



NA*i*

NATIONAL ADVISORY COUNCIL ON INNOVATION

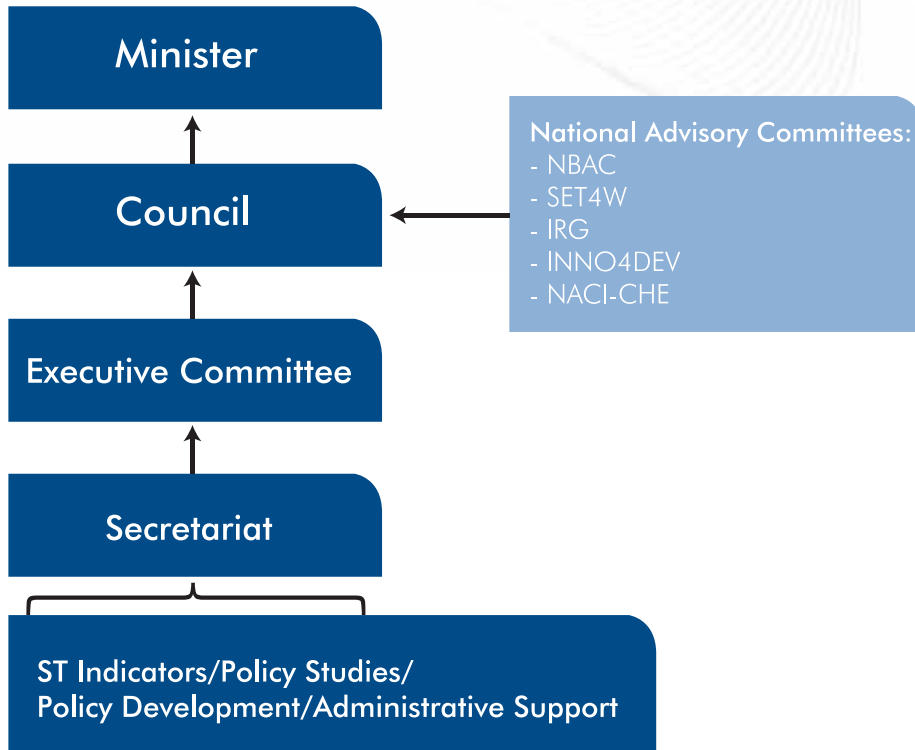
innovation for a better future

ANNUAL REPORT  
2011 | 2012

## THE NACI MANDATE

The National Advisory Council on Innovation (NACI) was established through the NACI Act (No. 55 of 1997) to provide policy advice to the Minister of Science and Technology on innovation. NACI's mandate relates to cooperation across the National System of Innovation, to achieve national economic and social objectives. This is achieved through evidence-based studies on areas of priority.

## NACI ORGANISATIONAL STRUCTURE



## THE NACI COUNCIL



Dr Steve Lenon  
(Chairperson)

Group Executive:  
Sustainability

Eskom



Mr Paul Baloyi

Chief Executive Officer

Development Bank  
of Southern Africa  
(DBSA)



Dr Phil Mjwara

Director-General

Department of  
Science and  
Technology (DST)



Dr Ntuthuko Bhengu

Executive Head:  
Provider Networks

Qualsa (Pty) Ltd



Prof. Jennifer Thomson

Department of  
Molecular and Cell  
Biology

University of Cape  
Town (UCT)



Prof. Francis Petersen

Dean of Engineering  
and the Built  
Environment

University of Cape  
Town (UCT)



Dr Johannes Potgieter

Chief Director:  
Innovation and  
Technology

Department of Trade  
and Industry (**the dti**)



Prof. Lineo Vuyisa  
Mazwi-Tanga

Rector and Vice-Chancellor

Cape Peninsula  
University of Technology  
(CPUT)



Prof. Nthabiseng  
Ogude

Deputy Vice-Chancellor

University of  
Pretoria



Prof. Cheryl de la Rey

Vice-Chancellor and  
Principal

University of  
Pretoria



Mr Kuseni Dlamini

Chief Executive Officer

Old Mutual



Dr Azar Jammine

Director and Chief  
Economist

Econometrix Ltd



Prof. Arnold van Zyl

Deputy  
Vice-Chancellor:  
Research

University of  
Stellenbosch



Ms Khugeka Njobe

Managing Director

Aveng Water



Prof. Helen Laburn

Dean: Faculty of Health  
Sciences/  
DVC-Research

University of the  
Witwatersrand



Mr Geoff Rothchild

Director: Government  
and International Affairs

Johannesburg Stock  
Exchange (JSE)



Prof. Gerhard  
Prinsloo

Director: Technology  
Transfer and Innovation

Durban University of  
Technology (DUT)



Prof. Krish  
Bharuth-Ram

Head: NACI Secretariat

NACI

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## MESSAGE FROM THE MINISTER OF SCIENCE AND TECHNOLOGY

THE HONOURABLE NALEDI PANDOR

If we are to realise our vision of a central role for science, technology and innovation in South African economic and social development, that vision has to be adopted widely across government, higher education institutions, non-government organisations and the private sector. This is the advice NACI has given to the Ministry since the release of the Organisation for Economic Cooperation and Development (OECD) innovation report on South Africa in 2007. It is, however, easier said than done. The recent (2012) Ministerial Review Committee on the South African Science and Innovation Landscape has given us a clearer idea of how to implement that vision of a central role for science and innovation through the introduction of an inter-ministerial committee and a raft of other important actions.

NACI's performance assessment of South Africa's innovation system in its 2009/10 Annual Report, based on a statistical analysis and extrapolation of the most recent available information from official sources, indicated a high overall risk of failing to meet our science, technology and innovation targets. It was quite a sobering analysis and called for a review of our strategies.

As part of that process, I am pleased to see that, in line with recommendations of both internal and external reviews of its structure and performance, NACI began to revise its strategic objectives and to introduce a new way of working. This entailed a move away from permanent standing committees towards the introduction of project task teams comprising experts drawn from universities, science councils

and business. It also began to enhance its in-house research and policy-analysis capacity.

Recently, NACI advised that the Department of Science and Technology (DST) should co-ordinate its social-innovation projects with social-innovation projects in other government departments and municipalities. This is part of NACI's encouragement of the DST to take wider responsibility for scientific advice throughout government. Over the past decade social innovation has blazed a trail to find solutions to our social and economic challenges in health, development and education. We now understand how to change the course of deadly epidemics, how to make use of new renewable energy technologies and how to give our pupils one-on-one tuition through mobile internet communication. Scientists in our universities and public research councils work on social innovations with a new enthusiasm.

With competition for budgets and other resources, it is important to ensure policies and strategies are informed by sound evidence-based advice. NACI has made a major contribution. Over the past three years its contribution has been particularly impressive. This has been in no small measure the result of the galvanising influence of Prof. Bharuth-Ram as Head of the Secretariat. His record speaks for itself; NACI became a hive of activity under his watchful eye. I thank the NACI Councillors, non-Council members of subcommittees and the Secretariat for all their effort, input and contributions during 2011 – 2012. Finally, I would like to thank Dr Steve Lennon, the Chairperson, for his long association with NACI that has given it stability, strength and continuity.



## MESSAGE FROM THE HEAD OF THE NACI SECRETARIAT

PROF. KRISH BHARUTH-RAM

**A**s outgoing head of NACI, this 2011/12 Annual Report allows me to reflect on NACI's achievements and the challenges faced over the past year.

NACI is mandated to deliver clear, evidence-based, autonomous and independent advice to the Minister of Science and Technology (and Cabinet) on the co-ordination and stimulation of the National System of Innovation (NSI) and several key issues related to science and innovation. Internal and external reviews over the past few years stressed that to achieve the over-arching goals, NACI requires a conducive environment, in particular through:

- An arm's-length relationship between NACI and the DST, similar to the relationship between the Council on Higher Education (CHE) and the Department of Higher Education and Training (DHET)
- Restructuring of the NACI Secretariat to improve provision of in-house expertise; to further stronger links with university research units and science councils
- Adoption of a project team approach, incorporating lead experts from academia, science councils or industry, to carry out pertinent research on identified priority topics for relevant high quality outputs; suggested as preferable to the historic advisory committee structure.

Systemic problems however remained a considerable issue for NACI, especially in the organisation not controlling governance and internal processes. This challenged the repositioning of NACI, primarily due to persisting capacity and other resource constraints.

In spite of the challenges, NACI achieved remarkable results over the past year, thanks to the continued enthusiasm of everyone involved. This financial year signified NACI's efforts to find solutions to the complex challenges facing the South African NSI. NACI's research and policy advice persistently emphasise that effective policy formulation as well as implementation are indispensable for a more productive innovation climate. The attendance of Minister Pandor at the Council meeting in February was most welcome; her invitation for more regular meetings with the Chair of NACI and Head of Secretariat needs to be followed up on next year.

“**The contribution of every stakeholder assisted NACI in high level advice to address the country's socio-economic challenges.**”



Highlights from the past year included Ministerial advice and information letters on the following topics:

- Human capacity for the national system of innovation
- Genomic sovereignty
- The role of biotechnology in food security
- Scalable social innovations to enhance societal upliftment
- Public understanding of biotechnology by the media
- Effects of the Genetically Modified Organism (GMO) Act
- Incentives for basic research in biotechnology.

NACI completed a number of research projects to inform policy advice, amongst others:

- Skills and education for science, engineering and technology to inform policy advice on human capital
- Analysis of progress in the National System of Innovation
- Sustainable funding for basic research in biotechnology
- Development of social indicators to track the impact of broad-based innovations on the quality of life of South Africans
- Position paper on national research facilities
- Exploration of the community innovation system: Bridging the innovation divide between formal and informal sectors
- Development of a framework for Science, Engineering and Technology (SET) gender policy.

NACI also provided considered input to national strategic initiatives such as:

- The Planning Commission's National Development Plan
- The DST's Research and Development (R&D) Strategy
- The Synoptic Report from the Ministerial Review Committee on the Science, Technology and Innovation (STI) Landscape.

We especially welcome the publication of the findings of the Ministerial Review Committee on the STI Landscape. Recommendations will hopefully provide much-needed direction to improve the overall policy framework for a National Innovation System that truly embraces and promotes regional innovation.

NACI's work is not done in isolation. Engagement was facilitated by strong partnerships and occurred through meetings, workshops, conferences and seminars. The contribution of every stakeholder is acknowledged, as this assisted NACI in high level advice to address the country's socio-economic challenges.

As Head of the Secretariat, I found it very encouraging that staff members keep on striving to improve their qualifications. Thiambi Netshiluvhi and Ncebakazi Galada completed their PhD studies during the year, Nyakallo Tsatsi and Zelda Roberts had PhD proposals approved, and others proceeded with work on their PhD proposals. My congratulations to these colleagues. My welcome, too, to Dr Ntsane Moleleki whose appointment brings much needed strength to the Secretariat.

In closing, I extend my thanks to the Secretariat team members. Despite the many challenges, including uncertainty about the Head of NACI position and reconfiguration of NACI, their dedication and support ensured that our programme of work was successfully completed during the 2011/12 financial year.



## MESSAGE FROM THE CHAIRPERSON

DR STEVE LENNON

As shown by the long list of advice from NACI, directed to the Minister of Science & Technology, this year was a busy one for NACI. Policy advice ranged from how to increase the contribution of women in the NSI, to achieving a fundamental shift in the skills development pipeline. Based on feedback from the DST and the Minister there seems to be agreement that implementation of the initiatives covered in NACI's advice could have far-reaching, positive results for the NSI.

### The Highlights

I am particularly pleased about the work of the Skills task team, which concluded its projects this year. Originally formed as a joint NACI/CHE initiative, this task team was reconstituted as a NACI Skills task team when CHE participation ceased. Recommendations from the task team placed strong emphasis on essential solutions to address technical skills requirements for the South African economy as a whole.

In addition, the SET for Women task team completed landmark work on a gender policy framework, to be concluded in 2012/13, laying the foundation for women to play a far more meaningful role in the NSI.

Once again NACI published the annual Science, Technology and Innovation (STI) Indicators, providing data on key performance measures. The conclusion is yet again that, whilst input parameters have been increasing, outputs from the NSI continue to respond frustratingly slowly

to stimuli. At the same time positive signals are detected, boding well for future progress. Some of these are: more students passing matric, higher education enrolments slowly increasing and some improvement in overall PhD completion. Further encouraging outcomes, specifically for science and innovation in the country, relate to South Africa's share of scientific publications and patent registrations.

“The SET for Women task team completed landmark work, laying the foundation for women to play a far more meaningful role in the NSI.”

### Continued Focus on NSI Performance

NACI maintains that the positive indicators have to dramatically increase to move the country to a knowledge economy. We believe key interventions are essential to maximise the role of the NSI in driving the New Growth Path. The potential force of science, technology and engineering can be exploited better with specific strategies:

- Firstly, the education value chain needs urgent attention, from basic education, Further Education and Training (FET) colleges and technical high schools, through to higher education and beyond. NACI's advice in the last year emphasised the interventions believed to be essential
- Secondly, NACI has repeatedly called for better co-ordination across government departments, associated structures and institutions. A single view of the NSI, outlining the current status and future prospects, is essential to optimally position for a globally competitive economy
- Thirdly, continued public and private investment in the NSI, from expenditure on R&D, to venture capital allocations and flagship projects, is necessary to build on the well-established base. South Africa's successful bid to host the Square Kilometre Array (SKA) is an excellent example of how big-science projects should be approached in future. Indeed, we look forward to the positive impact of the SKA on the overall System of Innovation.

the last year and I would like to acknowledge their contributions in particular.

The DST continues to provide administrative support to NACI and I herewith wish to thank the DG, Dr Mjwara, for his support and leadership.

The NACI Secretariat has thrived under the leadership of Prof. Bharuth-Ram. I want to stress my appreciation to everyone for their excellent technical work, in particular acknowledging the leadership from Krish in creating a tight and effective team.

Finally, I would like to thank the Minister of Science and Technology, Naledi Pandor, for her leadership, guidance and support. It is a privilege working with a committed champion of South African development.

## Future View

The current NACI Council's term of office will be concluded within the next year. Our work for the next year therefore focuses on completing the ambitious programme established at appointment. The aim is to create the foundation for a new Council and a new NACI, working with the Minister and the DST in taking forward the recommendations of previous reviews and the latest Ministerial Review. The new NACI will hopefully play an important, independent role in advising the Minister and through her, Cabinet, on all matters relating to innovation in the country.

## Acknowledgements

I would like to thank all NACI Councillors for their dedication, commitment and input over the last year. Several Councillors, namely Prof. De La Rey, Prof. Van Zyl and Dr Potgieter, resigned for various reasons in

# INTRODUCTION

## NACI'S MANDATE

NACI derives its mandate from the National Advisory Council on Innovation Act (No. 55 of 1997). Its core mandate is to advise the Minister of Science and Technology (S&T), and through her, the government of South Africa, on the role and contribution of innovation in promoting and achieving national objectives. The national objectives include the improvement of the quality of life of South Africans, the promotion of sustainable economic growth and international competitiveness. Given its broad mandate, NACI must reassert its position as the principal advisory body on STI in South Africa, with its advisory services directed at, among others, the:

- Co-ordination and stimulation of the National System of Innovation
- Development and maintenance of human resources for science, technology and innovation
- Revision of the innovation policy to ensure coherence
- Strategies or models for the promotion of all aspects of technological and non-technological innovation
- Funding of the science and technology (S&T) system
- Identification of R&D priorities in consultation with provincial departments and other interested parties
- Establishment, phasing out, rationalisation and management of science councils and national research facilities
- Establishment and maintenance of STI indicator systems
- International liaison and co-operation in STI.

## THE CONTEXT OF NACI'S WORK

The recent reviews of NACI (and the NSI) have proposed several new ways in which NACI should be structured as well as conduct its business in order to meet the challenges highlighted in the reviews. Some key findings, in respect of the NSI and of NACI, contained in the review reports – in particular those of the OECD Review of Innovation in

South Africa (2007), the Ministerial Review Committee (2008) and the Synoptic Report of Ministerial Review Committee on the STI Landscape (2011) – are highlighted below.

## Key Findings in Respect of the NSI

- i) The concept of a “National System of Innovation” as something wider than the sum of traditional R&D activities has only limited understanding
- ii) Virtually no prospective NSI planning, as envisaged in the White Paper on Science and Technology, has been possible
- iii) The challenges of coherence and co-ordination of government departments at national and regional levels, as well as agencies at their various levels in the NSI, run both vertically up and down the levels of authority in the system, as well as horizontally between the agencies
- iv) There seemed to be only limited horizontal coherence and integration between agencies in the “fragmented” NSI
- v) A greater clarification of roles between various agencies is needed
- vi) Business was insufficiently involved in “NSI-building”.

## Key Findings in Respect of NACI

- i) NACI's mandate was hamstrung by the fact that it reported to the DST and thus had no structural location that would afford it the authority needed for effective co-ordination of a national innovation system
- ii) NACI has been effectively constrained to “advise” only in the limited NSI domains in which the DST can operate
- iii) “In order for NACI to be effective, it needs a strong, efficient and effective Secretariat with substantial professional, technical and analytical capability (beyond mere administrative competence)” (OECD 2007).

These challenges have been taken up at workshops of NACI Council and the Secretariat, and have resulted in the development of a revised NACI Strategic Plan for the period 2011/12 – 2014/15, in which the key objectives are:

- To play a lead role in working towards achieving coherence and co-ordination in the NSI. This it plans to do through the development of a National Innovation Framework which includes Regional Innovation Specialisation at government departmental level, as well as at regional and local levels
- To monitor and evaluate the strength of, and foster alignment within, the national system of innovation
- To monitor and advise on the contribution of innovation to South Africa's economic growth and competitiveness, and to improve the quality of life of its citizens
- To develop the professional, technical and analytical skills of the Secretariat.

NACI's actions on these issues during the past year include:

- i) Meetings with a selection of Research and Innovation experts who have agreed to form a NACI task team to work towards the **development of a National Innovation Framework**, including regional innovation strategies and the clarification of roles between various agencies in order to achieve coherence and co-ordination in the NSI.  
The convening of a national symposium with international and national participation as well as brainstorming sessions to address the above issues and inform priority objectives of NACI's Performance Plan for 2012/13.
- ii) **Adoption of a Project Team Approach** to conduct NACI business. In the project teams approach:

- a) NACI Council will set the goals, terms of reference, and measurable outcomes for the project team;
- b) The project teams will consist of individuals who have the expertise necessary to complete the project at hand, and the roles of each selected team member will be clearly defined, thereby assuring timely delivery of high quality reports and other outcomes;
- c) Reliance on service providers to conduct NACI's research is reduced;
- d) NACI as an organisation will be able to more readily respond to a rapidly changing innovation environment, be more responsive to the changing political environment and evolve into a policy development body on research development and innovation.

NACI Council has formally approved the project team approach, and it forms a key element in NACI Performance Plan for 2012/13.

- iii) Focus on **development of professional, technical and analytical skills** within the Secretariat: the NACI Council has endorsed the transition away from the committee and reference group approach to an operational model that utilises project teams through joint appointments from Higher Education Institutions (HEIs) and science councils, as well as the expansion of in-house Secretariat research abilities to carry out the work mandated to NACI.

This past year was therefore used to finalise the work of the different committees in order to shift focus onto the new operational project team basis. In line with this, future research will be identified as applicable to specific topics, linked to NACI's business objectives. People with applicable expertise will thereafter be assigned, together with suitably experienced and qualified Secretariat staff, to conclude the research component and finalise the project during a specified time period.

# HUMAN CAPITAL DEVELOPMENT FOR THE NSI

## INTRODUCTION

Over the past few years NACI has included in its Annual Report a summary analysis of NSI progress, further to the S&T Indicators data published annually by NACI. Valuable insight into resources essential for innovation in the country has been afforded as a result of research across various disciplines. The previous Annual Report referred to four specific elements exerting direct influence on the NSI: Human Resources, Expenditure on R&D, Knowledge Production, and Trade in Technology. This introductory section of the 2011/12 Annual Report therefore expands on previous synopses by focusing on the first element and outlining some of the findings included in NACI's policy advice. NACI's analysis is based on wide-ranging investigation that informed our understanding of human resource challenges in the national context.

Numerous studies affirm that continuous human capital development is central to general economic growth, and even more important for countries aiming at a strategy of high innovation and knowledge intensity. Countries performing well on innovation have specific key characteristics in common: high concentration of talented academics and students, abundant skilled human resources and suitable alignment of non-human resources, further to enabling policy and regulatory systems.

### Human Capital Challenges in South Africa

The regulatory frameworks and governance arrangements in South Africa do exist to support innovation. Yet challenges persist, seen most explicitly in low ratios of researchers and shortages of professionals such as engineers. Researcher ratios are illustrated by data in Table 1: only 1.4 out of every 1 000 employees in South Africa (0.14%) work as researchers, while the ratio in Russia is 6.4% and in Brazil 2.2%. This possibly makes South Africa less attractive in international technology and R&D endeavours.

*Table 1: International comparison, researchers per 1 000 employed (FTE, 2001-2008)*

	2001	2002	2003	2004	2005	2006	2007	2008
<i>OECD Total</i>	6.9	7.0	7.3	7.3	7.5	7.6		
Brazil	1.5	1.5	1.7	1.7	2.0	2.1	2.2	
China	1.0	1.1	1.2	1.2	1.5	1.6	1.8	
Russian Federation	7.9	7.5	7.4	7.1	6.8	6.7	6.7	6.4
Slovenia	4.9	5.1	4.2	4.3	5.5	6.1	6.3	7.1
South Africa	1.3	-	1.2	1.5	1.5	1.5	1.5	1.4

*Source: South African S&T Indicators 2010, NACI*

The human capital challenge is associated with education and training shortcomings. Considering that an estimated 40% of all South Africans in the 18 to 24 age category is not employed or engaged in any form of education or training, there is a massive under-utilisation of potential human capital.

## EDUCATION AND SKILLS

One of South Africa's strengths is the relatively large ratio of young people, an important source of potential labour input as a factor in foreign investment decisions. However, lack of education and skills amongst the young, as mentioned above, makes the country unable to fully utilise the youthful workforce. Employment in SET sectors and knowledge intensive activities requires high levels of skills and successful strategies to develop these skills. Although graduate unemployment has been noted, inappropriate qualifications are of more concern, seemingly a factor in SET graduate unemployment. The correct skills and knowledge start at the basic education level and proceed through and beyond higher education, as hereafter discussed.

### Basic Education

Basic Education is widely accepted as the root of entrepreneurial mindsets and innovation abilities. Connections are seen between South Africa's low international ranking in mathematics and science, and unsatisfactory levels of R&D and innovation. NACI's research points to some of the problems: although some improvement in matriculation rates is recognised, less than a third of students who started public school in 2000 matriculated in 2010. Only about 20% of them achieved results enabling them to enter university or University of Technology (UoT) courses. Table 2 presents data from 2009 to 2010: around 16% of those who enrol in SET courses manage to graduate. SET enrolments and graduations are believed to be strongly affected by lack of achievement in mathematics and science at school level.

*Table 2: Matric achievement in South African Public Schools (2009 – 2010)*

	2009	2010	% OF TOTAL
Started school 12 years earlier	1 550 790	1 318 932	100.0
Number writing matric	552 073	537 543	40.8
Number passing matric	334 718	364 513	27.6
Number receiving university endorsement	109 697	126 371	9.6
Number receiving University of Technology endorsement	131 035	146 224	11.1
Other	93 356	91 241	6.9
Part-time matric	39 255	82 835	6.3
Mathematics > 40%	85 356	81 374	6.1
Mathematics distinctions	8 713	9 525	0.7
Science distinctions	999	5 962	0.4

*Source: Dr Azar Jammie, Econometrix, August 2011*

The quality of basic education is undoubtedly influenced by teacher ability. Studies have shown that teachers with subject-specific majors have a considerable advantage in this regard; inadequately qualified teachers detract from the collective ability to develop a culture of innovation.

School drop-out is another concern. Between 11% and 15% of children leave school after grade nine (the last year of compulsory education). At 18 years of age only 70% of eligible youth still attend educational institutions. In spite of high investment in education, differential schooling quality furthermore continues to reinforce racial patterns of unqualified and unemployed youngsters. Because of these factors, university enrolments and graduations remain disappointing for SET (Table 3) and in terms of racial and gender representation.

*Table 3: Higher education SET enrolments and graduations (2000 – 2009)*

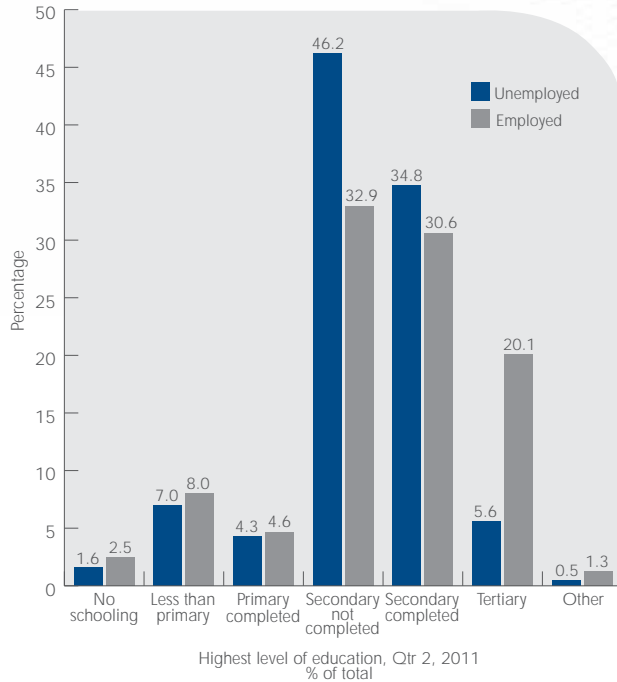
YEAR	SET ENROLEMENTS	TOTAL ENROLEMENTS	% SET	SET GRADUATIONS	TOTAL GRADUATIONS	% SET
2000	163 009	576 067	28.3	24 235	92 567	26.2
2001	169 245	626 440	27	25 087	95 776	26.2
2002	176 729	667 171	26.5	27 014	101 037	26.7
2003	193 864	705 246	27.5	29 698	108 215	27.4
2004	202 547	744 474	27.2	31 490	117 205	26.9
2005	210 706	735 070	28.7	33 506	120 375	27.8
2006	211 584	741 020	28.6	35 555	124 620	28.5
2007	214 687	761 084	28.2	36 429	126 641	28.8
2008	224 948	799 387	28.1	38 764	133 063	29.1
2009	237 058	837 779	28.3	40 971	144 852	28.3

## Higher Education

Potential economic returns, especially in high value professions, influence individual decisions to invest in education after basic compulsory schooling. High potential returns mean that people can be encouraged through easier access and financial assistance. Low potential returns make other considerations more prominent, such as earnings foregone while studying and tax implications. Providing incentives or reducing barriers work best to address the latter situation. As is the case elsewhere, South African job markets strongly favour higher education in employment. SET qualifications offer the highest employment advantages, as shown in Figure 1.



Figure 1: Correlation between level of education and employment

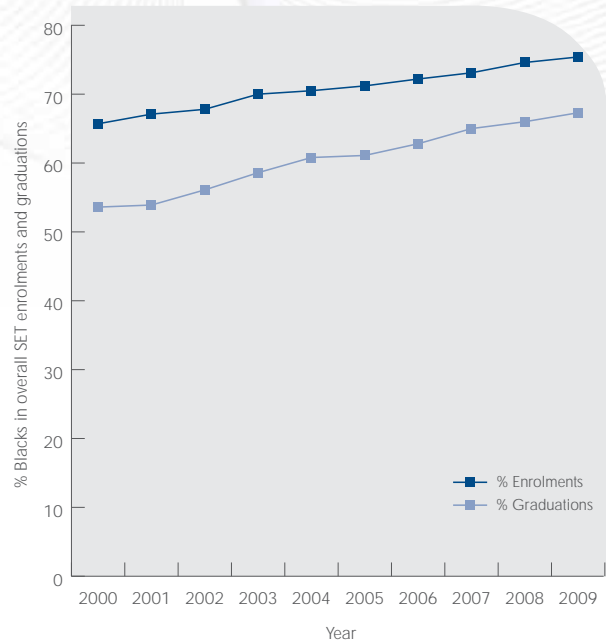


Source: Stats SA Labour Force Survey, Qtr 2 2011

Unfortunately South African students are not yet fully exploiting the potential advantages of relevant qualifications. NACI's data show SET qualifications are less than 38% of overall qualifications, although slightly improved over the past few years. The lack of black graduates in general seems to persist, linked to unequal schooling (Figure 2).

Other than the problem of inadequate matric mathematics, another challenge is the lack of harmonisation and synchronisation between Higher Education (HE), Further Education & Training (FET), and UoT.

Figure 2: SET enrolment and graduation trends – Black students (2000 – 2009)



Source: South African S&T Indicators 2010, NACI

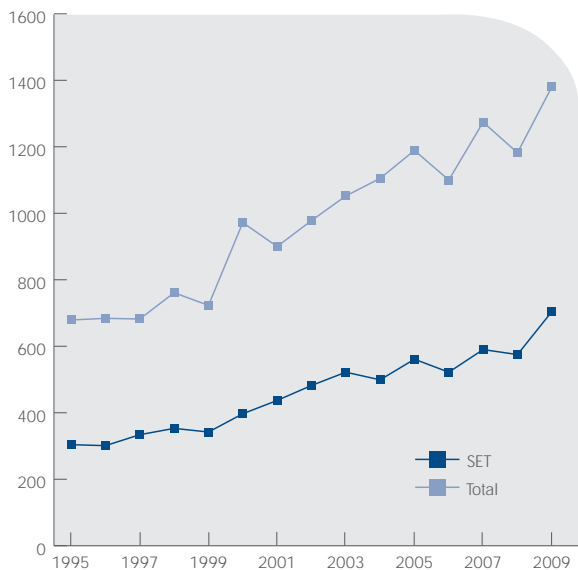
The latter universities battle to upgrade internal capabilities, while traditional universities are more successful. Qualifications from UoTs and FETs are meant to supply practical skills to the NSI, but in reality certificates and diplomas are often associated with rising graduate unemployment.

In short, NACI's investigations show prevalent barriers are: (i) Access to finance, especially for expensive SET courses, and (ii) Lack of information, which results in arbitrary selection of degrees rather than informed decisions.

## Post-graduate Studies

Post-graduate studies improve NSI capacity because of the creation of research skills and new knowledge, leading to inventions and patents; ultimately enhancing international competitiveness in knowledge intensity. Another advantage of academic research is that it often focuses on areas unlikely to be investigated otherwise, thereby assisting in pre-commercialisation incubation.

Figure 3: South African doctoral degrees (1995 – 2009)



Source: South African S&T Indicators 2010, NACI

The problems of SET basic degrees clearly have to be addressed before post-graduate numbers can hope to be increased, keeping in mind the importance of post-graduate studies for increased innovation. The gradual rise in SET PhDs in South Africa since 1995 is positive. Initiatives such as the South African PhD project and SA Research Chairs Initiative (SARChI) are especially welcomed. However, the country's targets are unlikely to be achieved at the current pace (Figure 3). Doctoral degrees

in relevant disciplines constituted half of the national doctorates awarded in 1995, reducing to less than a third in 2009.

Cost and duration of studies are challenges in post-graduate qualifications, prompting prospective students to enter the labour market. Drop-out rates at PhD level are estimated to cost the country in excess of R5 billion, partly attributed to students' inability to apply themselves sufficiently. Seamless progression, development of research skills and adequate information access are important suggestions from international examples.

## Education Policy

In South Africa a gap is seen between education and training and the needs of industry, attributed to misalignment of education and industrial policy. Government acknowledges the necessity for demand-led education and training, but the required co-ordination has not yet been accomplished. The massive unskilled workforce is unsuitable as knowledge and technology workers. Constrictive labour policies add to the problem.

## CONCLUSION

NACI's research and advice continue to focus on the challenges as well as the opportunities inherent in the South African System of Innovation. Our research highlights continued problems with sufficiently capacitating the NSI. Education and skills challenges can be addressed through strategies to align information availability and dissemination, in addition to addressing the quality of teaching and teaching content. Problems originate with basic education and continue throughout higher education and post-graduate studies. Financial barriers can be negated through seamless funding regimes, applied successfully in other countries. We support an industry emphasis as well as research emphasis in doctoral studies, effectively linking academic studies to sector requirements. More partnerships between industry, research institutions and government departments are vital to encourage relevant qualifications and skills.

It is not possible to present a comprehensive overview of all the research carried out on skills and education, but the aim is to stimulate national discourse and raise awareness of the many issues deserving attention in the drive to an innovative country.

# NACI COMPOSITION, ACTIVITIES, PERFORMANCE AND OUTPUT

## MANAGEMENT AND COMMITTEE STRUCTURES

NACI's mandate as a statutory council in terms of the NACI Act (No. 55 of 1997) directs the advice provided to the Minister of Science and Technology. Operationally the organisation consists of the following structures:

- *NACI Council* led by the Chairperson and comprising 14 Councillors in a part-time capacity, representative of government departments, prominent sectors, academic institutions and research councils. The NACI Council is responsible for strategic leadership and direction-setting.
- *The Executive Committee (ExCo)* deals with urgent matters between Council meetings and ensures execution of instructions and directives from Council.
- *Subcommittees and reference groups* focus on discipline-specific work and generate advice to the Minister through Council, comprising:
  1. Innovation for Development (INNO4DEV);
  2. Indicators Reference Group (IRG);
  3. NACI-SKILLS Development Committee;
  4. National Biotechnology Advisory Group (NBAC);
  5. Science, Engineering and Technology for Women (SET4W) .
- *The NACI Secretariat* is managed by the Head of Secretariat and supported by 12 staff members assigned to specific subcommittees and tasks (such as research and project management) pertinent to the organisation's overall advisory role.

As a consequence of the expertise available to NACI, input is obtained from a range of disciplines. Industry, government and Non-Governmental Organisation (NGO) perspectives are considered. Importantly, this

approach offers broad insight into matters affecting S&T and innovation, for cross-sectional policy recommendations aligned to the development goals of government, while attentive to intellectual vigour and practical relevance. Additionally, Council members' influence in the national innovation sphere in general, offers advantages of co-operation and collaboration.

## NACI COUNCIL AND EXCO ACTIVITIES

During the 2011/12 financial year three Council meetings and four ExCo meetings were held. An attendance rate of 51% was achieved for Council meetings and 55% for ExCo meetings. The members of the Executive Committee for 2011/12 were: Dr Steve Lennon (Chair), Prof. Krish Bharuth-Ram, Dr Johannes Potgieter, Prof. Cheryl de la Rey and Ms Khungeka Njobe.

Appendix A lists Council, ExCo and Reference Group members. An overview of members' attendance of meetings during the year is tabled under Appendix B.

## SUMMARY OF NACI OUTPUT AND ACTIVITIES

NACI's advice is the consensus view of Councillors and committee members, following evidence-based research, discussions and consultations on identified topical issues. Other than pertinent policy advice generated for the benefit of the Minister of Science and Technology, the analyses of data and research findings frequently result in publications and policy papers which are widely available.

Activities from the committees and expert groups are outlined under the subsequent sections. The following tables provide a summary of overall NACI activities and outputs, categorised under workshops and events, advice, research reports and publications.

*Overview of NACI Workshops and Events – 2011/12*

WORKSHOP/DISCUSSION TOPIC	DATE
NBAC lunch seminar on Biofuel and Bioproducts from Sugarcane	6 May 2011
Round-table discussion on Replication of Broad-based Innovations with Social Impact	21 June 2011
Extraordinary meeting on Business Models for Small and Medium Enterprises with Potential to Address Societal Challenges and Needs	20 October 2011
Launch of the annual S&T Indicators and co-hosting of the National symposium	22-23 September 2011
OECD workshop on national indicator data, presentation by NACI	25 October 2011
SET4W workshop on SET Gender Policy Development	February 2012
National Innovation survey workshop, co-hosted	8-9 October 2011
Meeting with Tshwane Municipality, Research & Innovation division	20 March 2012
Meeting with Zanele Monnakgotla, from the Industrial Development Corporation (IDC)	11 April 2012
NBAC workshop on Bioprospecting	22 March 2012
Secretariat workshop on National Development Plan (NDP)	10-11 March 2011

*Summary of Advice Generated – 2011/12*

Policy advice on Human Capacity for the National System of Innovation – February 2012
NBAC advice on Genomic Sovereignty
Information letter: The Role of Biotechnology in Food Security
Scalable Social Innovations to Enhance their Impact on Societal Upliftment (advice finalised, to be presented to the Minister)
Public Understanding of Biotechnology by the Media
Advice on the GMO Act
Advice on Basic Research and Biotechnology Incentives
Advice on Addressing Barriers for Women in Science

*Research Projects Completed – 2011/12*

Skills and education for Science, Engineering and Technology to inform policy advice on Human Capital
Desktop scan of graduate and placement programmes in STI environments
Desktop research on the centrality of human capital to growth in the NSI
Analysis of progress in the National System of Innovation
Sustainable funding for basic research in biotechnology
Providing incentives along the biotechnology pipeline
Development of social indicators to track the impact of broad-based innovations on quality of life of South Africans
Position paper on national research facilities
Exploration of community innovation system: Bridging the innovation divide between formal and informal sectors
Symposium Proceedings Report – SET Gender Policy and Agriculture
Research to update S&T Indicators for 2011
Comprehensive input to the National Development Plan
Feedback to the Ministerial Review Committee report
Research report: Assessment of Incentives for Employing Women in the Corporate Environment
Policy analysis: Incentives for Employing Women in the Corporate Environment
Policy analysis: Review of Facing the Facts and Causes for Trends: A Pipeline Illustrating the Overall Participation of Women in SET
Position paper on Systemic Improvements and Policies to Enhance the Position of Women in Agriculture
A SET Gender Policy Framework

*Publications Finalised – 2011/12*

The 2010 South African S&T Indicators
---------------------------------------

## COMMITTEES AND REFERENCE GROUP REPORTS

Five specialist advisory committees are responsible for policy research, analysis and generating advice, chaired by NACI Councillors with input from Council members as well as non-Councillors, appointed according to subject-specific requirements. Advice is considered and approved by Council for overall alignment and coherence before submission to the Minister of Science and Technology.

### INNOVATION FOR DEVELOPMENT ADVISORY COMMITTEE (INNO4DEV)

#### Mandate

The INNO4DEV committee develops policy advice on the promotion of broad-based innovation (technological, non-technological, formal, non-formal) and encouraging the application of these in response to socio-economic challenges.

#### Business Meetings

INNO4DEV held four business meetings during the year.

#### Advice

A letter of advice has been developed on Scalable Social Innovations to Enhance their Impact on Societal Upliftment: it is awaiting presentation to the Minister.

The advice was based on the research findings on applicable local innovation initiatives, which do not enjoy widespread implementation. This made recommendations on national innovation database, replication of innovation, fragmentation of innovation activities and financial constraints.

#### Workshops and Events

The following workshops/events were hosted by INNO4DEV:

- Extraordinary Meeting on Anglo Zimele's Replicable Business Model for Small and Medium Enterprises with Potential to Address Societal Challenges and Needs, 20 October 2011
- Round-table Discussion on Replication of Broad-based Innovations with Social Impact, 21 June 2011.

#### Research

The following research projects were undertaken during the year:

- Development of Social Indicators to Track the Impact of Broad-based Innovations on Quality of Life of South Africans
- Exploration of Community Innovation System: Bridging the divide between formal and informal sectors.

### INDICATORS REFERENCE GROUP (IRG)

#### Mandate

The IRG generates data and information for the development of a comprehensive science, technology and innovation (STI) indicator system, aimed to be part of the national statistical system, thereby monitoring the performance of role players in the NSI and ultimately informing long-term national planning.

#### Business Meetings

Three business meetings were held on 27 May 2011, 6 October 2011 and 22 February 2012.

#### Advice

No advice letters were drafted during this financial year, but the Indicator data served to inform advice letters on Human Capital and SET Gender Policy.

## Research and publications

Research was completed on the following topics:

- Analysis of progress in the National System of Innovation: summarised in the NACI Corporate Annual Report, and as the basis for a published article
- Analysis of DST's Ten-year Innovation Plan: to assess targets set by the DST plan and the progress towards a knowledge-based economy
- Survey of access and utilisation of NACI's advice and research publications: to inform strategic planning and achievement of objectives related to stakeholder liaison
- Desktop research: to inform the Social Indicators work, as linked to the current S&T Indicators Measurements.

The following publication was produced during this period:

- South African S&T Indicators (2010), providing statistics and data on STI performance, trends and progress.

## Projects initiated during the year

- *Draft Indicators report on 2011 S&T indicators*  
To inform the data published for the annual updated report during the 2011/12 financial year, annual updated measurements of S&T indicators and analysis of associated progress made in different aspects
- *Development of South African innovation index*  
The development of a scoreboard of input and output STI indicators to include Social and Quality of Life Indicators, facilitating continuous assessment of the state of innovation in South Africa

### • *NACI Innovation Portal*

The IRG conceptualised and proposed the Innovation Portal, as a central internet-driven platform for all national innovation data, analytical reports and discussions around the NSI, approved by DST for implementation during the 2012/13 financial year.

## Workshops and events

The following events were organised by the IRG:

- Launch of the 2010 S&T Indicators publication at the Annual Symposium, co-hosted by NACI (22-23 September 2011)
- National Innovation Survey workshop, co-hosted by NACI with DST and HSRC (8-9 November 2011).

## Planning for 2012/13

The following projects are planned for the year:

- *South African Science and Technology Indicators 2011*  
Analysis and publication of annual update, aiming to widen the scope of measurements in line with South African development conditions and international trends
- *Science Technology and Innovation Landscape*  
This study aims to map innovation clusters from the South African STI landscape for a baseline of comparison on national and international measures.

## NACI SKILLS TASK TEAM

### Mandate

This task team started as a collaboration with the Council on Higher Education (CHE) in 2008, advising on SET human capital for innovation initially to both the Ministers of Science and Technology, and Higher Education and Training. This has since evolved into the NACI Skills task team, with input from pertinent stakeholders.

### Business Meetings

Business meetings were scheduled on 11 April 2011, 18 June 2011, 14 August 2011 and 9 October 2011.

### Advice

Ministerial advice was formulated and delivered during the year on the following:

- *Skills and education for NSI Human Capital development*  
This drew on extensive research and analysis of trends relating to SET skills challenges, and the identification of solutions to improve NSI human capacity through improved basic and higher education as well as employment approaches.

### Research

The task team completed research on the following topics:

- *The centrality of human capital to growth in the NSI: assessing demand for skills by business*  
This studied the link between South Africa's persistent shortages of skills, and effects on the supply and demand of relevant capacity across the human capital pipeline, to inform the advice letter on human capital

- *Desktop scan of graduate and placement programmes in STI environments*

The research covered aspects of graduate employability, the application of graduate placement programmes and other mechanisms that can assist to bridge the gap in knowledge and skills acquired between post-school education and the labour market.

### Workshops and Events

No workshops or events were organised by the Skills task team during the year.

### Planning for 2012/13

The committee's work was concluded with delivery of the advice on human capital for the NSI. The project team approach will be applied in future, with plans to render advice on sector-specific skills challenges and solutions, aligned to the different priority areas that form part of NACI's mandate.

## NATIONAL BIOTECHNOLOGY ADVISORY COMMITTEE (NBAC)

### Mandate

NBAC was formed in line with the National Biotechnology Strategy's call for the establishment of a Biotechnology advisory committee to advise the Minister of Science and Technology on biotechnology issues. The primary aim is the provision of high-level strategic advice on developing the sector, and monitoring issues of bio-ethics.

### Business Meetings

Four meetings were held, on 5 May 2011, 12 August 2011, 17 November 2011 and 23 March 2012.



## Advice

NBAC completed four advice letters and one information letter:

Advice letters:

- Genomic sovereignty
- Public understanding of biotechnology by the media
- Advice on the GMO Act
- Basic research and biotechnology incentives.

Information letter:

- The Role of Biotechnology in Food Security.

## Research and Publications

NBAC conducted two new studies to support the generation of evidence-based Ministerial advice:

- *Sustainable funding for basic research in biotechnology*  
The purpose of the research was to determine the necessary conditions for balancing the funding pipeline, with a special emphasis on making sure that basic biomedical and other research that feeds the biotechnology innovation pipeline is not neglected. The study identified the key challenges affecting basic research that is relevant to building a pipeline of biotechnology discoveries by the relevant bodies in South Africa and advancing recommendations as to how best to address these
- *Providing incentives along the biotechnology pipeline*  
The purpose of this research was to identify areas in which incentives would be important along the biotechnology pipeline both to promote development of the sector and to achieve national objectives. The study identified the key areas in which provision of incentives would be appropriate, as well as the infrastructure that will be required to administer them.

## Workshops and Events

NBAC's one-day workshop at the Innovation Hub, Pretoria on 22 March 2012, was attended by 83 people from the public sector, NGOs, research institutions and the private sector. The theme was "Bioprospecting South Africa's Biodiversity: a driver for the new bio-economy". The workshop brought together biotechnology experts working on global themes and perspectives. The workshop was also intended to highlight the legislative environment, policies and strategies related to bioprospecting in South Africa. The key note address was delivered by the Deputy Minister of the Department of Science and Technology, and presentations were made by Prof. Sagadevan Mundree from Queensland University, Australia and other prominent leaders in the field, including Prof. Don Cowan (extremophiles), Prof. Danie Brink (marine resources), Prof. Melodie Slabbert (legal/legislative environment of South Africa's bioprospecting), Prof. Michael Pepper (human genome), Dr Vinesh Maharaj (botanical/plants biotechnology) and Dr Juan Mulopo (acid mine water drainage).

## Planning for 2011/12

The advisory committee plans to proceed with the following research projects:

- *Priority areas in biotechnology* – to analyse the state of the South African biotechnology sector and draw up a list of priority areas and suggest which areas need investment in order to enhance the country's competitiveness. This study will include Health, Agro and Industrial biotechnology.
- *Bioinformatics platforms* – NBAC is planning to do an analysis in this area and provide advice on how best the country can properly manage the Bioinformatics systems.

## SCIENCE, ENGINEERING & TECHNOLOGY FOR WOMEN (SET4W)

### Mandate

The committee provides expert advice on the promotion and development of women in STI, to facilitate gender mainstreaming and influence stereotypical perceptions. Advice relates to policy interventions for meaningful participation of both genders.

### Business Meetings

SET4W held seven business and project meetings including a symposium on the following dates 29 April 2011; 19 July 2011; 25 August 2011; 06 October 2011; 25 November 2011; 06 December 2011; and 15 February 2012.

### Advice

Advice on Barriers Affecting Women in SET was developed.

### Research and Publications

Publications arising from SET4W's research work will be developed in the coming financial year. Analytical and research work was completed on the following topics:

- Incentives for employing women in corporate environments
- Tertiary education barriers affecting entry of females students into SET fields
- Review of *Facing the Facts* and causes for trends: a pipeline illustrating the overall participation of women in SET
- Systemic improvements and policies to enhance the position of women in agriculture
- SET Gender policy.

### Workshops and Events

- *SET Gender policy and Agriculture Workshop*  
The workshop, hosted on 15 February 2012, encouraged discussion and input to the SET gender policy, as the basis for advice planned during the current year.
- *Tanzanian delegation*  
The committee hosted a delegation from Tanzania on 19 July 2011, to discuss commonalities and policy approaches.

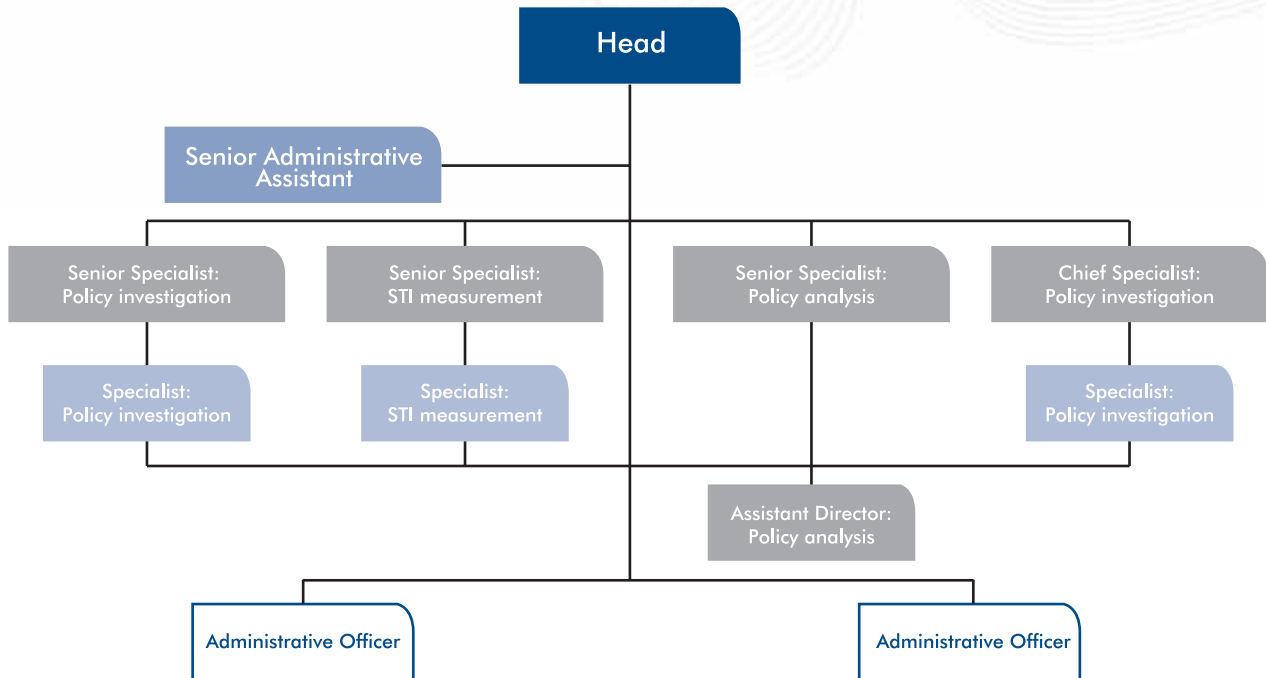
### Planning for 2012/13

Proposed research includes the following topics, for which detailed terms of reference will be developed during the impending year:

- Position paper on identified trends as discerned through work carried out for the *Face the Facts* publication
- Barriers affecting the entry of female students into SET fields.

# NACI SECRETARIAT

The success of NACI as an advisory body depends on support from the Secretariat to integrate committee input, administer and manage operational aspects of Council, ExCo and reference group functions. The Secretariat carried out basic research, organised all pertinent meetings, events and communications, drafted the NACI Strategic Plan for 2011/2012 – 2015/2016 and aligned business plans as required. Operations were enabled through the appropriate application of human, financial, infrastructure and other resources. Pertinent organisational functions and associated aspects of performance specific to the NACI Secretariat are outlined in this section.



*NACI Secretariat organogram*

## Human Resources

Under the leadership of Prof. Bharuth-Ram the NACI Secretariat staff assisted in fulfilling the organisational mandate. During 2010/11, further to the appointment of a fulltime Head, processes were completed to fill vacant positions, including two Senior Specialists and one Specialist. The following organogram gives an overview of relevant positions and the reporting structure applicable to the NACI Secretariat:

### Skills Development

NACI Secretariat staff is encouraged to upgrade professional capabilities and acquire further qualifications to boost NACI's operations. Training programmes attended during the year by various staff members included executive development, aimed to build management expertise in the public sector.

### Research and Innovation Co-operation

The focus on relationship building is indispensable for the NACI statutory role, to create synergies and facilitate knowledge sharing and support development goals. NACI's co-operative approach entails interaction with a number of organisations and representation in various initiatives. Prominent national and international stakeholders with which NACI interacted during the year included:

- National Science and Technology Forum (NSTF) (NACI is an EXCO member of this organisation)
- Organisation for Economic Cooperation and Development (OECD)

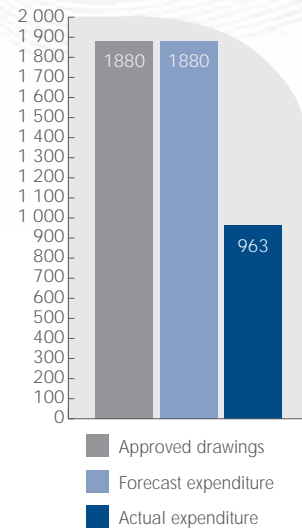
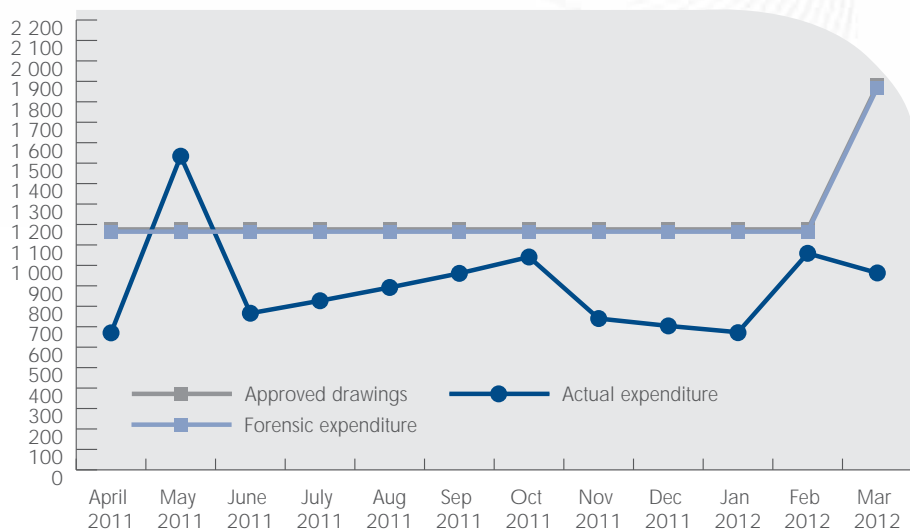
(the Secretariat participated in presentations at the OECD workshop, and assisted with provision of data for the OECD annual updates of country reports)

- Parliamentary Portfolio Committee on Science and Technology
- Southern African Research and Innovation Management Association (SARIMA)
- Technology Innovation Agency (TIA)
- Africa Institute of South Africa (AISA)
- Academy of Science of South Africa (ASSAf)
- Universities and academic institutions
- Department of Trade and Industry
- South Africa Netherlands Research Programme on Alternatives in Development (SANPAD)
- Tshwane Municipality Research and Innovation Division.

The NACI Strategic approach emphasises both formal and informal relationships, and wide consultation in relation to NSI progress will hence increase in future.

## Financial Resources

Funding for NACI's operations came from the DST's Programme 1 (Administration). Expenditure, administration and compliance with the Public Finance Management Act (No. 1 of 1999) were dealt with by the relevant divisions of the DST, as in the past. NACI's expenditure is tabled below.



		Apr-11 R'000	May-11 R'000	Jun-11 R'000	Jul-11 R'000	Aug-11 R'000	Sep-11 R'000	Oct-11 R'000	Nov-11 R'000	Dec-11 R'000	Jan-12 R'000	Feb-12 R'000	Mar-12 R'000	Total R'000	Approved drawings vs projected vs actual expenditure R'000	Average rate of deviation R'000
Forecast expenditure	Month	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 880	14 816	14 816	108
	Cumulative	1 176	2 352	3 528	4 704	5 880	7 056	8 232	9 408	10 584	11 760	12 936	14 816			
Actual expenditure	Month	670	1 534	766	827	892	961	1 041	740	704	673	1 059	963	10 830	10 830	174
	Cumulative	670	2 204	2 970	3 797	4 689	5 650	6 691	7 431	8 135	8 808	9 867	10 830			
Approved drawings	Month	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 176	1 880	14 816	14 816	108
	Cumulative	1 176	2 352	3 528	4 704	5 880	7 056	8 232	9 408	10 584	11 760	12 936	14 816			

## NACI: PLANNING FOR THE FUTURE

The Medium-Term Strategic Framework 2009 – 2014, Framework for a New Growth Path for Economic Development (2010), and other government strategies, prescripts and plans continue to form the basis for NACI's strategic execution, prioritising national objectives. The NACI Strategy for the period 2011 – 2016 is awaiting approval and has been prepared with the confidence that NACI remains an important policy advisory body in the national context. NACI's renewed focus on policy influence relates to specific target sectors:

- Monitoring, evaluation and co-ordination of the NSI
- Agriculture, food security and the bio-economy
- Government investment in infrastructure
- Energy security, the green economy and climate change
- SME development in growth sectors
- Skills development, gender, delivery of essential services and the impact of S&T in general.

NACI will continue to provide ample expertise and insight resulting from its vast collective experience to highlight challenges confronting STI in South Africa, advising on policies to address these challenges through an inclusive approach. The emphasis on cross-disciplinary input will progressively apply a project-based approach to maximise effectual advice. At an operational level NACI intends to actively develop internal analytical skills for optimal utilisation of resources. Management and advisory activities resolve to fortify the position as prominent in providing accurate, timely advice to government on Science, Technology and Innovation, building on the impressive baseline already established and remaining committed through all activities to the mission of:

“Innovation for a better future”

## APPENDIX A: MEMBERS OF COUNCIL AND SUPPORTING COMMITTEES

*NACI Councillors (Appointed from March 2009 to February 2013)*

TITLE	FULL NAME	POSITION	ORGANISATION
Dr	Steve Lennon (Chair)	Group Executive: Sustainability	Eskom
Mr	Paul Baloyi	Chief Executive Officer	Development Bank of Southern Africa (DBSA)
Dr	Phil Mjwara	Director-General	Department of Science and Technology (DST)
Dr	Ntuthuko Bhengu	Executive Head: Provider Networks	Qualsa (Pty) Ltd
Prof.	Cheryl M de la Rey	Vice-Chancellor and Principal	University of Pretoria
Mr	Kuseni Dlamini	Chief Executive Officer	Old Mutual
Dr	Azar Jammine	Director and Chief Economist	Econometrix
Prof.	Helen Laburn	Dean: Faculty of Health Sciences/DVC-Research	University of the Witwatersrand
Prof.	Lineo Vuyisa Mazwi-Tanga	Rector and Vice-Chancellor	Cape Peninsula University of Technology (CPUT)
Ms	Khungeka Njobe	Managing Director	Aveng Water
Prof.	Nthabiseng Ogude	Deputy Vice-Chancellor	University of Pretoria
Prof.	Francis W Petersen	Dean: Engineering and the Built Environment	University of Cape Town (UCT)
Dr	Johannes FA Potgieter	Chief Director: Innovation and Technology	Department of Trade and Industry ( <b>the dti</b> )
Prof.	Gerhardus J Prinsloo	Director: Technology Transfer and Innovation	Durban University of Technology (DUT)
Mr	Geoff Rothschild	Head: Government & International Affairs	Johannesburg Stock Exchange (JSE)
Prof.	Jennifer A Thomson	Department of Molecular and Cell Biology	UCT
Prof.	Arnold van Zyl	Deputy Vice-Chancellor: Research	University of Stellenbosch
Prof.	Krish Bharuth-Ram	Head: NACI Secretariat	NACI

*Members of NACI Executive Committee (ExCo) for 2011/12*

TITLE	FULL NAME	POSITION	ORGANISATION
Dr	Steve Lennon	Chair: NACI	Eskom
Prof.	Cheryl de la Rey	Councillor	University of Pretoria
Prof.	Krish Bharuth-Ram	Head: NACI Secretariat	NACI
Ms	Khungeka Njobe	Councillor	Aveng Water
Dr	Johannes Potgieter	<i>Ex-officio</i> Councillor	<b>the dti</b>

APPENDIX A: MEMBERS OF COUNCIL AND SUPPORTING COMMITTEES (CONTINUED)

*Members of INNO4DEV*

TITLE	FULL NAME	POSITION	ORGANISATION
Prof.	Francis W Petersen (Chair)	Dean: Engineering and the Built Environment	UCT
Mr	Paul Baloyi	Chief Executive Officer	DBSA
Dr	Ntuthuko Bhengu	Executive Head: Provider Networks	Qualsa (Pty) Ltd
Mr	Kuseni Dlamini	Chief Executive Officer	Old Mutual
Dr	Azar Jammine	Director and Chief Economist	Econometrix
Prof.	Lineo Vuyisa Mazwi-Tanga	Rector & Vice-Chancellor	CPUT
Mr	Geoff Rothschild	Head: Government and International Affairs	JSE
Prof.	Gerhardus Johannes Prinsloo	Director: Technology Transfer and Innovation	DUT

*Members of IRG*

TITLE	FULL NAME	POSITION	ORGANISATION
Prof.	Gerhard Prinsloo (Chair)	Director: Technology Transfer and Innovation	DUT
Mr	Stanley Ntakumba	Director: Performance Monitoring and Evaluation	The Presidency
Prof.	Francis Petersen	Dean: Faculty of Engineering and the Built Environment	UCT
Dr	Johannes Potgieter	Chief Director Innovation & Technology	<b>the dti</b>
Mr	Godfrey Mashamba	Chief Director: S&T Investment	DST
Prof.	Arnold van Zyl	Deputy Vice-Chancellor: Research	University of Stellenbosch

*Members of NACI Skills Task Team*

TITLE	FULL NAME	POSITION	ORGANISATION
Dr	Steve Lennon (Chair)	Managing Director: Resources & Strategy Division	Eskom
Dr	Albert van Jaarsveld	President/Chief Executive Officer (CEO)	National Research Foundation (NRF)
Dr	Phil Mjwara	Director-General	DST
Prof.	Essop Ahmed	CEO	Council on Higher Education (CHE)
Prof.	Yunus Ballim	Deputy Vice-Chancellor	University of the Witwatersrand
Mr	Geoff Rothschild	Head: Government and International Affairs	JSE
Dr	Johannes Potgieter	Chief Director: Innovation and Technology	<b>the dti</b>



*Members of NBAC*

TITLE	FULL NAME	POSITION	ORGANISATION
Ms	Kungeka Njobe (Chair)	Managing Director	Aveng Water
Prof.	Sagadevan Mundree	Deputy Director: Centre for Tropical Crops and Biocommodities	Queensland University of Technology, Australia
Prof.	Michael Pepper	Professor: Unit for Advanced Studies	University of Pretoria
Prof.	Jennifer Thomson	Emeritus Professor: Department of Molecular and Cell Biology	UCT
Prof.	Henk Huismans	Professor and Head: Department of Genetics	University of Pretoria
Prof.	Ames Dhai	Head: Steve Biko School of Bioethics	University of the Witwatersrand
Prof.	Jocelyn Webster	Executive Director	AfricaBio
Dr	Gatsha Mazithulela	Vice-President: Research Infrastructure & National Research Facilities	NRF
Dr	Hennie Groenewald	Executive Manager	Biosafety South Africa
Dr	Antonel Olckers	Founder and CEO	DNAbiotech (Pty) Ltd
Mr	Ben Durham	Director: Biotechnology	DST
Mr	McLean Sibanda	Senior Patent Attorney/CEO	TIA/Innovation Hub
Ms	Kelebohile Lekoape	Regulatory Manager	Bayer Cropscience (RSA)

*Members of SET4W*

TITLE	FULL NAME	POSITION	ORGANISATION
Prof.	Lineo Vuyisa Mazwi-Tanga (Chair)	Rector & Vice-Chancellor	CPUT
Prof.	Nlhabiseng Ogude	Deputy Vice-Chancellor	University of Pretoria
Dr	Romilla Maharaj	Executive Director: Human and Institutional Capacity Development	NRF
Dr	Yolisa Pakela-Jezile	Manager for Sustainable Rural Livelihoods	Agricultural Research Council (ARC)
Dr	Mmantsae Diale	Lecturer	University of Pretoria
Ms	Bridgette Gasa	Managing Director	The Eliiox (Pty) Ltd
Adv.	Louisa Barbara Zondo	General Counsel	Independent
Ms	Jacqueline Williams	Managing Director	Williams & Chalmers

## APPENDIX B: MEETING ATTENDANCE

*NACI Council, ExCo Meeting Participation by Councillors: April 2011 – March 2012*

MEMBERS	COUNCIL (3)	EXCO (4)	INNO 4DEV (3)	IRG (3)	NACI SKILLS (4)	NBAC (4)	SET4W (4)
Dr S Lennon (Chairperson)	3	4			3		
Dr P Mjwara	0	0			0		
Mr P Baloyi	2		2				
Dr N Bhengu	0		0			0	
Prof. C de la Rey	0	2			1		
Mr K Dlamini	0		0				
Dr A Jammie	2		2				
Prof. H Laburn	2						
Prof. L Mazwi-Tanga	1		2				4
Ms K Njobe	1	1				2	
Prof. N Ogude	2						2
Prof. F Petersen	1		3	1			
Dr J Potgieter	1	4		2	2		
Prof. G Prinsloo	3		2	3			
Mr G Rothschild	3		2		2		
Prof. J Thomson	2					4	
Prof. A Van Zyl	3			2			

## APPENDIX C: LIST OF ABBREVIATIONS AND ACRONYMS

AISA	Africa Institute of South Africa	NSTF	National Science and Technology Forum
ARC	Agricultural Research Council	OECD	Organisation for Economic Cooperation and Development
ASSAF	Academy of Science of South Africa	PHD	Doctor of Philosophy
CEO	Chief Executive Officer	R&D	Research and Development
CHE	Council on Higher Education	S&T	Science and Technology
CPUT	Cape Peninsula University of Technology	SANPAD	South Africa Netherlands Research Programme on Alternatives in Development
DBSA	Development Bank of Southern Africa	SARCHI	South African Research Chairs Initiative
DHET	Department of Higher Education and Training	SARIMA	Southern African Research and Innovation Management Association
DST	Department of Science and Technology	SET	Science, Engineering and Technology
DUT	Durban University of Technology	SET4W	Science, Engineering and Technology for Women
EXCO	Executive Committee	SKA	Square Kilometre Array
FET	Further Education and Training	STI	Science, Technology and Innovation
FTE	Full-Time Equivalent	<b>the dti</b>	Department of Trade and Industry
GMO	Genetically Modified Organism		
HEI	Higher Education Institutions		
IDC	Industrial Development Corporation		
INNO4DEV	Innovation for Development Committee		
IRG	Indicators Reference Group		
JSE	Johannesburg Stock Exchange		
NACI	National Advisory Council on Innovation		
NBAC	National Biotechnology Advisory Committee		
NDP	National Development plan		
NGO	Non-Governmental Organisation		
NRF	National Research Foundation		
NSI	National System of Innovation		



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