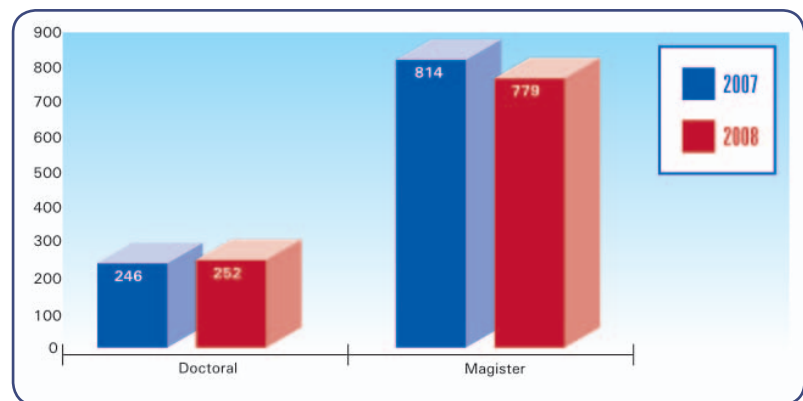
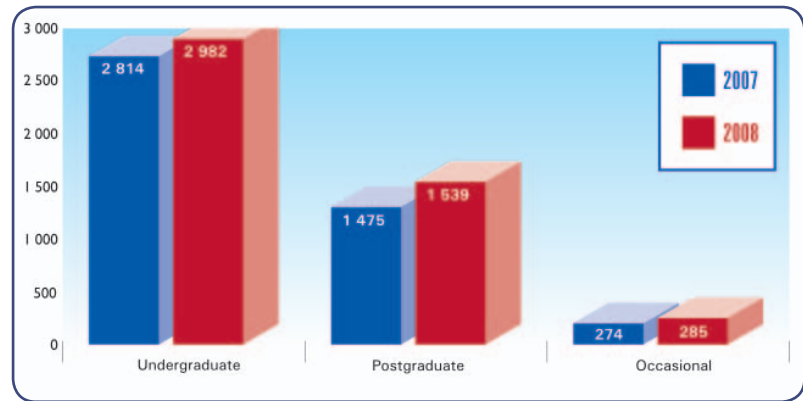
Year	Description	Black	Coloured	Asian	White	Total
2007	Undergraduate	1492	66	38	1218	2814
	Postgraduate	710	41	40	684	1475
	Occasional	230	6	2	36	274
*TOTAL		2432	113	80	1938	4563
2008	Undergraduate	1667	51	37	1227	2982
	Postgraduate	755	40	43	701	1539
	Occasional	260	5	1	19	285
* TOTAL		2682	96	81	1947	4806

International students

Nationality	Year	Year
	2007	*2008
Angola	2	0
Asian countries	20	24
Botswana	17	23
Democratic Republic of the Congo	0	1
European countries	9	10
Lesotho	118	144
Malawi	3	5
Mauritius	2	3
Mozambique	4	7
Namibia	54	65
North America	15	5
Other African countries	47	69
South America	1	0
Swaziland	5	6
Zambia	7	7
Zimbabwe	48	60
Total	352	429

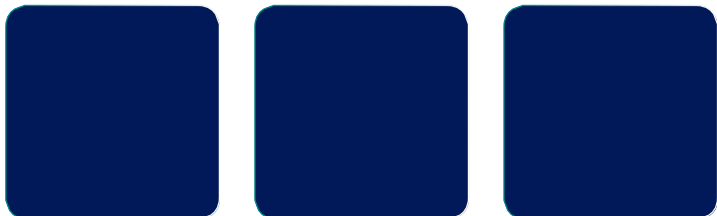
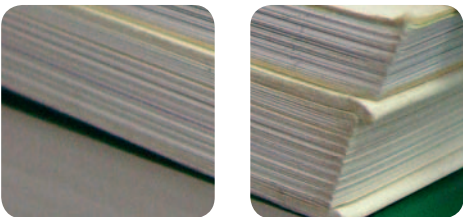
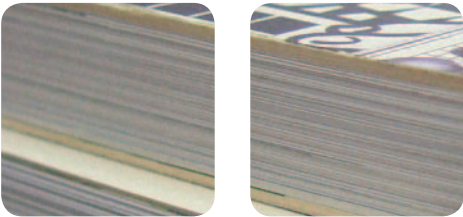
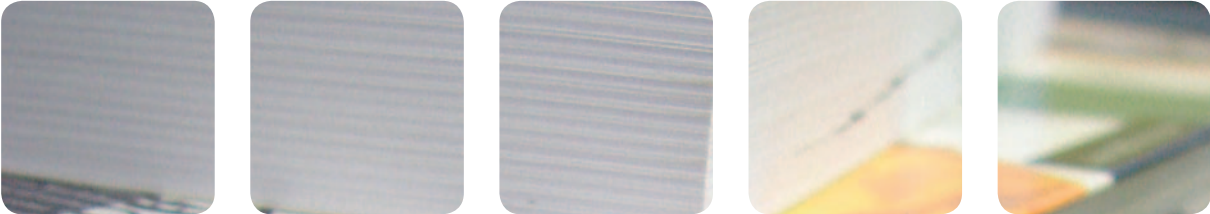
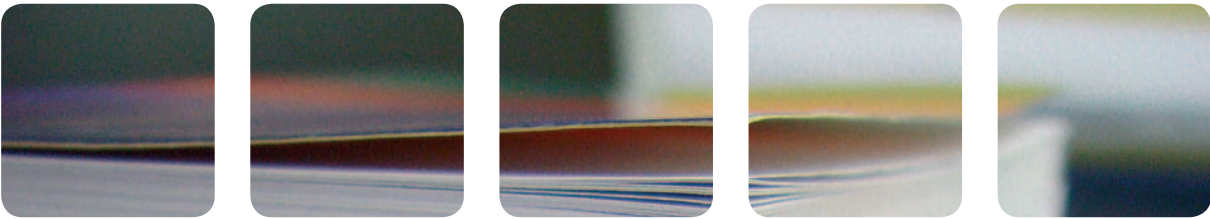
*2008 Final HEMIS figures not available

Comparison for the Faculty of Natural and Agricultural Sciences





Glossary



Glossary

A

AACC -	American Association for Cereal Chemists
AACE -	Association for the Advancement of Cost Engineering
ADF -	Amsterdam Density Functional Programme
ADG -	Average Daily Grain
AEASA -	Agricultural Economics Association of South Africa
AEON -	the African Earth Observation Network
AGU -	American Geophysical Union
AI -	Artificial Insemination
ARC -	Agricultural Research Council
ARV -	Antiretroviral
ASC -	Architecture Student Conference
ASAQS -	Association of South African Quantity Surveyors
ASOCSA -	Association of Schools of Construction of Southern Africa

B

BBSRC -	Biotechnology and Biological Sciences Research Council
BMBF -	Federal Ministry of Education and Research, Germany

C

CAA -	Commonwealth Association of Architects
CANSA -	Cancer Association of South Africa
CAB -	Centro de Astrobiología
CED -	Centre for Education Development
CePHMa -	Centre for Plant Health Management
CHESD -	Centre for Higher Education Studies and Development
CHPC -	Centre for High Performance Computing
CIDB -	Construction Industry Development Board
CIOB-SA -	Chartered Institute of Building, South Africa
CSIR -	Council for Scientific and Industrial Research Organisation
CSTA -	Cereal Science and Technology Association
CUT -	Central University of Technology

D

DiMTEC -	Disaster Management Training and Education Centre for Africa
DMISA -	Disaster Management Institute of Southern Africa
DRRW -	Durable Rust Resistance in Wheat
DST -	Department of Science and Technology
DWAF -	Department of Water Affairs and Forestry

E

ECA -	European Crystallographic Association
EGIC -	Economic Growth and International Competitiveness
EMSA -	Environmental Management Systems Association
EMS -	Environmental Management Systems
EPWP -	Expanded Public Works Programme

F

FAO -	Food and Agricultural Organisation
FETWater -	Framework Programme for Research Education and Training in Water
FMP -	Facilities Management Programme
FSRDPP -	Free State Rural Development Partnership Project
FTIR -	Fourier Transform Infra Red Spectrometer

G

FGAP -	Facility for Genomics and Proteomics
GIS -	Geographical Information Systems
GMO -	Genetically Modified Organisms
GRDM -	Groundwater Resource Directed Measures
GSSA -	Grassland Science Society of South Africa
GSSA -	Geological Society of South Africa

H

HCI -	Human-computer Interaction
HRTEM -	High Resolution Transmission Electron Microscopy

I

IAMA -	International Food and Agribusiness Management Association
IAU -	International Astronomical Union
ICACS -	International Conference on Atomic Collisions in Solids
ICCC -	International Conference on Coordination Chemistry
ICEC -	International Cost Engineering Council
ICRISAT -	International Crops Research Institute for the Semi-Arid Tropics
ICSU -	International Council for Science
IDC -	Industrial Development Corporation
IGC -	International Geological Congress
IGS -	Institute for Groundwater Studies
IMWA -	International Mine Water Association
INCRoP -	Insects on New Crops Programme
IPMP -	Intensive Project Management Programme
ISI -	International Statistical Institute
ISME -	International Society for Microbial Ecology
IT -	Information Technology
IUMS -	International Union of Microbiological Societies

L

LPI -	Lunar and Planetary Institute
LRAD -	Land Redistribution for Agricultural Development

M

MCEE -	Minnesota Council on Economic Education
MDC -	Maputo Development Corridor
MEC -	Member of the Executive Council
MNS -	Material and Nanosciences Cluster
MOU -	Memorandum of Understanding
MRC -	Medical Research Council
MSA -	Masters in Sustainable Agriculture
MSSA -	Microscopy Society of Southern Africa
MUCPP -	Mangaung University Community Partnership Programme

N

NAMC - National Agricultural Marketing Council
 NASA - National Aeronautics and Space Administration
 NASSP - National Astrophysics and Space Science Programme
 NBN - National Bioinformatics Network
 NCEE - National Council for Economic Education
 NDF - Neutral Detergent Fibre
 NECSA - Nuclear Energy Corporation of South Africa
 NERPO - National Emergent Red Meat Producers Organisation
 NGO - Non-Governmental Organisation
 NRF - National Research Foundation
 NSTF - National Science and Technology Forum
 NWGA - National Wool Growers' Association

O

OECD - Organisation for Economic Cooperation and Development

P

PAQS - Pacific Association of Quantity Surveyors
 PDMS - Provincial Disaster Management Centre
 PRT - Protein Research Trust

R

RDP - Redress and Development Programme
 RIBA - Royal Institute of British Architects
 RICS - Royal Institute of Chartered Surveyors
 RIEP - Research Institute of Education Planning
 RMMA - Red Meat Abattoirs Association
 RPO - Red Meat Producers Organisation
 RTPI - Royal Town Planning Institute

S

SA - South Africa
 SAAPMB - South African Association of Physicists in Medicine and Biology
 SAB - South African Breweries Limited

SABC - South African Broadcasting Corporation
 SACAP - South African Council for the Architectural Professions
 SACPCMP - South African Council for the Property Valuers Profession
 SACPLAN - South African Council of Planners
 SACQSP - South African Council for the Quantity Surveying Profession
 SADC - Southern African Development Community
 SAFA - South African Feedlot Association
 SAFEFE - South African Foundation for Economic and Financial Education
 SAFOI - South African Fryer Oil Initiative
 SAIA - South African Institute of Architects
 SAIM - Society for Industrial and Applied Mathematics
 SAISC - Southern African Institute of Steel Construction
 SANBI - South African National Biodiversity Institute
 SANCID - South African Commission on Irrigation and Drainage
 SANPAD - South African Netherlands Research Programme on Alternatives in Development
 SANSA - South African National Survey of Arachnida
 SAPOA - South African Property Owners Association
 SAPPS - Symposium of the South African Pecan Producers Association
 SAQA - South African Qualifications Authority
 SASA - South African Statistical Association
 SASHS - Southern African Society for Horticultural Sciences
 SASM - South African Society for Microbiology
 SAWMA - South African Wildlife Management Association
 SAWSS - Southern African Weed Science Society
 SCM - Scientific Computing and Modeling
 SEG - Society of Economic Geologists
 SEM - Scanning Electron Microscope

SLE - Senior Lecturer Equivalent
 SSSSA - Soil Science Society of South Africa
 SWMA - Southern African Wildlife Management Association

T

TEM - Transmission Electron Microscope
 THRIP - Technology and Human Resource for Industry Programme

U

UCT - University of Cape Town
 UEC - Unit for Earth Construction
 UFS - University of the Free State
 UJ - University of Johannesburg
 UK - United Kingdom
 UN - United Nations
 UNESCO - United Nations Educational, Scientific and Cultural Organisation
 UNU - United Nations University
 UP - University of Pretoria
 USA - United States of America
 USAID - United States Agency for International Development
 UWC - University of the Western Cape

W

WCAP - World Conference on Animal Production
 WITS - University of the Witwatersrand
 WRC - Water Research Commission

