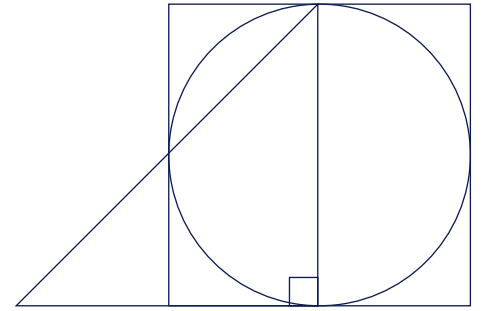


# Report

05/06



## Faculty of Natural and Agricultural Sciences



# Faculty of Natural and Agricultural Sciences

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Cover page: Aspects of natural and agricultural sciences.

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# From the Dean's office



*Prof. Herman van Schalkwyk.*

The Faculty of Natural and Agricultural Sciences at the University of the Free State (UFS) leads the way in the practising of natural and agricultural sciences in South Africa and the highest levels of quality and credibility are reflected.

Our commitment, however, reaches far beyond just this. It reaches beyond the borders of the country and across continents; its multi-disciplinary and practical approach is vested in all the disciplines presented by the faculty.

In 2005/06 the Faculty experienced significant growth in measurable outputs. A contributing factor was the comprehensive apparatus strategy and plan which was implemented in 2005. With this strategy, university funds were used to leverage other funds in order to obtain huge discounts from suppliers of apparatus. In this way the faculty managed to obtain almost R50 million worth of apparatus in 2005.

The strategy was continued in 2006 when an agreement to the value of R7 542 531 was reached with Shimadzu, according to which apparatus was supplied to the faculty at discount prices. The agreement, which is valid for three years, entails the free replacement of apparatus which is purchased during this period with upgraded versions.

The new apparatus forms part of the UFS vision to compete internationally with quality research outputs in certain niche areas, to provide leadership in advanced training to students from the African continent and to establish the university as a leader among South African universities.

Two researchers with a B rating from the National Research Foundation (NRF) were also appointed. Both of these initiatives bore fruit and in 2006 the faculty increased its total research outputs by

about 13%. As an example, the Department of Chemistry's outputs increased by 100%.

The faculty has been bursting at the seams over the past couple of years. Student figures rose from 3 935 undergraduate, postgraduate and occasional students in 2005, to 4 224 in 2006. There is also strong representivity of students from other African countries and in 2005/06 almost 600 students studied at the faculty.

An extended B.Sc. programme has been presented to students since 2005. The programme aims at providing students who do not comply with all the requirements for the B.Sc. programme with the necessary sub-structure to complete the B.Sc. degree successfully. A preliminary evaluation of the results indicates that the programme is delivering the desired results.

The alignment of the Qwaqwa Campus, which was incorporated into the UFS in January 2003, remains a challenge. Regular discussions are held with staff on the campus in order to make the faculty's programmes more sustainable and to align it with the broader strategic plan of the UFS.

On a national level, the faculty is in the process of making its mark in terms of teaching and community service. In 2005 the faculty again actively began utilising its

experimental farms. A three-way agreement between the UFS, the National Farmers Union (NAFU) and the Mangaung Local Municipality led to the establishment of the Lengau Agricultural Development Centre on the Sydenham Experimental Farm. The centre provides training and mentorship to small-scale upcoming farmers.

To be dynamic and progressive requires innovative thinking. It requires commitment and a desire to deliver excellent teaching and learning opportunities to students. It requires a willingness to form partnerships, and a multi-disciplinary and practical approach to the tertiary education environment in South Africa.

This report covers the faculty's activities in 2005/06. It is a reflection of two years' commitment on the part of a team of skilled and motivated academics and support staff.



**Prof. Herman van Schalkwyk**

Dean: Faculty of Natural and Agricultural Sciences  
University of the Free State

# Urban and Regional Planning



“South Africa is bursting at the seams and we would like to ensure that everyone gets his rightful place in the sun.”

Prof. Das Steyn.

## Overview

The year 2005 kicked off with two new programmes being presented for the first time: honours degrees in Spatial Planning and Land Property Development Management (Housing).

The honours in Spatial Planning is part of the new package consisting of a one-year honours and a one-year master's programme in Urban and Regional Planning (MURP), which replaces the old two-year MURP programme. Both of these qualifications are necessary to register as a professional urban and regional planner.

It is important that students complete most of the basic theoretical work during the honours course and then concentrate more on research while doing their master's degree. A student undertaking this new masters degree will be able to specialise in Sustainable Rural Development, Tourism and Development, Community Planning or Integrated Developmental Planning.

In 2005 two contract research projects were completed. The first project, with Dr Maléne Campbell as study leader, was a study into the possibility of a development corridor between Bloemfontein and Welkom. Prof. Steyn, Departmental Chairperson, and a team of students were closely involved in the research and found that such a corridor would not be viable. They pointed out that the national government would have to help by supplying economic aid to save the Free State Goldfields.

Prof. Steyn and Mr Piet Potgieter led a departmental team in the compiling of a redevelopment plan for the Bloemfontein urban centre. The team was part of a greater multi-disciplinary team under the leadership of Mr Kobus Botha from Vela VKE Consulting Engineers and included Mr Kobus du Preez from the UFS Department of Architecture and Dr Lochner Marais from the Centre for Development at the UFS.

In 2006 the field work for a project of the South Africa-Netherlands Research Programme on Alternatives in Development (SANPAD) on



Students doing a practical survey of Bloemfontein.

the acceptability of earth construction was completed. Prof. Steyn, study leader, worked with Ms Petria Jooste-Smit and Mr Gerhard Bosman from the UFS Department of Architecture on this project. Ms Tamara Derksen, a student from the Technical University of Eindhoven and an associate of the department, helped with the statistical

work. A draft report was tabled in November 2006 in Eindhoven during a workshop held to analyse the final results. The final report will be completed in 2007. The department also published a special festival centennial issue *UV 100 jaar* of the journal *Stads- en Streeksbeplanning* in which the department's accredited articles appeared.



Students busy with a housing survey in informal settlements for the South Africa-Netherlands Research Programme on Alternatives in Development for an earth construction research project.





A play, written by Mr David Brink from Stage Alive, was performed in Sesotho and Tswana by two students – Galie Malebo and Godfrey Manenye – from the UFS. Here the play is performed at the Dibeng-Sa Tsebo School. The play was performed to teach communities how to build houses using earth bricks.

### Academic staff

**Professor:** Prof. Das Steyn  
**Senior Lecturer:** Dr Marléne Campbell  
**Lecturers:** Mr Pieter Potgieter,  
 Ms Lize Barclay  
**Senior Professional Officer:** Ms  
 Drienie Steenkamp

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## Research outputs

### Publications

**Detering, A., Campbell, M.M. & De Kock, J.** 2005. City-regional councils: A myth, or method for better planning? The case of the Khomas region (Namibia). *Acta Structillia* 12(1&2): 84-105.

**Potgieter, P.J.** 2005. Studentehuse rondom die Universiteit van die Vrystaat: 'n Noodsaaklike euwel? *Urban and Regional Planning* 48: 17-26.

**Steenkamp, G.M. & Steyn, J.J.** 2006. To control or not to control: The role of sustainable planning in order to accommodate informal brickyards in the integrated development plan of the Mangaung Municipality. *International Journal of Sustainable Development and Planning* 1(4): 1-8.

**Steenkamp, G.M., Mogoe, M.E., Campbell, M.M. & Steyn, J.J.** 2005. Moontlike ruimtelike oplossings vir gesinne en gemeenskappe waar die gesinstuktuur verander het weens MIV/VIGS. *Urban and Regional Planning* 48: 27-34.

**Steyn, J.J.** 2005. *Inspraak sonder insig is uitspraak sonder uitsig*. Research publication 31: Department of Urban and Regional Planning, University of the Free State, Bloemfontein, South Africa.

**Steyn, J.J.** 2005. The European Union's is not a development model for Africa. *Urban and Regional Planning* 49: 34-44.

**Steyn, J.J. & Jooste-Smit, P.** 2006. Informal small brickyards in Free State townships are enhancing local economic development. *Acta Structillia* 13(1): 82-105.

**Steyn, J.J. & Steyn, M.M.** 2005. Die rol en plek van ideologie in stadsbeplanningsteorie. *Tydskrif vir Christelike Wetenskap* 41(1&2): 193-213.

### Conference contributions

**Bolton, T. & Campbell, M.M.** 2005. *The R30 region as development corridor: A study to determine the feasibility of development*. Paper presented at the 18th Workshop on European Advanced Studies, Institute in Regional Science, Lodz and Krakow, Poland.

**Campbell, M.M.** 2006. *The changing profiles of homeless people: Conflict, rooflessness and the use of public space*. Paper presented at the 17th Europe Advanced Studies Conference, Institute in Regional Science, Ljubljana, Slovenia.

**Campbell, M.M.** 2006. *The viability of a corridor development of the R30 Route between Welkom and Bloemfontein*. Paper presented at the Planning Africa 2006 Conference: Making the connection, Cape Town, South Africa.

**Campbell, M.M., Ward, M. & Stewart, T.** 2005. *Towards the integration of housing with a mass transport system in the Greater Johannesburg*. Paper presented at the 33rd World Congress in Housing, Pretoria, South Africa.

**Steenkamp, G.M.** 2005. *Brickyard: A threat to the environment or job creation?* Paper presented at the 11th Annual Conference of the International Association for Impact Assessment, Thaba 'Nchu, South Africa.

- Steenkamp, G.M.** 2006. *Stormwater in South Africa: A problem or an asset? A planning perspective*. Paper presented at the Sustainable Built Environments Conference: Sustainable Building - Mitigating Social and Environmental Poverty, Bloemfontein, South Africa.
- Steenkamp, G.M. & Steyn, J.J.** 2005. *To control or not to control? The role of sustainable planning in order to accommodate informal brickyards in the integrated development plan of the Mangaung Municipality*. Paper presented at the Sustainable Development and Planning Conference, Bologna, Italy.
- Steyn, J.J.** 2005. *The European Union is not a role model for Africa's NEPAD*. Paper presented at the 18th Workshop on European Advanced Studies, Institute in Regional Science, Lodz and Krakow, Poland.
- Steyn, J.J.** 2006. *'n Plekkie in die son vir elkeen: Ruimtelike lesse uit België vir 'n Suid-Afrika in transformasie*. Paper presented at the "Suid-Afrikaanse Akademie vir Wetenskap en Kuns Multidissiplinêre Wetenskapsimposium", Bloemfontein, South Africa.
- Steyn, J.J.** 2006. *Orania: An eco town to accommodate Afrikaners*. Paper presented at the 6th Eco-city Conference, Bangalore, India.
- Steyn, J.J.** 2006. *Sustainability: An acceptable world wide religion which few practices*. Paper presented at the Sustainable Built Environments Conference: Sustainable Building - Mitigating Social and Environmental Poverty, Bloemfontein, South Africa.
- Steyn, J.J. & Drewes, E.** 2005. *NEPAD – Uitdaging vir ruimtelike beplanning om 'n droom te realiseer*. Paper presented at the "Suid-Afrikaanse Akademie vir Wetenskap en Kuns Simposium", Pretoria, South Africa.
- Steyn, J.J. & Schoeman, A.D.** 2005. *Is Ad Hoc planning the death in the pot for urban neighbourhoods? A case study of Langenhoven Park (Mangaung Municipality)*. Paper presented at the Housing Research Dissemination Day, Housing Educators' Forum, Free State Branch, Department of Housing, Bloemfontein, South Africa.
- Steyn, J.J. & Schoeman, A.D.** 2006. *Is Ad Hoc planning the death in the pot for urban neighbourhoods? A case study of Langenhoven Park (Mangaung Municipality) changing from a garden suburb to a possible urban liability*. Paper presented at the Planning Africa 2006 Conference: Making the Connection, Cape Town, South Africa.
- Steyn, J.J. & Schoeman, A.D.** 2006. *Public space determines the quality of housing: A case study in Langenhoven Park (Mangaung Local Municipality)*. Paper presented at the South African Housing Foundation Conference, Cape Town, South Africa.

# Statistical data of the faculty

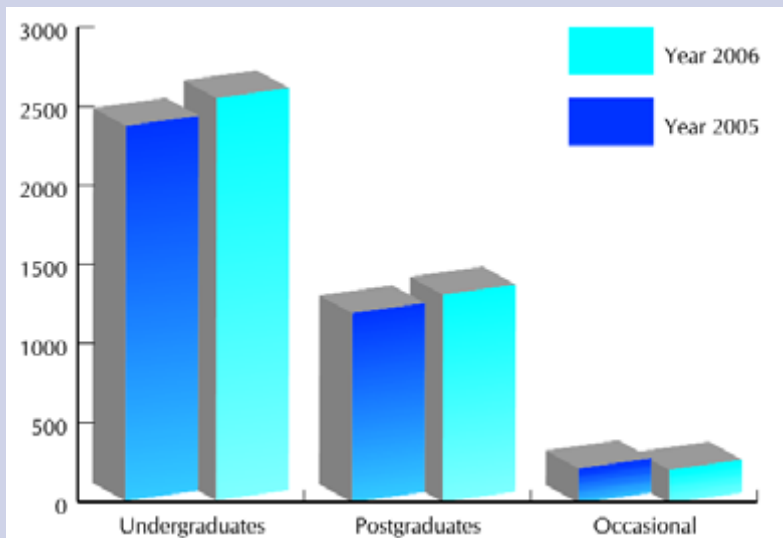


# Student figures

Faculty of Natural and Agricultural Sciences, 2005/06

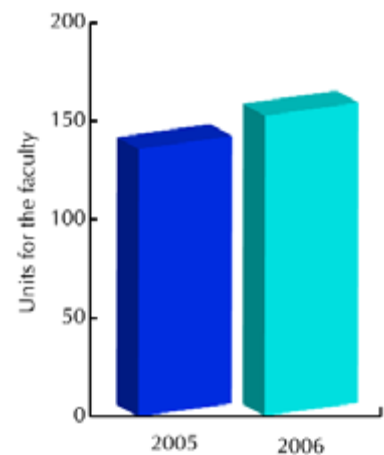
Male					
2005					
Description	African	Coloured	Indian	White	Total
Undergraduate	676	31	26	724	1457
Postgraduate	351	22	15	400	788
Occasional	84	3	4	17	108
<b>Total 2005</b>	<b>1111</b>	<b>56</b>	<b>45</b>	<b>1141</b>	<b>2353</b>
2006					
Description	African	Coloured	Indian	White	Total
Undergraduate	729	28	21	768	1546
Postgraduate	385	21	16	431	853
Occasional	68	2	2	23	95
<b>Total 2006</b>	<b>1182</b>	<b>51</b>	<b>39</b>	<b>1222</b>	<b>2494</b>
Female					
2005					
Description	African	Coloured	Indian	White	Total
Undergraduate	563	41	11	394	1009
Postgraduate	206	16	11	221	454
Occasional	101	5	2	11	119
<b>Total 2005</b>	<b>870</b>	<b>62</b>	<b>24</b>	<b>626</b>	<b>1582</b>
2006					
Description	African	Coloured	Indian	White	Total
Undergraduate	641	39	17	401	1098
Postgraduate	243	15	17	234	509
Occasional	103	2	2	16	123
<b>Total 2006</b>	<b>987</b>	<b>56</b>	<b>36</b>	<b>651</b>	<b>1730</b>
Total					
2005					
Description	African	Coloured	Indian	White	Total
Undergraduate	1239	72	37	1118	2466
Postgraduate	557	38	26	621	1242
Occasional	185	8	6	28	227
<b>Total 2005</b>	<b>1981</b>	<b>118</b>	<b>69</b>	<b>1767</b>	<b>3935</b>
2006					
Description	African	Coloured	Indian	White	Total
Undergraduate	1370	67	38	1169	2644
Postgraduate	628	36	33	665	1362
Occasional	171	4	4	39	218
<b>Total 2006</b>	<b>2169</b>	<b>107</b>	<b>75</b>	<b>1873</b>	<b>4224</b>

Student nationality		
Nationality	2005	2006
Angola	1	
Asian countries	21	18
Botswana	20	20
European countries	6	6
Lesotho	142	142
Malawi	2	1
Mauritius		2
Mozambique	8	7
Namibia	40	42
No information	1	
North America	4	4
Other Africa	45	48
South Africa	3610	3893
South America		1
Swaziland	13	13
Zambia	4	6
Zimbabwe	18	21
<b>Total</b>	<b>3935</b>	<b>4224</b>



Student figures

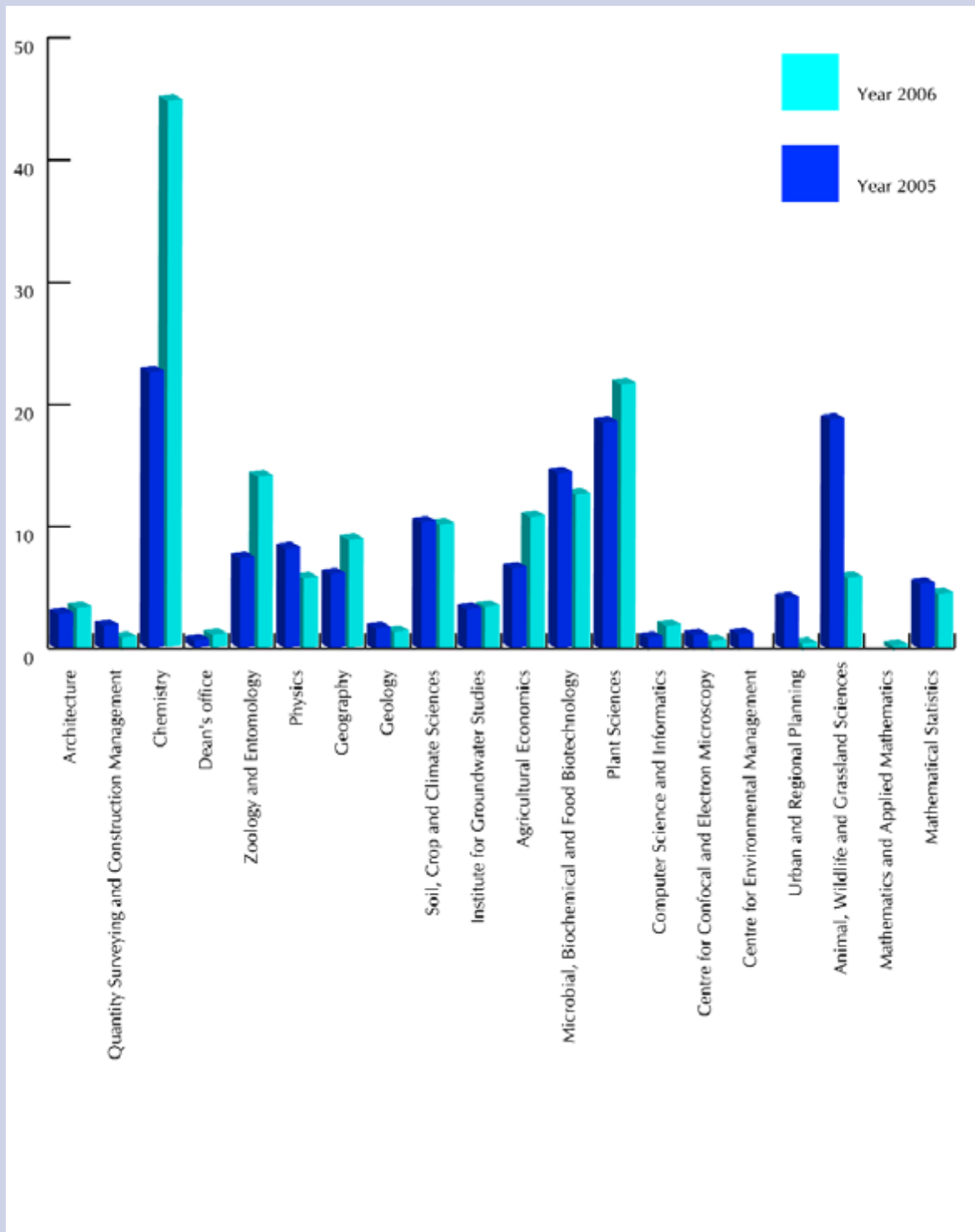
## Research outputs for the Faculty of Natural and Agricultural Sciences



Articles published in accredited approved research journals.

## Departmental research outputs

Articles published in accredited approved research journals, 2005/06



# Glossary



# Glossary

## A

ACIAR	Australian Centre for International Agricultural Research
AEASA	Agricultural Economics Association of South Africa
ALPRU	African Large Predator Research Unit
ARC	Agricultural Research Council
ARMSCOR	Armaments Corporation of South Africa
ARS	Agri Risk Specialists
ASAQS	Association of South African Quantity Surveyors
ASSA	Anatomical Society of South Africa
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
AVS	American Vacuum Society

## C

CANSA	Cancer Association of South Africa
CATSA	Catalysis Society of South Africa
CBD	Convention of Biological Diversity
CCEM	Centre for Confocal and Electron Microscopy
CePHMa	Centre for Plant Health Management
CfPB	Centre for People and Buildings
CIAT	International Centre for Tropical Agriculture
CIDB	Construction Industry Development Board
CIMMYT	International Maize and Wheat Improvement Centre
CIOB	Chartered Institute of Building
CIOB-SA	Chartered Institute of Building - South Africa
CSACEE	Central South African Council on Economic Education
CSIC-INTA	Centro de Astrobiología
CSIR	Council for Scientific and Industrial Research
CSIRO	Commonwealth Scientific and Industrial Research Organisation

## D

DEAT	Department of Environmental Affairs and Tourism
DiMTEC	Disaster Management Training and Education Centre for Africa
DMISA	Disaster Management Institute of South Africa
DST	Department of Science and Technology

## E

EAAP	European Association for Animal Production
EASA	Education Association of South Africa
ECA	European Crystallographic Association
EIGG	Environmental Inorganic Geochemistry Group
EPWP	Expanded Public Works Programme
ESBES	European Symposium on Biochemical Engineering Science
ESREL	European Safety and Reliability
ESRP	Economic and Social Rehabilitation Programme

## F

FAO	Food and Agriculture Organisation
FEMS	Federation of European Microbiological Societies
FMP	Facilities Management Programme
FOTIM	Foundation of Tertiary Institutions of the Northern Metropolis

FSRPO	Free State Red Meat Producers Organisation
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## G

GIS	Geographical Information Systems
Glen ADI	Glen Agricultural Development Institute
GM	Genetically Modified
GMBA	Gauteng Master Builders' Association
GMO	Genetically Modified Organisms
GWK	Griekwaland-Wes Koöperasie

## H

HIV	Human Immunodeficiency Virus
HPCSA	Health Professions Council of South Africa
HPLC	High Performance Liquid Chromatography
HSPCM	Health and Safety Programme for Construction Managers

## I

IAGOD	International Association on the Genesis of Ore Deposits
IAH	International Association of Hydrogeologists
ICCC	International Conference on Coordination Chemistry
ICEC	International Cost Engineering Council
ICID	International Commission on Irrigation and Drainage
ICP	Inductively Coupled Plasma
ICRBM	International Conference on Rodent Biology and Management
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDC	Industrial Development Corporation
IGS	Institute for Groundwater Studies
IITA	International Institute of Tropical Agriculture
INCRoP	Insects on New Crops Programme
INTSORMIL	International Sorghum and Millet Research Support Programme

## IPMA

IPMA	International Project Management Association
IPMP	Intensive Project Management Programme
IRDP	Institutional Research and Development Programme
IRWH	In-field Rainwater Harvesting
IUCr	International Union of Crystallography
IUMS	International Union of Microbial Societies
IUPAP	International Union of Pure and Applied Physics

## J

JFM	Journal of Facilities Management
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## L

LExEn	Life in Extreme Environments
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## M

MIRCHEN	Microbiological Resources Centre
MIT	Massachusetts Institute of Technology
MRM	Mineral Resource Management
MSA	Master's Degree in Sustainable Agriculture
MSSA	Microscopy Society of Southern Africa
MUCPP	Mangaung University Community Partnership Programme
MURP	Master's Degree in Urban and Regional Planning

## N

NaCOF	National Climate Outlook Forum
NAFU	National African Farmers Union
NAMC	National Agricultural Marketing Council
NASA	National Aeronautics and Space Administration
NASSP	National Astrophysics and Space Science Programme
NCEE	National Council for Economic Education
NDA	National Department of Agriculture
NECSA	National Energy Commission of South Africa
NELSAM	Natural Earthquake Laboratory in South African Mines
NERPO	National Emergent Red Meat Producers' Organisation
NGO	Non-Governmental Organisation
NML	National Metrological Laboratory
NMMU	Nelson Mandela Metropolitan University
NMR	Nuclear Magnetic Resonance
NRF	National Research Foundation
NUFU	Norwegian Council of Universities Committee for Development, Research and Education
NWGA	National Wool Growers' Association

## O

OABS	Optimal Agricultural Business Solutions
OECD	Organisation for Economic Co-operation and Development

## P

PARSA	Parasitological Association of Southern Africa
PDMIW	Processing and Disposal of Mineral Industry Wastes
POT	Peaks over Threshold
PPP	Public Private Partnership
PRT	Protein Research Trust

## R

RICS	Royal Institute of Chartered Surveyors
RIEP	Research Institute of Education Planning
RNA	Research Niche Area
RPO	Red Meat Producers' Organisation

## S

SA	South Africa
SAACE	South African Association of Consulting Engineers
SAB	The South African Breweries Limited
SACI	South African Chemical Institute
SACPCMP	South African Council for the Project and Construction Management Profession
SACPVP	South African Council for the Property Valuation Profession
SACQSP	South African Council for the Quantity Surveying Profession
SADC	Southern African Development Community
SAFMA	South African Facilities Management Association
SAFOI	South African Fryer Oil Initiative
SAIP	South African Institute of Physics
SAISC	Southern African Institute of Steel Construction
SAMSI	Statistical and Applied Mathematical Sciences Institute

SANCIAHS	South African National Committee for the International Association of Hydrological Sciences	SEDA	Small Enterprise Development Agency	UNEP	United Nations Environment Programme
SANCU	South African National Consumer Union	SMME	Small, Medium and Micro Enterprises	UNESCO	United Nations Educational, Scientific and Cultural Organisation
SANPAD	South Africa-Netherlands Research Programme on Alternatives in Development	SRC	Student Representative Council	USA	United States of America
SAPOA	South African Property Owners' Association	SRL	Sustainable Rural Livelihood	USAID	United States Agency for International Development
SAPS	South African Police Services	SSAG	Society of South African Geographers	UTCHEM	University of Texas Chemical Compositional Simulator
SAQA	South African Qualifications Authority	<b>T</b>		UWC	University of the Western Cape
SASAS	South African Society for Animal Science	THRIP	South African National Research Foundation Thrust for Industry-Related Projects	<b>W</b>	
SASQUA	Southern African Society for Quaternary Research	TUE	Technical University Eindhoven	WARFSA	Water Research Fund of Southern Africa
SAVAH	South African Association of Visual Arts Historians	<b>U</b>		WATOC	World Association of Theoretically Orientated Chemists
SBE	Sustainable Built Environments	UCT	University of Cape Town	WFP	World Food Programme
		UFS	University of the Free State	WITS	University of the Witwatersrand
		UJ	University of Johannesburg	WRC	Water Research Commission
		UK	United Kingdom	WUA	Water Users' Association
		UN	United Nations		