THE FOCUS AREA LANDSCAPE PROGRAMME OF THE NATIONAL RESEARCH FOUNDATION:

A REVIEW

FINAL REPORT

SUBMITTED TO

THE VICE-PRESIDENT

(RESEARCH AND INNOVATION SUPPORT AND ADVANCEMENT) NRF

BY

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FOREWORD

This investigation was commissioned at a time that we were also engaged in an evaluation of the impact of the *NRF Rating System*. Being involved in two evaluations dealing with separate but related programmes of the National Research Foundation (NRF) provided my team and myself a unique opportunity to gain insight into the spectrum of its research development functions and the way these were executed. This involvement again underscored what a privilege it is to contribute, albeit modestly, to the policy and strategy of an organisation as complex and important as the NRF. I am indebted to the NRF in general and the Vice-President in particular for affording me and my team the opportunity to participate in this endeavour. We trust that this report will do justice to the important function you entrusted to us.

I wish, further, to express my appreciation to all researchers and officials that participated in individual or group discussions and who set time aside to share their views on and experiences of the *NRF Focus Area Programme* in such a committed way.

Completion of a study such as this one is dependent on direct and indirect contributions, assistance, insights, critique, access to databases, and editing by a large number of colleagues – often on inconveniently short notice - and I wish to record my appreciation to each one of them.

This is the second project in which Maria Sikaundi and Simon Gathua, both postgraduate students at the University of Pretoria, collaborated – thank you sincerely for your indispensable and competent assistance.

I wish to acknowledge the prompt and indispensable assistance we received from the staff of the NRF’s Grants Management and Systems Administration and the Evaluation Centre. The management and staff members were most helpful in ensuring that information that was not readily available, was provided at short notice. I appreciate your support and time enormously.

I trust that this report will comply with the expectations of the NRF and that it will contribute to the important strategic evaluation the organisation is currently involved in.

Dr HC Marais
1 November 2007
EXECUTIVE SUMMARY

BACKGROUND

The National Research Foundation (NRF) in the earlier half of 2007 launched a comprehensive review of most of its functions and systems as part of a strategy development process, NRF vision 2015. This process included the present evidence-based evaluation study of part of its funding strategy and programmes.

THE BRIEF AND ITS OPERATIONALISATION

The brief of the study referred to “a retrospective view of the FAL concept during the period 2001 to 2006” in relation to its contribution to a series of dimensions, including its underlying rationale, alignment to national imperatives, implementation, contribution to robust and multi-disciplinary research, reception by relevant communities and its strengths and weaknesses. In addition, the brief specified that recommendations “regarding the future strategic direction for NRF funding programmes” be made.

The scope was clearly very broad since it concerned the focus area landscape, i.e. the approach of mapping the NRF mandated landscape and subsequently to develop programmes to address/support each one of those area. The scope would thus include both the ‘topography’ of the landscape and the specific programmes populating it, namely a total of nine separately administered support programmes to be evaluated on nine dimensions. In view of time restrictions, it was decided to use the Focus Area Programme (FAP) as prime example of the focus area landscape model and only to touch on the other programmes, if and where essential.

The brief was operationalised by identifying the sources of information that would be analysed and provided for a mix of quantitative (content and bibliometric analyses) and qualitative (personal interviews and group discussions) approaches. It was agreed with the service provider that the report would present the most relevant evidence allowed by the time frame of about two months. This meant that the study could not be exhaustive and had to rely on subsets of information and samples. Nevertheless, the approach to the study, namely a mediated known sources review, was designed to develop a fair overview of the field of investigation and to allow
for analysis that would as unbiased as possible. This study was approached as an evidence-generating study that should contribute to strategy evaluation and not as an academic in-depth investigation of steering of a research system.

**Main Conclusions**

The following main conclusions were drawn from the findings:

**Justification of the introduction of the Focus Area Programme**

Four reasons were offered for the radical shift in 2000 from the funding of curiosity-driven to steered problem-orientated research, viz. firstly, the establishment of the ‘new’ National Research Foundation incorporating the natural and social sciences; secondly, the national imperative of directing public resources towards addressing national challenges; thirdly, international reorientation from Mode 1 to Mode 2 in knowledge production; and fourthly, international best practices in public funding of research.

**Model underlying the Focus Area Programme**

The model underlying the *FAP* was one of steering the publicly funded research system towards a Mode 2-type of knowledge production and could be described as having comparative validity, since it reflected the international main stream thinking current since at least the early 1990s. Although it represented a rather radical change of course in public funding of self-initiated research in South Africa, it was received as well as could be expected by a research community often characterised by opposition to any form of steering.

**Implementation of the Focus Area Programme**

A set of conclusions was reached on the question of the implementation of the *FAP*. Firstly, the *FAP* was incompletely implemented to the extent that not sufficient resources had been made for either stimulation and coordination of and capacity building in multi-disciplinary research or the monitoring of utilisation of research findings from *FAP* funded projects. Secondly, the multi-layered evaluation system has been well designed, but there seem to be indications that the panels do not enjoy sufficient credibility. Thirdly, funding levels were found to be too low. Fourthly, the administration of the *FAP* led to an apparently contradictory pair of conclusions. On the one hand, the management and the general administration of the programme were rated positively, but the feedback communication and on-line application system elicited less positive comments, on the other.
Empirical analyses

A range of empirical analyses were undertaken and the conclusions are summarised in the following paragraphs.

Alignment with national imperatives

The focus areas were found to be very well aligned with national imperatives as inferred from a range of official government policy documents.

Reception by communities

The research community realised from the start that the FAP represented a significant change in the direction of NRF funding strategy, but the consultative approach contributed towards sufficient buy-in by the research community. There are variations in attitude among different components of the research community, the general orientation towards this aspect of the NRF is positive, but there is currently some scepticism about its real impact on contributing to the solving of national problems.

Fit between focus area terms and research proposals

Researchers succeeded well in matching their research proposals to the focus area frameworks and in this regard are constructively supported by the FAP staff. In this sense the programme has been successful in eliciting research proposals that are aligned to the strategic direction intended by the NRF

Mix of research and multi-disciplinarity

The operationalised evaluation design of the Focus Area Programme’s contribution to multi-disciplinarity was narrow, namely publications in journals covering more than one knowledge field. The bibliometric analyses led to the conclusion that FAP funded authors did not show a higher preference for multi-disciplinarity than non-NRF funded South African authors. It was, however, further concluded that more comprehensive research would be required to provide a definitive answer.

Strengths, weaknesses and challenges

It was concluded that the main strengths were:
• At the national level, the decision by the NRF at the turn of the century to change course from support of unrestricted disciplinary orientated self-initiated research to funding of steered relevant and multi-disciplinary orientated research and the substantive preparatory work it did as well as the consultative process it followed in introducing the FAP

• At the sectoral systems level, the extent to which institutions have accepted the philosophy underlying FAP, namely the need for relevant research and multidisciplinarity

• At the institutional level, the interpretation of FAP as being a readiness and commitment by the NRF to steer more dynamically the research system;

• At programme level, FAP was as well designed and implemented as the context at the time allowed

• At administrative level, FAP is well administered at higher levels of management.

The main weaknesses of the FAP include the following:

• At national level, non-optimal funding of FAP supported research

• At sectoral level, exhaustion of the small pool of experts on whom the quality control of the system depends

• At institutional level, the need for capacity to dynamically and proactively facilitate and stimulate multidisciplinary research as well as monitor utilisation of research findings by the NRF

• At programme level, the focus area, Distinct South African Opportunities, that often serves as safety net or catch-all is somewhat of an anomaly in the FAP, on the one hand, and the exceptionally high success rate of applications to the focus area Indigenous Knowledge Systems on the other, causes stress in the system

• At administrative level, the need to upgrade the quality of feedback on various aspects of applications.

The main challenges awaiting the NRF with respect to focussed research funding programmes are the following:
• **National level**: Establishing a credible and productive relationship with DST with regard to focussed research initiatives.

• **Sectoral level**: Developing and instituting a system of staff secondments as a means for addressing staff turn-over, especially at middle and senior management levels

• **Institutional level**: Developing an approach to steering of the research system that would balance legitimate concerns of the research community on the one hand and the research system and government on the other

• **Programme level**: Capitalising on lessons learnt in the first six years of *FAP* and transferring those lessons to subsequent programmes

• **Administrative level**: Developing and maintaining a top class professional administrative capacity.

**RECOMMENDATIONS**

The following high-level recommendations were formulated for consideration by the NRF:

**Continuation of steered focus area orientated research**

• The NRF should continue to steer at least a significant portion of research it funds towards relevant focussed areas and in the process encourage and reward multi-disciplinarity.

• The NRF should maintain sufficient flexibility to be able to adjust the focussed directions towards which it wishes to steer research, should circumstances require it.

**Support for disciplinary research**

• The NRF should institute a research funding programme aimed at supporting self-initiated discipline orientated research to serve the needs of rated researchers and other *bona fide* discipline orientated research projects.

**Integrated approach to steering**

• The NRF should dynamically contribute to stimulating and capacity building in research
approaches involving relevant and multi-disciplinary research, should it continue funding focussed research, albeit in modified programmes.

Utilisation of NRF funded research findings

- The NRF should establish an utilisation capacity that should be responsible for functions such as monitoring utilisation of NRF funded projects; scanning research findings with a view to possible utilisation; matching research findings to identified needs in the national environment; etc.

Conceptual, financial and operational differentiation between knowledge production and capacity development programmes

- The NRF has to consider the balance between the knowledge production and innovation promoting FAP on the one hand and capacity development programmes, on the other, to determine the most productive balance in evaluation processes, standards, funding and programmes.

Management of focus area orientated research

- Striving for excellence in research presupposes professionalism in all dimensions of the adjudication and grant administrative processes and the NRF should ensure that all these functions comply with the highest professional standards.

- The NRF should, like sister organisations abroad, seriously consider the option of secondments of senior academic and other staff from other institutions for periods of up to three years to compensate for staff turn-over at the higher levels of the organisation on the one hand and the introduction of new thinking on the other.

- Addressing unevenness (inter alia with regard to quality and cost) in the peer evaluation system should be a priority and it is recommended that an instrument such as a multi-criteria decision model (MCDM) should be developed to suit the requirements of the broader spectrum of disciplines being served by the NRF. Such an instrument should (and can) be validated to suit the unique requirements of groups of disciplines.

- The NRF should consider establishing a committee of panel chairpersons tasked to ‘normalise’ (also in the statistical sense) the consolidated list of outcomes of project evaluations for submission to the NRF executive.
• As part of its steering role, the NRF should produce three user-friendly information documents (Internet based) to assist researchers, evaluators and administrators alike with regard to facets of research funding in general and grants in particular, namely a comparative overview of research grant guidelines of peer funding agencies in selected comparator countries, a guide to effective applications for NRF grants, and a guide to effective peer-evaluations of research proposals

Implementation of a new strategy

• The NRF should, upon approval of the outcomes of the present evaluation project – even if only in part - and before implementing any amended or new strategy, develop and approve an implementation monitoring plan and instrument(s), including the indicators to be used.

• Should the NRF decide in principle to retain support of focussed research in some form or another, it should implement such a system only after consultation with the full range of its stakeholders.

Strategic management and research information

• The NRF, being at the nexus of diverse information and knowledge sources on research systems and performance, should establish a corporate objective to ensure the systematic and accessible storage of relevant information sets for strategic management (for example, on international research policy and strategy trends advanced human capital development, utilisation of research findings and inter-disciplinarity of projects).

CONCLUSIONS

The evaluation of a research funding programme, such as the Focus Area Programme, confronts all parties in the contract with a dilemma somewhat unique to evaluation research, namely how to weigh the evidence in favour of or against the continuation of the specific programme. The critical factor is often not the substantiation or implementation or management of the programme, but its reception by the intended beneficiaries. The Focus Area Programme represented a significant attempt by the NRF to steer the research funding system away from the traditional comfort zone of self-initiated and curiosity-driven research, important as that zone may have been throughout the history of science – until the late nineteen eighties, that is. It stands to reason that many researchers would not be favourably disposed to this kind of steering by a funding agency. However, it had become imperative for the NRF to bring about this strategic change.
Against the preceding background and in the light of evidence submitted in this report the overriding conclusion is that the development and implementation of the *Focus Area Programme*

- came at the right time,
- has been partially successful,
- the rationale behind it and the model underpinning it remain valid and
- the steering role of the NRF should not be abandoned – even if the *Focus Area Programme* should be significantly amended - but the organisation should take account of the necessary conditions (as identified in this report) for successfully steering the system and manage a programme such as the current one.

In addition to the four preceding conclusions/recommendations the study also suggests that provision should be made for a programme dedicated to promoting discipline-orientated research without it becoming a ‘soft’ option for research which is neither scientifically nor societally relevant.
CHAPTER 1

BRIEF, CONTEXT AND DESIGN

The National Research Foundation’s (NRF) strategic decision soon after its founding to organise its support and promotion of research in terms of nationally relevant focus areas was at least partially in line with the strategy of many other comparable national funding agencies across the world, notable African examples being Egypt and Tunisia. In contrast to the ‘traditional’ approach to support for and promotion of non-directed, self-initiated and curiosity-driven research, a focus area strategy for various reasons has to be reviewed more regularly. Two important reasons are, firstly, the corporate and national imperatives of ascertaining whether the strategic objectives underpinning it are being met and, secondly, because national and international priorities – with which the support and promotion strategy is intended to be aligned - change at an accelerated pace. The present initiative of the NRF to review the Focus Area Landscape (FAL) should be welcomed against this background.

The decision by the NRF to evaluate the focus area strategy should also be welcomed as part of best South African practice of regularly reviewing institutions and programmes. In its background report to the OECD, the National Advisory Council on Innovation (NACI; 2006) listed the short but rich strategy of institutional and programme reviews as one of the real strengths of the South African National System of Innovation (NSI). That report listed a range of such reviews, including a significant number undertaken by the NRF. This commitment of the NRF to review its programmes at five-year intervals should be encouraged throughout the NSI.

In the earlier half of 2007 the NRF launched a comprehensive strategy development process, NRF vision 2015. This process included the present evidence-based evaluation study of part of its funding strategy and programmes.

1. THE BRIEF AND INTERPRETATION

The brief and terms of reference (ToR) are summarised below.

1.1 The purpose of the review

The purpose of the review was described as providing “a retrospective view of the FAL concept during the period 2001 to 2006 in relation to (...) its original intention/philosophy within the
landscape in which the Research and Innovation Support Agency (RISA) supports research. The framework for the FAL intended bringing researchers in various scientific disciplines together for constructive interaction to address South Africa’s requirements in terms of highly skilled human resources, needs and challenges (...) and to develop recommendations regarding the future strategic direction for NRF funding programmes”.

1.2 Scope and dimensions of the review

The scope of the Review of the Focus Area Landscape was conceived not only to include the Focus Area Programme (FAP), but also Thuthuka and Institutional Research Development Programmes, Student Support, International Science Liaison and Equipment.

The terms of reference further specified that the following dimensions should be covered (‘comment on’, as it was stated in the terms of reference) in the review:

- Underlying philosophy and concept of the NRF Focus Area Landscape (FAL)
- Strengths and weaknesses of the FAL concept
- How well the FAL concept was implemented across the various programmes within the NRF
- Provision for robust research contributions in all disciplines across the spectrum
- Extent to which the nine focus areas have addressed national imperatives over time
- Nature of the research problems addressed by funded research projects in relation to the focus areas’ frameworks
- Extent to which the FAL has facilitated the disciplinary, multidisciplinary, interdisciplinary and transdisciplinary mix of research in South Africa
- Extent to which the research communities have responded to the FAL concept

The review was commissioned in September 2007 and the date for the completion of the review was set for the end of October 2007.
1.3 Interpretation of the brief

The brief was interpreted as an ex-post facto programme evaluation that would serve as an input to a strategic planning process that the NRF was engaged in. The following dimensions formed the nexus in the conversion of the brief into an empirical evaluation project.

1.3.1 Scope and depth of evaluation

The scope of the evaluation was quite wide, if it is, firstly, considered that it referred to the focus area landscape model, in other words the approach of mapping the mandated landscape and subsequently to develop programmes to address/support each one of those areas. The scope would thus include both the ‘topography’ of the landscape and the specific programmes, namely a total of nine separately administered support programmes. Furthermore, the brief identified no fewer than nine evaluation dimensions that had to be addressed in the space of about eight weeks. The NRF accounted for this complex challenge by using the operative term ‘comment on...’ in the terms of reference, but it was nevertheless agreed that the study should strive for the optimum empirical depth allowed within the given timeframe. It was clear from the start that it would not be possible to do justice to all the components of the brief in the time provided for the project. It was consequently decided to use the Focus Area Programme (FAP; see Chapter 2, Section 4.1) as example of the focus area landscape model and only to touch on the Development programmes, if and where essential; it would not be possible to include the other programmes in the study.

1.3.2 Approach to evaluation

At the outset, it was decided to follow a combination of a quantitative and a qualitative approach. The design of this evaluation project could best be described as a mediated known representative sources design (the point of departure being the ‘known groups’ design in psychometrics) – known representative sources, since the sources of information were deliberately chosen for their informedness, representivity and availability; and mediated, since the project leader and staff actively engaged with the sources to gain the best possible information from them. (One observer referred to the approach as resembling qualitative imputation.)

Underlying an evaluation in which relationships between at least two main stakeholders are involved, is the challenge to weigh in a fair and rational way often conflicting interests. In the present case, at least three stakeholders were involved. Firstly there was the community of researchers – the intended beneficiaries of public funding - which is normally interested in undertaking its research in as unrestricted environment as possible and guided primarily by methodological criteria. Secondly, there was the funding agency which is essentially nationally and R&D policy orientated – custodians of public interest.
and informed about international best practices. Thirdly, in an overarching way, there was a government which is exclusively focussed on attaining national objectives. In addition, each of these three stakeholders has its own international best practices discernable frame of reference in considering the undertaking, promotion and funding of research. Figure 1.1 tries to depict the situation that is often overlooked in evaluations of public-sponsored programmes. The mediated known representative sources design assumed that this evaluation study could not be approached from the perspective of one stakeholder only, but had to account for the legitimate interests of at least these three stakeholders.

**Figure 1.1: Multidimensional Approach to Evaluation**

1.3.3 Timeframe and effects

The *FAP* was launched in 2001 at a time when there was a need for stimulating, facilitating and supporting collaborative, multi-/interdisciplinary and relevant research. The effects of this new orientation, if any, could be expected to take some time to manifest themselves, if the reasonable assumption is made that it represented a significant change of course for academic research in the country. Further, it is unlikely that a one five-year or two to three two-year cycles of funding would be sufficient to register on some of the dimensions specified in the terms of reference, especially given the average project life cycle of academic research.

2 Operationalisation of the Brief

In line with of the Terms of Reference (#6) the review was structured in terms of the following set of nine interrelated review dimensions or objectives.
2.1 **Assessment of the research support and promotion model underlying the FAL**

This would entail an assessment of the rationale and composition of the FAL as it was conceived in 2000 within the context of changing socio-economic and other national policy contexts. Information sources would include the formal Focus Area Landscape strategy and system, inputs to be solicited from selected NRF officials involved at the time, and any documents pertaining to the establishment of the FAL at the time. The analytical approach would entail a content analysis of the FAL policy for comprehensiveness, internal consistency, feasibility and relevancy.

2.2 **Evaluation of the success of the implementation of the FAL model**

The second dimension would entail the analysis of a sample of the support and promotion initiatives, including research grants focus areas and disciplines to determine the extent to which the actual initiatives reflected the rationale and intention of the FAL materialised. Information sources would include the formal FAL strategy and a sample of NRF records of support and promotion initiatives and the analytical approach would consist of descriptive analyses of the relevant NRF records and comparisons with the FAL strategy. (Review dimension 5 was incorporated under this dimension in view of its thematic and conceptual similarity.)

2.3 **Evaluation of the extent to which the implemented FAL model provided for robust research across relevant disciplines**

This dimension would entail peer evaluations of proposals and quality of outputs, looking for associations between FAP funding and robust research without considering cause-effect relationships; a concurrency as opposed to causal approach. Information sources: The most recent list of approved grants and bibliometric information on outputs. Analytical approach: Content analyses of a representative sample of NRF peer evaluations and secondary bibliometric analyses of outputs.

2.4 **Assessment of the extent of ‘overlap’ between research undertaken with the focus areas and the national imperatives**

This dimension would require the classification of funded research projects in terms of the national imperatives on the basis of a register of approved projects, national imperatives as reflected in government publications; the analytical approach would consist of listing of generic national imperatives and content analysis of projects followed by contingency analyses.

2.5 **Determination of the ‘fit’ between funded research proposals and the frameworks of the respective focus areas**

This dimension entailed the testing the goodness of fit of a sample of funded projects against the frameworks of the focus areas. In view of its similarity to the second dimension, namely the
implementation of the *FAP*, it was incorporated in the report on review dimension 2 (see Section 2.2 above).

2.6 Evaluation of the influence of the FAL on the mix of research

This component of the study would focus on the ‘disciplinarity’ of projects and publications based on the register of most recently approved projects and bibliometric information on publications.

2.7 Assessment of the reception of the FAL model by different research communities

This assessment asked, firstly, for secondary statistical analyses of selected raw data from the NRF Corporate Stakeholder Survey undertaken in 2004 for the NRF Institutional Review and secondly for feedback from a selection of directors of research at South African universities.

2.8 Assessment of the strengths and weaknesses of the FAL model

This would be the penultimate dimension, incorporating the outcomes of the reviews of the preceding seven dimensions. The information sources would include conceptual models of support and promotion models (best practices), the FAL model, as well as outcomes of the other seven dimensions, while the analytical approach would entail comparative conceptual analyses.

2.9 Recommendations with regard to the continuation of the FAL and its most appropriate future constitution

This dimension would consist of the application of policy analyses of relevant documents of South Africa and comparator countries in the light of the results of the preceding eight dimensions.

2.10 Qualifying notes on the review dimensions

It should firstly be noted that the development programmes were also addressed where feasible and possible, although the point of gravity of the study was the FAP. Secondly, the availability and accessibility of information within the tight time constraints of the study led to forced adjustments to the breadth and depth at which each of the dimensions could be addressed.

3 Design of the Evaluation Study

The operationalisation of the evaluation study required a wide spectrum of types of information and analytical approaches. One way of representing the potentially complex research design the study required, is the model in Figure 1.2.
Figure 1.2 shows the contribution the different sources of information and analytical approaches made to the report. In short, the report relied very heavily on NRF management information, somewhat less so on the empirical results generated by dedicated analyses and much less on scholarly publications. Particulars of each of the components can be found in the next section below.

Figure 1.2: Representation of the Research Design

3.1 Sources of information

The sources of information that were used as inputs to this study are briefly described below; the analytical approaches are also identified.

3.1.1 Individual in-depth interviews

In-depth interviews (averaging approximately 60 minutes each) were conducted between August and the first week of October 2007 with seven key role players in NRF funding structures, especially the FAP, to obtain qualitative information on their experiences as well as their
perceptions of the strengths, weaknesses and challenges of NRF funding programmes and systems. These interviews focussed exclusively on the FAP. In addition, relevant information – and there was a considerable volume - distilled from the 10 interviews that had been conducted for the evaluation of the impact of the NRF Rating System (Marais 2007), was also accounted for in this study on the FAP.

Each interviewee was assured that his/her contributions would remain anonymous and would not be attributed in the report to any particular individual.

- The 16 interviewees represented the following constituencies of the research and development system: top managers and consultants responsible for the initiation and the management of the early phase of the development of the FAP; current and previous executive managers of the system at the NRF; executive university managers (from universities with an established research tradition and formerly disadvantaged institutions); and researchers.

- The interview framework consisted of the following themes (variously nuanced according to the specific background of the interviewee): current position and involvement in the FAP; perceived rationale for the FAP; comparisons with other systems of funding; strengths and weaknesses of the FAP; conditions for the FAP; future of the system, and changes or alternatives to it; and any other comments.

- The following analytical framework, shown in Figure 1.3, was used for organising and analysing the information.

**Figure 1.3: Analytical framework used for FAP related interview information**
3.1.2 Group discussions

Two dedicated group discussions took place. The one on 7 September 2007 focussed on external experiences, perceptions and recommendations of university research offices, and was attended by representatives of six institutions in the Northern provinces. The other one on 26 September 2007 focussed on internal experiences, perceptions, and recommendations of eight NRF line managers and administrators directly involved in the FAP and Institutional Development Programmes. Participants were assured, firstly, that their inputs would be treated confidentially, secondly, that the inputs would be anonymised, and thirdly, that they would be been given an opportunity to comment on the record of proceedings. The project leader acted as facilitator, each session lasted approximately 90 minutes and an analytical model similar to the one for individual interviews (see Figure 1.3).

Additional information was acquired from six focussed group discussions held for the rating study (Marais, 2007). The FAP was inevitably discussed in the framework of the funding of rated researchers and relevant information generated in those groups was incorporated in the present study. Those group meetings took place in Durban, Cape Town, Potchefstroom, Stellenbosch, Pretoria and Polokwane and were attended by 37 academics, mostly grant holders, and managers.

3.1.3 Secondary statistical analysis of an earlier NRF Stakeholder Survey

The tight time frame did not allow for a survey of users’ assessments of the FAP, but this study could be informed by a secondary analysis of data collected for a Stakeholder Survey the NRF had commissioned in 2004 as an input to its most recent NRF Institutional Review (the service provider for which was Marketing Surveys and Statistical Analysis, MSSA; see NRF 2005c). The stakeholder population from which the sample was drawn, included NRF grant holders, panel members, reviewers, research organisations, NRF staff and NRF board members. For the purpose of these statistical analyses grant holders (rated researchers and other grant holders), panel members and reviewers were treated as separate representatives of those communities, since their involvement and interest in the FAP were different. The questionnaire items did not exactly match the variables covered in the present study, but were thought to represent close proxies.

Secondary statistical analyses were conducted on the data of items of the MSSA questionnaire dealing with the NRF’s performance with regard to increasing the quality and quantity of researchers and students, facilitating the utilisation of knowledge, addressing national and international priorities, adherence to quality, and provision of a useful rating of individual researchers. Kruskal-Wallis non-parametric analyses were done to determine whether the three
groups differed significantly and Mann-Whitney U tests to determine the location of any differences.

Details on technical aspects of the survey design can be found in the report (NRF 2005c: 11-14) and are summarised here:

- A mail questionnaire, focusing on the mandate and impact of the NRF, was faxed and e-mailed at the end of 2004 to 2 000 grant holders, 457 panel members and 2 904 reviewers; the reported response rates were 12.6%, 16.4% and a low 3.7% respectively.

- A special series of statistical reliability and validity checks conducted for a previous project on the NRF Rating System project had shown the questionnaire to be satisfactorily reliable and valid.

- The conversion of the database and analyses were undertaken by co-researcher, Simon Gathua.

### 3.1.4 Analysis of SAKnowledgebase at CREST

The SAKnowledgebase database developed and managed by the Centre for Research on Science and Technology (CREST) at the University of Stellenbosch is the most comprehensive bibliometric source of data on scientific journal articles authored and co-authored by South African researchers (for further information see [http://academic.sun.ac.za/crest/](http://academic.sun.ac.za/crest/)). It contains more than 90 000 titles and 9 069 authors and covers the 243 ISI field-specific journal categories developed into a four-tiered hierarchical scientific field classification ranging from 243 very detailed distinctions between fields, though broader groupings of 33 and 19 fields to 4 very broad scientific fields). The grant holders of 2004 were used as test population and their publication patterns for the subsequent years were traced in the list of journal article authors listed in the SAKnowledgebase. Transposing the 2004 FAP funded researchers onto the SAKnowledgebase required the following steps:

- The names of the 2004 list of FAP and DP grant holders were matched with those in the SAKnowledgebase, which produced 507 (of a total of 924) matched FAP supported researchers and 148 (of a total of 429) researchers supported by the Development Programmes. (It should be noted that reasons why names could not be matched, include initials not being exactly the same, different institutions, variations and spelling of surnames, articles not yet registered on the database, and, of course, the possibility that the researchers had in fact not published in the specified period.)
• It was decided not to analyse the data in terms of broad disciplinary fields, since the focus areas and development programmes were included as variables. Disciplinary fields will be included in subsequent analyses.

• A new database (including authors, identified as FAP and DP funded, publishing in journals covered in the SAKnowledgebase) was thus created exclusively for the present statistical analysis to enable comparisons between ‘FAP and DP funded researchers’ and ‘non FAP funded researchers’ on a number of indicators, specified in Chapter 4.

(The preparation of the database and the analyses were carried out by Nelius Boshoff, Derick van Niekerk and Simon Gathua, under the guidance of Johann Mouton.)

3.1.5 NRF data sets and sources of information

The study relied heavily on accessing and analysing NRF management data sets relevant to this evaluation study, including various phases and formats of the application process, data on publications (other than journal articles), proceedings of the committee meetings, funding and related subjects. The specific sources are acknowledged at appropriate points in this report. (the NRF officials that provided the formatted information on request were Robin Drennan, Gudrun Schirge, Elaine Lemmer, Saloshana Naidoo and Dot Moller.) It should be noted that for technical reasons, it was not possible to use the same periods, categories of researchers and/or intervals throughout for all the various analyses; minor and non-significant variations might also appear between the different data sets.

• Information on Focus Area Programms and Development Programme grants

All relevant information on FAP and DP grants were made available on a confidential basis to the project leader. Different subsets of these data were used in different parts of the evaluation study. A random sample of 200 most recently approved projects were drawn to test the congruence between the focus area frameworks and the actual projects, while all the grants for 2004 were used in the bibliometric analyses (see Section 3.1.4 for the methodological approach above).

• Documentation

A near compete set of policy and management documents were also made available for consultation by the project leader. These documents are identified where appropriate.
3.2 Summary

The terms of reference for this evaluation study were very wide covering virtually the entire spectrum of funding programmes of the NRF. The initial interpretation of the brief and the subsequent operationalisation led to the scope of the study eventually being restricted to focus primarily on the FAP and secondarily on the Institutional Development Programmes. The research design provided for both qualitative and quantitative approaches. The qualitative components consisted of interviews, group discussions and content analyses of documents, while the quantitative components consisted of secondary statistical analyses of data generated by a NRF Stakeholder Survey and bibliometric analyses. An important qualification that was identified in the preceding sections was the expectation that the six years covered by this review, namely from 2001 to 2007, might turn out to be too short to show permanent influences on the academic R&D system, assuming that all conditions for such a systemic initiative had been met. This latter assumption will be revisited in later chapters.

4 Structure of this Report

The report is structured in the following way:

- Chapter 2 first offers a background to the introduction of the FAP, secondly addresses the first evaluation dimension (ED) by critically describing the model underlying the FAP, and thirdly summarises the management of the system.

- Chapter 3 offers an assessment of the success of implementation of the FAP (ED #2.2).

- Chapter 4 reports on the outcomes of the empirical components of the evaluation, viz. its alignment with national imperatives (ED #2.4); the reception of the FAP by research communities (ED #2.7); contribution to robust research (ED #2.3); and influence on the mix of research (ED #2.6).

- Chapter 5 reviews the strengths, weaknesses and challenges of the FAP, i.e. review dimension #2.8.

- Finally, Chapter 6 presents the main conclusions of the evaluation and also offers a set of recommendations in response to evaluation dimension #2.9.
CHAPTER 2

THE FOCUS AREA PROGRAMME:

BACKGROUND, UNDERLYING MODEL AND MANAGEMENT

The National Research Foundation (NRF) was established in 1999 in terms of Act 23 of 1998 (RSA 1998) to support and promote research in all fields of science and technology, including indigenous knowledge. This meant that the NRF would fund the fields of the Natural Sciences, Engineering and Technology (SET) as well as the Social Sciences and Humanities, but not the Medical Sciences which would be (and still are) funded through the Medical Research Council. The incorporation of the two science cultures, namely Natural and Social Sciences, into a new funding body was recommended by the reviews commissioned by the government at the end of the 1990s (DACST 1998a and 1998b). The mandate of the NRF specified that the support of research should be done “… through funding, human resource development and the provision of the necessary facilities in order to facilitate the creation of knowledge, innovation and development” (RSA, 1998: Section 3). (The NRF incorporated the former Centre for Science Development of the Human Sciences Research Council that was responsible for funding of research in the human sciences and the FRD which was responsible for that function in SET.)

Between 1999 and 2001 the main funding programme of the NRF was essentially that of reactive funding of self-initiated curiosity-driven research along the lines practiced before by the FRD and CSD respectively. The ‘liberty’ allowed academic researchers before 2000 was best epitomised by the original philosophy of the rating system: provide funds with the minimum conditions and the good researcher would produce quality research.

In 2001 the Focus Area Programme (FAP) was launched. It would treat both science cultures the same and in 2002 an evaluation and rating system for the Social Sciences and Humanities was also introduced that would extend the rating system introduced for the natural sciences and engineering as far back as 1984 (NRF Evaluation Centre, 2007).

Against the preceding background, the following section outlines of the motivation for and processes followed in establishing the Focus Area Landscape; that section is followed by an evaluation of the model underlying the Focus Area Programme strategy. The last section of this chapter describes the management of the Focus Area Programme.
1 MOTIVATION FOR CHANGE

This section first considers the broader historical context immediately preceding the founding of the NRF and the subsequent launch of the FAP, since it is assumed that broader policy trends – even philosophy – function as antecedents or co-producers of developments such as we have seen with regard to R&D and S&T policy in South Africa. The second part of this section offers a brief overview of the motivation of the NRF itself in choosing in favour of the focus area landscape model. The broader historical context is attended to in somewhat more detail, albeit it still very superficially, than the motivation of the NRF itself, since the influence of the former on national systems is perhaps not always fully appreciated.

1.1 Selective historical contextual elements

A number of external and internal factors manifestly or latently set the scene for a reconsideration of research funding policies in South Africa.

In the international arena, a shift in the direction of relevant, as opposed to ‘blue skies’ research, was given impetus with the dissemination of the main message of the influential 1994 book, The new production of knowledge. The dynamics of science and research in contemporary societies, by Gibbons and his associates. It is important that the book, and the stream of publications – some quite critical - that followed in its wake, in fact offered a new typology of modes of knowledge production based on analyses of the literature – it labelled trends that had already become manifest in the literature. The book argued that research was increasingly becoming relevant and addressed challenges within society, characterised by team and interdisciplinary projects, and raised issues of the utilisation of research findings and related matters. These trends had been emerging for some time as a reaction to increasing questioning by governments of the contribution that research made to national development, above and beyond training of a new generation of academics and producing more academically relevant knowledge.

The pressure that emerged from these new perspectives contributed to many national research funding agencies increasingly steering their national research systems in the direction of collaboration, and socio-economically relevant directions. It could be argued that this development in a sense marked the end of the spirit of Science: The endless frontier in which Vannevar Bush (1980) so persuasively argued that good scientists would produce good research if they were allowed the maximum freedom. In short, notwithstanding many members of the research community that argued – and are still arguing - against government steering, the fact remains that increased steering by government through funding agencies had become quite entrenched in many countries during the nineteen-nineties. South Africa in that period was
actively re-considering its R&D policy and strategies and was bound to take serious note of these
dynamics.

Nationally, these trends were explicitly reflected in at least two important policies that were
published by the South African government in the latter half of the 1990s, viz. the two white
papers on science and technology and higher education, respectively. The *White Paper on S&T*
(DACST 1996), for instance, provided for an array of research that would in future be funded,
ranging from basic research to innovation. Although this might look like safeguarding (self-
initiated?) basic research, two further notes made this less certain. Firstly, the reference to basic
research was somewhat of an afterthought and, secondly, the funding of what would become the
Innovation Fund would not be from ‘new money’ but initially at least be a result of top-slicing of
the general science vote – which would mean less money for the science councils, including the
agency funding functions (cf. Marais 2000). The *White Paper on Higher Education 3* (DoE
1997) referred to the need for the higher education system to incorporate Mode 2-type research
in its R&D strategies. Both these policies were at least partially aligned to the key government
*Reconstruction and Development Programme* (RSA 1994) that was the first national strategy to
focus on developing the economically disadvantaged part of the population.

A national sectoral trend at the time that should be accounted for in this context was the
successful, if politically contested, so-called national cooperative programmes managed by the
CSIR (Cooperative Scientific Programmes) and the HSRC (National Programmes). These
directed research programmes were managed on a client-contractor basis, independent of the
main funding programmes for self-initiated (mostly basic and curiosity-driven) research. Each
of these programmes focussed on issues of national relevance, entailed collaborative
interinstitutional and multidisciplinary designs and succeeded in involving substantial numbers
of academic researchers. National issues that were focussed on in some of these programmes,
included ICT, environmental issues, and the like in the case of the CSIR’s Cooperative Scientific
Programmes and education, future supply and demand of human resources and race relations in
the case of the HSRC’s National Programmes. The demise of these programmes left public
funding agencies without an instrument for directly addressing national issues. (It could
probably be argued that the Department of S&T [DST] is increasingly operating in this space
with some of its initiatives and that are currently coordinated by the NRF on an agency basis.
However, this will later in this report be argued to be an anomaly that will have to be confronted
at some point.)

Finally, at the institutional level the founding of the National Research Foundation, composed of
the defunct Foundation for Research Development (for SET disciplines; FRD) and the centre for
Science Development (for the Social Sciences and Humanities; CSD), should be listed as a co-
producer of what became known as the *Focus Area Programme*. The *FAP* was seen as a rather
obvious funding instrument to sensitise the different science cultures to each other with regard to just about all dimensions of research, ranging from themes, through evaluation to possible collaborative research. It should come as no surprise that the potential communality between the science cultures was a salient theme in the country-wide stakeholder workshops (see Section 1.2 below). This part of the process was also informed by surveys of opinions and experiences of stakeholders of the former FRD and CSD (cf. Fatti & Mashago 2000).

1.2 Process of change

The NRF embarked on a rather comprehensive strategic process in its preparation for the implementation of the new direction. This process is briefly summarised below from the perspective of FAP by way of highlighting a few of the steps represented in Figure 2.1.

- The primary initiative for the change in course of research funding came from the CEO and his top management as a function of analyses of the shrinking role played by NRF funding in the national household, the national imperative of the South African government for concerted efforts to improve the country’s economic growth and improving the quality of life of all its people and international trends in public support for academic research.

- Figure 2.1, made available by Anthon Botha of Technoscene, shows the strategy process followed in the development of the Research Support Division as it was labelled at that stage (subsequently it became the FAP strategy). The following notes are intended to highlight some of the features of the development process, without expressing an opinion on any of the detail.

- It should be noted that in the early stages of the development process the emphasis was more on changing the context of research and finding the right focus than developing a new funding strategy. This was determined later by the board and executive.

- A consultant and senior members of staff conducted several regional consultative workshops (dark blue ovals in Figure 2.1) with stakeholders in which the draft plan for the research context (new funding strategy) was set out (motivation, rationale, structure and related matters). These sessions were mainly, but not exclusively, attended by representatives from higher education institutions, public research institutions, although a few representatives from the business sector did attend some of the regional sessions.

- Figure 2.1 shows, inter alia, in the text boxes on the left some of the foresight and future studies that were used as initial inputs in the exploration of the environment. The blue
ovals show critical events/actions in the strategy development process, while the bottom text boxes represent critical management issues that would require attention.

- A macro scan (red oval in Figure 2.1) of the national scene was undertaken by senior members of staff and served as coordinates for the mapping fields or areas that the NRF might include in a new strategy. Feedback from the consultative sessions was accounted for in later versions of the plan which was eventually submitted to the NRF Board.

- The dark green oval highlights the fact that the Focus Area Programme was not conceived as an isolated strategy, but that it would form part of a new set of programmes.

Figure 2.1: Strategic Development of the Focus Area Programme
Figure 2.1 further shows that the stakeholder workshops were given the opportunity to consider the draft research strategy (as a discussion model) that had already been drafted internally. (Some critics of the process perceived this part of the process as having been ‘confronted’ with what was a fait accompli.)

In summary, Figure 2.1 shows a comprehensive strategic planning process that resulted in, among a range of initiatives, the Focus Area Programme.

The Board of the NRF approved the new strategy on 27 June 2000 and undertook to keep it in place for the year of launching plus two five year cycles (NRF 2000c). At the time, the Chief Executive Officer of the NRF described “the focus areas as ‘steering mechanisms’” (NRF 2000b).

1.3 Linkage between focus areas and national imperatives: Original logic

Generating focus areas that would conceptually relate to national imperatives was a challenge in its own right. A next challenge was that of convincingly showing that the two sets of themes could be mapped onto each other. The question was whether the draft limited set of focus areas would in fact cover the key national imperatives. This was a concurrent validation test, as it were, and formed part of the preparatory in-house phase of the development of the plan. Figure 2.2 offers an example of this part of the development of the focus area programme.

Figure 2.2 shows the validation process followed in the development of the focus areas during the development stage. First, all the national imperatives (urban renewal taken here as an example) were plotted onto the foresight foci showing the conceptual relationships between the two sets of foci. Secondly, those national imperatives were transposed onto the disciplines to determine the potential of the disciplines to address those imperatives. In this way, the NRF tested, at least at a conceptual level, the association between the national imperatives, foci and potential relevance of disciplines to contribute to each of the imperatives through the focus areas.
2 THE FOCUS AREAS

Thumbnail descriptions of the focus areas can be found in Table 2.2 (also see, e.g., NRF, 2000: Chapter 2).

Table 2.2: The Focus Areas and Development Programmes

<table>
<thead>
<tr>
<th>Focus areas</th>
<th>Sub-areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenge of globalisation: Perspectives from the Global South</td>
<td>Identities, movements and social change; political economy and technology; state, society and conflict resolution; theorising the global</td>
</tr>
<tr>
<td>Conservation and Management of Ecosystems and Biodiversity</td>
<td>Biology and conservation of inland species; coastal and oceanic processes; dynamics and management of terrestrial and freshwater systems; dynamics, impact and exploitation of atmospheric systems; ecology, systematics and conservation of marine life; marine aquaculture; seachange, incl. biotechnology, ecosystems; functioning, ecosystems and change, ecosystems and society; sustainable inland resources; sustainable marine and coastal; systematics and biogeography of inland species; systematics and biogeography of terrestrial and aquatic species (SABI)</td>
</tr>
</tbody>
</table>
Three notes are worth highlighting at this point. In the first place, all nine focus areas are labelled the sub-areas or sub-themes listed in eight of the nine focus areas are formulated in way relating them to general knowledge issues (problems or phenomena) relevant to society, rather than academically organised knowledge areas. The OECD review of the country’s NSI described the orientation of the FAP as not being disciplinary orientated, but linked to social and economic application of results (2007: 66). In the second place, only one focus area, Unlocking the future, is at sub-area level defined in terms of disciplines. As indicated earlier, this was a deliberate choice made in the strategic planning process as a way of accommodating disciplines that expected that they would be excluded from participating in this funding programme. To the extent that projects in this focus area would be working at the frontiers of science would they be in the spirit of the focussed area research strategy. However, this focus area would defeat the purpose if it mainly functions as a catch-all for discipline orientated research that could not be
placed in one of the other eight focus areas and this would give rise to the question as to whether the focus area landscape should not provide for a funding programme for discipline orientated research.

The third note concerns the differences in nuances between high-level principles underlying and/or objectives of the FAP in general and the operational aims of specific focus areas. The principles underlying the focus areas are, on the one hand, originally described (cf. NRF 2000: 5, 6) as “...areas of opportunity and problem areas for research”, while “Basic and applied research may be carried out within all focus areas” and do not refer to potential contributions to national and international problems (i.e. other than scientific ones). On the other hand, the description of the focus areas (NRF 2000: 6 ff) mostly contextualises the focus areas explicitly in the realm of national and international other-than-scientific problems, e.g. “Contribute to the eradication of poverty”, “...and conserve the biodiversity resources in South Africa”, “...develop innovative technologies” and “...provide solutions and possible interventions to avert..” These descriptions remained essentially unchanged in the 2006 guide to the FAP (NRF 2005f). The latter specifications were in line with the press release at the time, namely “the importance of national priorities within the focus areas” (NRF 2000: 1).

3 MODEL UNDERLYING THE FOCUS AREA PROGRAMME

The preceding sections offer useful points of departure to identifying the possible model underlying the FAP. Here a brief overview of a typology of public research funding models is first offered, followed by an assessment of the appropriateness of that model for the NRF.

3.1 Best practices in selected countries

Reference was made earlier in Section 1.3 that the development of the Focus Area Programme was informed by best practices elsewhere in the world. The following paragraphs offer very brief Internet-based pointers to the current situation in the following countries: Australia, Canada, Egypt, The Netherlands, and the UK. The results of this Internet survey are summarised below.

3.1.1 Australia

The funding programmes of the Australian Research Council are guided by a national policy and a set of national priorities. According to the Australian Research Council, “The national policy framework for research and innovation is established in part by Backing Australia's Ability, the Australian Government's package of initiatives to support the generation of new ideas, the commercial application of ideas, and the development and retention of skills.” National research priorities are: An environmentally sustainable
Australia: Promoting and maintaining good health; Frontier technologies for building and transforming Australian industries; and Safeguarding Australia. (http://www.arc.gov.au/aboutarc/arc_profile.htm#research_centres).

3.1.2 Canada

Research funding is managed by four federal granting councils. The disciplinary orientated research funding agencies of Canada make frequent reference to the expectation that research it funds would contribute to the economic growth and improved quality of life. The Natural Sciences and Engineering Research Council of Canada (NSERC), for instance, refers to the motivation for its health programme: Firstly, the Collaborative Health Research Projects “supports focused collaborative research projects in any field of the natural sciences and engineering which, if successful, will lead to health benefits for Canadians, more effective health services, and economic development in health-related areas.” (http://nserc.ca/) NSERC Funds the research projects through seven target areas with specified research topics within each of the target areas. These target areas are: Advanced communications and management information; Biomedical technologies; Competitive manufacturing and value-added products and processes; Healthy environment and ecosystems; Quality foods and novel bioproducts; Safety and security; and Sustainable energy systems. On of the programmes that the Social Sciences and Humanities Research Council, manages is Strategic Themes which include the following sub-themes: Governance and social structure, Culture and identity, Sustainability, safe and healthy living, and Aboriginal development. (http://www.sshrc.ca/web/about/publications стратегические темы.e.htm)

3.1.3 Egypt

The Egyptian S&T system is currently undergoing a major overhaul. In the process the funding role of the Academy of Scientific Research and Technology will be transferred to a new Egyptian National Funding Agency. Given this transformation suffice here to say that the existing – and probably the new – competitive grant system supports the framework of themes in the government’s national priorities. What is more, researchers are required to report on what strategies should be followed to implement their recommendations.

3.1.4 The Netherlands

The Dutch national research funding agency, the Nederlandse Organisatie voor Wetenschaplijk Onderzoek (NWO), recently released a new research support strategy. It contains the following significant statement, “Society expects science to contribute
substantially to the solution of complex societal challenges. (...) In future the NWO will focus more on societal needs and economic challenges for which expert knowledge and technology can help find solutions.” The thematic programmes that are deduced from these points of departure address this commitment to relevance. (http://www.nwo.nl.nwohome.nsf.pages).

3.1.5 Social sciences in the United Kingdom

As is well known, research funding in the UK is done by seven separate research councils. The following thumbnail of the Economic and Social Research Council gives an indication of the extent of steering in that system. Its research challenges are: Succeeding in the global economy; Population change; Environmental change; Understanding and shaping individual decisions; Education and life chances; Religion, ethnicity and society; and International relations and security. (http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/about/delivery_plan/priorities_ and_funding/)

The very selective exploration shows that public research funding strategies have in most countries shifted over time from exclusively supporting fully self-initiated and curiosity-driven research to at least including the funding of directed and multi-disciplinary projects in their portfolio of programmes. Deeper analyses would show different dynamics at the root of these shifts and the current configurations, but the fact remains that there is an undeniable degree of steering towards directed research, at least in the five cases referred to above. In this sense, the Focus Area Programme of the NRF appears to be in line with these international trends.

3.2 Typology of public research funding models and the FAP’s location

A careful reading of the literature on public research funding shows that there are a few root models and a large number of permutations, the specifics of which depend on a particular country’s political history and tradition of research policy. In this regard, reference needs only be made to the particular legacies of, on the one hand, the British colonial systems that determined the systems obtaining in countries as divergent as South Africa and India, and the Spanish colonial inheritance in Spain and, for instance, Chile, on the other. These are significantly different again from the socialist systems modelled after the philosophy and practice of the former USSR. This is, however, not the place to analyse the manifold of permutations, but identify root models!

The following general model for mapping research funding agencies and research funding programmes is based on the Visions of science model of Marais (2000: 54). Three dimensions
serve as coordinates, viz. extent of steering, approach to research, and the primary purpose of research; a few explanatory notes on each of the dimensions follow:

- **Extent of steering**: Steering of the research system, institutions and programmes can vary from minimal steering consisting of enablement with practically no strings attached (e.g. providing a budget but allowing the entity to do whatever research it wants to undertake, such as the CSD and FRD in the early 1990s) to maximum steering such as occurred in the former Socialist research system.

- **Approach to research**: For the purpose of this model the approach to research can range from disciplinary research primarily aimed at generating new knowledge to the other extreme of multi or inter-disciplinary aimed at addressing problems other than those intrinsic to science itself. At the risk of using misleading labels, these two poles are labelled Mode 1 (epitomised by the former FRD and CSD approaches to funding) and Mode 2 (currently probably best represented by the Innovation Fund), respectively.

- **Primary purpose of research**: This dimension, rather than others, is used here to reflect a relatively unique South African characteristic, namely that of research capacity development. This dimension is defined by, at the one pole, research that is used as a vehicle for capacity building (the NRF development programmes would be an example) to the other pole which is characterised by research that is directed towards the generation of new knowledge.

A representation of the moderately to highly steered model can be found in Figure 2.3 which also locates the following programmes: FAP (2), DP (3), IF (1), and former CSD/FRD programmes in the two-dimensional space. A more detailed description of the model will be published elsewhere as soon as the analyses have been completed, but suffice at this stage to offer labels the four quadrants in the present moderately to highly steered representation:

- Quadrant 1: ‘Endless frontier’
- Quadrant 2: ‘Strategic science’
- Quadrant 3: ‘Internship’
- Quadrant 4: ‘Classical’

Figure 2.3 graphically brings to the fore a number of interesting strategic issues within a steered funding system, of which the following are of direct importance to this report:
• The *FAP* is located in the quadrant ‘knowledge/innovation production’, and ‘Mode 2’. If all the programmes of the NRF were to be plotted in this model, it would become abundantly evident that the space close to ‘knowledge/innovation production’ and ‘Mode 1’ is practically empty, especially since rated researchers also have to apply to *FAP* for research funding. (In a low steering version of the model, the *NRF Rating System* as such would be located in the quadrant defined by ‘Mode 1’ and ‘Innovation’.) This positioning of *FAP* takes sufficient account of the somewhat ambivalent description of the *FAP* in official documentation alluded to earlier in Section 2 of this chapter.

• The *FAP* and DP are located in different quadrants of the modelled space, notwithstanding their sharing positions on the dimensions of ‘approach to research’ and being steered.

• The radical move that the establishment of *FAP* represented can be seen in the distance between *FAP* and the previous FRD/CSD funding programmes. (The latter are plotted on
a continuum to reflect the dual mission, i.e. knowledge production and human resource development.)

- Most of the research projects of public research institutions (science councils) would be close to the Innovation fund (1).

- The outcomes of the best practices overview earlier in this chapter (Section 3.1) would locate at least some programmes of the national funding agencies, e.g. NWO and ARC, in proximity of the FAP.

4 MANAGEMENT OF FOCUSED RESEARCH

4.1 Structure

The functional structure of the research support mandate of the NRF is summarised in Figure 2.4. The figure portrays what the NRF often describes as a seamless approach to research funding “across the value chain (from fundamental to strategic to applied) for development application and commercialisation” (NRF 2005e: 1).

The following notes contextualise the point of gravity of the study.

- The Research and Innovation Support Agency (RISA) is the business unit mainly responsible for research development and funding. It consists of the following directorates:
  
  o Knowledge Fields Development
  o Institutional Capacity Development
  o Knowledge Management and Strategy
  o Grants Management and Systems Administration

- RISA is engaged in the management and administration of several self-initiated funding programmes adhering to distinct funding approaches.

- The label “Focus Areas” is used as collective noun by the NRF to denote the funding approach that entails broad, mostly multi-disciplinary, priority areas in which funding for research is made available. There are nine focus areas (see Table 2.2).
Two programmes function within the ambit of the Focus Areas i.e. the:

- **Focus Area Programmes (FAP)** to develop the prioritised knowledge fields and other emerging fields; and
- Development programmes that include the Institutional Research Development Programme with its current 83 Research Niche Areas (cf. NRF 2007c), Thuthuka which includes Women in Research, Researchers in Training, and Research Development Initiative for Black Academics.

Grants Management and Systems Administration (GMSA) is responsible for the management and administration of grants made in the Focus Areas through the Focus Area Programmes and the Development Programmes.

The point of gravity of this study is the **Focus Area Programmes (FAP)**; the programme has been italicised in the rest of the report to prevent confusion with the generic programme label.

### 4.2 Process

A summary of the administration of the focus area grant system can be found in the largely self-explanatory ISO compliance Figure 2.4 (http://intranet.nrf.ac.za/gmsa_iso_docs.htm). The following two aspects are not shown in the figure, but should be mentioned here:
• GMSA is responsible for Phases 1 to 13.
  
  o GMSA processes a relatively large number of approximately applications per year across funding programmes (approximately 2 000 during the first semester of 2007 alone).

  o Not shown in Figure 2.4, is the fact that the research has one of three access routes to NRF funding (NRF 2003 and 2007). Firstly, a researcher can apply for funding over a two-year cycle that may be extended by another cycle of two years (on the basis of a research proposal and track record). Secondly, an NRF rated researcher can apply for funding for a period of five years (on the basis of his/her track record). Thirdly, and within the capacity development context, institutions and researchers can apply for funding (maximum three two-year cycles) from one of the six research development programmes.

• Step 2: This screening function is performed internally by GMSA and concerns matters such as correctness of information.

• Step 3: represents a two-stage peer evaluation process. The first phase consists of a postal peer-evaluation, the evaluation dimensions being significance of the proposed research, methodological approach, feasibility of the research plan and resources, and overall scientific merit; each dimension is rated on a six-point scale ranging from exceptional to poor. The second phase consists of a panel meeting where members consider the postal evaluations, additional methodological observations, the alignment with the focus area framework and to make recommendations to the NRF. The panel scorecard consists of the following items: scientific merit, area relevance, HR capacity development, HR equity redress, and strategic importance of outcomes.

• The “Programme” set of processes are the responsibility of Knowledge Management and Strategy and not those of GMSA.
4.3 Monitoring

The administrative and management procedures of the *Focus Area Programme* provide for a range of monitoring mechanisms, of which the following two should be mentioned here, viz. GMSA’s quarterly management progress reports and a series of special status reports on each of the focus areas. The former reports, submitted for the attention of the NRF executive, offer brief statistical summaries of the processing of applications and assessment of various management challenges – as such indispensable monitoring tools of output against targets and for timely budgetary and related corrections. The special status quo reports are strategically intended, initially, “to develop a baseline description of research supported in the period (...) and its relationship to the Focus Area” and, subsequently, “to develop a comparative understanding (...) in respect of research focus, methods and capacity (...) to stimulate forward looking research (...) and to get a clear understanding of unsuccessful applications” Internal framework prepared by KFD, 1 April 2005). Five status reports were accessed in the present review. They varied greatly in scope from focus area to focus area (e.g. from 33 to approximately 250 pages) and content (from summary statistical tables only to interpretations of cross-tabulations). If standardised across focus areas and responded to by the panels, they could prove very valuable to dynamically managing the *Focus Area Programme*. (A comment: If updated and standardised versions of status quo reports on all the focus areas were available, they could have served as the core of the present evaluation report.)
4.4 Management structure, process and monitoring: Conclusions

The following provisional conclusions can at this stage be offered on the basis of the preceding cryptic overview of the management structure and processes of the FAP:

- The supply and demand orientated programmes are managed as separate subsets of programmes; this is a wise approach.

- The fact that GMSA supplies management support to a wide range of funding programmes should add to efficiency, but is would require officials with credibility among the academic community to promote positive and productive interaction between the NRF and the research community.

- In principle, the management process provides for sufficient cross-controls (e.g. two-layered peer evaluation, funding decisions made outside GMSA, and the provision for appeals) to ensure a fair and reliable management system.

- Internal management monitoring instruments are in place. In principle, the status quo reports on each focus area could be of great strategic value – if appropriately utilised - to ensure a dynamic programme in general and relevant focus areas.

4 Concluding Summary

The purpose of this chapter has been to contextualise and review the origins, underlying philosophy and model, strategic motivation, nature and management of the Focus Area Programme and can be summarised as follows:

- The implementation of the Focus Area Programme (FAP) was preceded by an iterative strategic planning process that entailed the full spectrum of NRF funding and related support functions and elicited ‘sufficient’ acceptance by the research community, notwithstanding scepticism in many quarters. Empirical information on attitudes of the research community showed marginally positive attitudes towards proxies for the FAP.

- At the time, the FAP represented a sharp change in the course of research funding in South Africa, i.e. away from the earlier self-initiated and curiosity-driven orientation to a system which steered publicly funded research towards focus areas that were more problem orientated and required multi-disciplinary research. It was - and still is - well aligned to the publicly funded research systems of other countries.

- The new steered research funding system was (and is still) motivated by at least the following three emerging and evolving realities: Firstly, a multiplication of national and
international challenges of increasing complexity also as reflected in South African government policies; secondly, growing competition between different sectors for public resources; and thirdly, the international emergence of ‘new’ models of knowledge production, notably Model 2-types of approaches.

- As such, the NRF’s decision to change the course of its research funding strategy and the direction of that change were justified at the time.

- The management and administrative systems for FAP conceptually comply with internal management criteria, such as separation of evaluation and approval, explicit schedules, and sufficient resources (e.g. staff and ICT), normally set for such systems. Interfaces at inter-organisational levels appear satisfactory. However, the emphasis – and success - on inter-organisational level and staff turn-over may have caused neglect of professional interfaces between officials and researchers. Questions about professional interactions between officials and researchers on project and content-related matters need attention.

Chapter 3 offers findings and conclusions with regard to the implementation of the Focus Area Programme, i.e. evaluation dimension 2.
CHAPTER 3

IMPLEMENTATION OF THE FOCUS AREA PROGRAMME

The terms of reference required that the success (or otherwise) of the implementation of the Focus Area Programme be assessed. Four different aspects concerning the implementation of the FAP are addressed in this chapter. First, four necessary capacities for successful implementation are analysed, followed, secondly, by a brief consideration of the funding of the programme. The third theme deals with the administration of the programme and the fourth section reports on the fit between proposals and focus area frameworks.

1 NECESSARY CAPACITIES

The focussed research concept was new to the research community who had become accustomed to self-initiated research that was (probably) in most cases curiosity-driven. If it is further kept in mind that the NRF had deliberately chosen to change the course of publicly funded research the question of what external and internal capacities would be required to do so successfully. Against this background, the following four capacities are briefly discussed in this section: Continuous environmental scanning; stimulation/coordination of multi-disciplinary research; systems and human resources for peer evaluation of proposals; capacity for the monitoring of research utilisation.

1.1 Environmental scanning

It was clear from Chapter 2 (Section 1.2) that the NRF had done a good job in preparatory work, including environmental scanning, before implementation of the new focus area landscape model, including the FAP. Functioning in the context of relevant research – if not demand-driven research – requires that an organisation, irrespective of whether it is a funding agency or a research performing one, should have (access to) a capacity to monitor the relevant environment to enable the adjustment or even radical change of its foci. Of course, an organisation should not destabilise the system by amending foci too often, especially when multiple-year funding cycles are involved.

No explicit information in the sources that were consulted for this study, could be found that showed the existence of such a dedicated capacity in the NRF. It would therefore seem that the implementation of the new strategy was incomplete in this respect. It follows that the NRF should require an environmental scan capacity, should the Focus Area Programme be continued,
even in a different form - irrespective of the role currently being played by the DST in this regard.

1.2 Stimulation/cooordination of multi-disciplinary research

As already stated often in this report, the implementation of FAP was not just a minor adjustment to the NRF’s research funding system. The important conversion of the system entailed a movement away from a (single) disciplinary research orientation to a multi and even interdisciplinary research orientation which has become essential to address the increasingly complex problems requiring research. To quote the Research Councils of the UK, “Multidisciplinary research takes place at the edges of traditional disciplines and across traditional subject boundaries. (…) novel multidisciplinary research is needed to solve many, if not all, of the next decade’s major research challenges (…) Experience shows that multidisciplinary research works best when scientists from different research backgrounds are able to work together free from discipline or structural barriers.” (http://www.rcuk.ac.uk/research/multidis/default.htm)

Many methodologists have shown that multi and inter-disciplinary research requires serious adjustments to just about all phases of the research process, ranging from problem definition through research design to project management. The implication for a new programme is clear: Successful implementation by the NRF would require much more than an adjustment to reactive administrative orientation. Successful implementation and maintenance of the FAP would require pro-active multi and interdisciplinary methodological and project management capacity that might be in relatively short supply in the research community. This seems to have been a key objective of designated senior NRF officials up to approximately 2004 when staff turnover led to a scaling down of this function.

Against the preceding background, it can be concluded that the implementation of the FAP was incomplete and that dynamic re-activation of this type of function is a necessary condition for successfully steering NRF funded projects towards multi and eventually inter-disciplinarity, collaboration and relevant research.

1.3 Peer-evaluation

The adjudication/evaluation process was shown in Chapter 2 to be a multi-layered and multi-phased one consisting of at least three mail evaluations per application, and a panel for each of the focus areas and sub-areas which considers the reviews, note additional methodological

\[\text{\footnotesize 1 It is important to note that the problems and challenges referred to in this quotation include both scientific and societal ones. That was also the point of departure in the establishment of the Focus Area Programme and is the sense in which 'relevance' is used in this report.}\]
considerations, consider the alignment between the proposal and the focus area framework and make a final recommendation, including level of proposed funding, to the NRF on each application. Relevant information on the peer evaluation system is summarised below:

- On average, just more than 10 000 reviewers are approached per year to evaluate 2 700 proposals for funding; the acceptance rate is approximately 30% and it is estimated that less than 10% of the reviewers are attached to institutions outside South Africa. The reviewers are provided with evaluation guidelines. Analyses of proceedings of the panel meetings and qualitative feedback obtained in interviews and group meetings suggest that the quality of postal peer evaluations is generally of a good standard.

- An average of five external panel members attended the panel meetings in September 2006.

- The minutes of the 12 different panel meetings, analysed in this project, were uneven in scope and depth of (proceedings and therefore?) reporting. The format and style of the minutes varied greatly and an analysis and conclusions across recorded minutes were not feasible.

- The panels have come in for criticism in the qualitative interviews and group discussions conducted for this study. The criticism centred around the following issues: uneven expertise among and contributions by panel members, what is perceived as arbitrary cuts in the budgets, separately and together impacting negatively on the credibility of the system (cf. also similar conclusions of the institutional review in this regard; NRF 2005b: 39).

- Appeals: Figure 2.5 (Chapter 2) showed that the system provided for an appeal procedure. An appeal can be lodged against the outcome of an application in general or a particular aspect, such as the quantum of the approved grant, and is normally considered by the particular programme within the Grant Management Systems Agency with the final decision being made by the executive director of the appropriate NRF division (other than GMSA). The records show that 100 appeals (representing 4% of applications) had been lodged against the funding decisions for 2007 and 10 of these were, to varying degrees, successful.

In principle, the evaluation system as such is commendable and must be listed as indicating successful implementation of the programme. The positive assessment of the system itself and the negative feedback on parts of the process, especially the panel proceedings, received from sections of the research community, lead to the following overarching principle, namely that a
critical condition for the success of any funding system is the credibility of all the components of the ex ante evaluation process.

1.4 Monitoring utilisation of research findings

Research utilisation refers to “any form of use to which scientific research and its results are put. So, in addition to economic or commercial utility (such as the development of new technologies), we could also include social utility (use of research for society at large, e.g. the design and development of social interventions) and political utility (science in support of political decision-making, e.g. the development of a new health policy)” (NACI 2003).

In 2004 the National Advisory Council on Innovation (NACI) came to the following conclusions on the basis of a comprehensive study on the utilisation of research findings in South Africa: Firstly, research findings should be utilised to a much larger degree if the country wished to get a reasonable return on research investment. Secondly, the challenge of utilisation of research findings was not receiving sufficient attention from researchers, funding agencies and government in general and NACI made recommendations on ways the situation could be improved at all three levels. Thirdly, NACI showed that the utilisation process can be managed to produce a higher rate of utilisation of research findings.

The massage was clear, namely that the utilisation of research findings was an important function of research. In the present context, this conclusion is especially relevant to the Focus Area Programme. A close reading of documentation on the development and the implementation of FAP suggests very strongly the expectation that the FAP would directly or indirectly contribute to economic growth and improving the quality of life of South Africans – utilisation of research findings is one of the intervening mechanisms. In fact, the annual performance report of GMSA identifies this as one of its four core missions, although its priority status was not rated in the 2006/07 report. (The lack of operational provision for this function probably accounted for the fact that the OECD report did not refer explicitly to FAP in its informative and important discussion of linkages between different elements of the innovation chain in the funding system; cf. 2007: 115ff.)

The NACI study and a range of other studies have shown convincingly that utilisation of research findings is a very complex process that is influenced by a dynamic set of factors internal and external to the research process. Effective utilisation of research findings requires much more than a set of recommendations at the end of a research report, dissertation or academic paper. There is, furthermore, consensus in the literature that the process has to be managed for it to take place.
All the above suggests that the NRF would add significant value to the potential contribution of research to development and growth in South Africa, if it did have a capacity to promote the utilisation of research findings funded from its programmes. The fact that the NRF did not have such a capacity associated with the Focus Area Programme, should be seen as a shortcoming in the implementation of that programme. An utilisation capacity could include functions such as the following:

- Development of guidelines on utilisation of research findings for applicants
- Monitoring and recording utilisation of findings from NRF funded projects
- Development and management of a utilisation index
- Scanning research findings with a view to possible utilisation
- Matching research findings to needs in the national environment
- Promote utilisation of research findings by means of information and training

2 **FUNDING**

The following very brief overview of the funding of the FAP and other NRF programmes is intended at assessing the success with which the programme was implemented and not as an in-depth analysis of research funding in the country.

2.1 **Selected Statistics**

The following aspects are covered in this section: ratio of grants to funding, requested vs. approved funds, and percentage projects funded.

2.1.1 **Ratio of grants to funding**

Table 3.1 offers an overview of the budgets of the Focus Area Programme (and Development Programme) of the NRF and shows that the number of grants has increased by 14.2% (26% in the case of the Development Programme) between 2004 and 2007, while the allocated funds have increased by 17.4% (24%) over this period – the positive growth having been lower than the inflation rate. However, the table also shows a negative growth in funding allocations between 2004 and 2006, namely 16% (21%) and 4.3% (9%) respectively. The conclusion is inevitably that allocated amount shows a decrease relative to the number of grants and rate of inflation.
Table 3.1: Budgets of the Different Programmes over Time

<table>
<thead>
<tr>
<th>Programme</th>
<th>Total number of grants</th>
<th>Total allocated (R'000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2004/05</td>
<td>2005/06</td>
</tr>
<tr>
<td>Focus area programmes</td>
<td>1021</td>
<td>1185</td>
</tr>
<tr>
<td>Development programmes</td>
<td>586</td>
<td>711</td>
</tr>
</tbody>
</table>

2.1.2 Requested versus approved fund

Information on the differences between requested and approved funding can be found in Table 3.2. For this analysis, information on 430 projects approved in 2007 was used. The table shows the extent to which the NRF reduced the funding originally applied for. Three observations are worth highlighting here, namely firstly, the considerable variation between focus areas. *Socio-political impact of globalisation* recorded the largest relative reduction of 66% and *Indigenous Knowledge Systems* recording the smallest with 16%. (In this regard it should also be mentioned that the mean size of *IKS* grants for 2006/07 was the highest of the nine focus areas, namely R149 000 and the lowest mean grant of R52 000 was that of *Education*; NRF [51] 2007e: 17.) Secondly, the mean reduction across focus areas was 47%; and, thirdly, there may obviously be different intrinsic reasons for the reduction of budgets. Finding explanations for the wide variation between focus areas in budget reductions would require further probing, and should be a matter worth the attention of the NRF.

The following comments are relevant with regard to the second observation: The magnitude of the mean budgetary cut-backs is a matter of concern, especially if the relatively moderate mean size of grants (per annum) of R124 312 is considered. The impact of such a reduction becomes more striking in the light of the NRF’s approach of marginal costing which excludes the funding of items such as salaries and essential overheads. This aspect was also noted as a matter of concern in the institutional review (NRF 2005b: 45). In fairness, it should be noted that in approving the new strategy the NRF Board expressed itself in favour of the principle of more comprehensive funding for fewer projects (NRF 2000c), but it does seem to have materialised. The implication should be clear, namely that the modest size of approved grants put researchers and their institutions under a great deal of pressure. It should be added, though, that this somewhat categorical conclusion assumes that research projects would not be brought to conclusion with unspent surpluses!

The third observation could have more than one explanation, including over-budgeting by researchers, budgetary items not complying with NRF funding guidelines, availability of funding from other sources, and, of course, real or anticipated shortage of funds.

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Table 3.2: Variance between Funds Requested and Funds Allocated - 2007

<table>
<thead>
<tr>
<th>Focus Area (A)</th>
<th>Requested (B)</th>
<th>Mean (C)</th>
<th>Allocated (D)</th>
<th>Mean (E)</th>
<th>% (D/B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic growth &amp; internat. competitiveness</td>
<td>26 508 090</td>
<td>224 645</td>
<td>11 412 360</td>
<td>146 312</td>
<td>43</td>
</tr>
<tr>
<td>Sustainable livelihoods</td>
<td>7 723 435</td>
<td>198 037</td>
<td>3 166 408</td>
<td>143 928</td>
<td>41</td>
</tr>
<tr>
<td>Education &amp; challenge of change</td>
<td>3 342 130</td>
<td>107 811</td>
<td>2 050 600</td>
<td>85 442</td>
<td>61</td>
</tr>
<tr>
<td>Information &amp; communication technology</td>
<td>2 779 800</td>
<td>138 990</td>
<td>1 266 000</td>
<td>79 125</td>
<td>46</td>
</tr>
<tr>
<td>Socio-political impact of globalisation</td>
<td>2 871 581</td>
<td>239 298</td>
<td>983 805</td>
<td>109 312</td>
<td>34</td>
</tr>
<tr>
<td>Conservation and management of ecosystems</td>
<td>14 416 203</td>
<td>192 216</td>
<td>8 739 500</td>
<td>132 417</td>
<td>61</td>
</tr>
<tr>
<td>Indigenous knowledge systems</td>
<td>2 373 794</td>
<td>237 379</td>
<td>2 005 094</td>
<td>200 509</td>
<td>84</td>
</tr>
<tr>
<td>Unlocking the future</td>
<td>17 788 834</td>
<td>179 685</td>
<td>7 071 589</td>
<td>112 247</td>
<td>40</td>
</tr>
<tr>
<td>Distinct SA research opportunities</td>
<td>2 348 600</td>
<td>156 573</td>
<td>1 642 733</td>
<td>109 516</td>
<td>70</td>
</tr>
</tbody>
</table>

2.1.3 Percentage funded

A relevant issue in the context of the funding of FAP projects can be seen in Figure 3.1 where it is shown that the percentage projects funded is inversely correlated with the number of projects approved.

Figure 3.1: Declining Trend in Percentage of Funded Projects
2.2 Funding: Conclusions

The information offered above does not tell the whole story about NRF research funding in general or the FAP in particular. However, it does suggest a few conclusions and urgent issues for attention of the NRF and, one might add, the Department of Science and Technology.

• If the NRF is to honour its perceived mandate of functioning as main public research funding agency, it will have to access additional resources to improve the discouraging situation illustrated above.

• If the NRF budget is not increased to meet demands and fair expectations, the NRF might have to resort to further narrowing of its grant guidelines, a step that should be avoided. The guidelines are conservative as they stand as can be seen from the following examples. Institutions are required to take certain ‘institutional’ costs for their account; and certain essential budgetary expenses, for, e.g., staff replacement are not covered by the NRF grant; statistics showed that approved grants were often reduced to fit the available funds.

• The mean success rate for the FAP and Development programmes (applications : approvals) hovers around 50%. It would be tempting to recommend that the threshold be significantly raised (as anticipated at the launch of the FAP), thereby increasing the size of per hominem grants. However, for reasons discussed elsewhere in this report, that would not seem to be the route to go – for planning purposes, a success rate of around 50% would seem to be probable for the time being, anomalous as this may seem.

• The wide variance in success rates (40% in the case of ICT to 84% in the case of IKS) between focus areas is questionable and cause for serious concern within the normal management requirements of a focussed research strategy. It suggests a serious inconsistency in the interpretation and application of assessment criteria by the different panels and does not promote the perceived credibility of the evaluation system. In this regard, the exceptionally high success rate of the fledging knowledge area, Indigenous Knowledge Systems, needs the attention of scholars in that field itself and NRF management alike (also see Marais 2000). This situation again underscores the need for a committee of panel chairs to review the recommendations of the panels.

3 MANAGEMENT AND ADMINISTRATION OF THE FOCUS AREA PROGRAMME

To repeat a change management stereotype: The launching pad for successful implementation of a new (research support) strategy is professional administration. The position of the Focus Area Programme was identified and the Grant Management Systems Agency (GMSA) were outlined
in Chapter 2 (Section 4; see Figures 2.4 and 2.5). It was noted there that the NRF had consolidated its funding administration in 2004 to improve effectiveness and efficiency. This means that the GMSA now forms the hub of a complex administrative challenge, marked by all phases of at least 15 funding programmes (which includes FAP), consisting of approximately 5000 applications per year totalling more than R650 million (projected to reach R750 million in 2008/09; cf. NRF 2007b), a multi-layered peer evaluation system that yields on average 50% of successful grant holders per year, and multiple-year budget and funding cycles. The consolidation seems to have created an administration that performs well and that would pass a performance audit of standard administrative and financial practices, if internal and external feedback on this issue is to be used as evidence.

The structure and process have been provisionally evaluated in the previous chapter and at this point only the following comments need be added:

- The management structure and processes have been designed to provide a fair and reliable system for the processing of all phases of funding applications and in this respect FAP can be said to have been successful implemented, at least internally.

- Indications are also that the interface between the NRF administration, more specifically GMSA, and university research offices is effective.

- Qualitative feedback, however, indicates that the interface between the NRF and the research community, i.e. the researchers themselves, may not be satisfactory, especially with regard to feed-forward on project opportunities/challenges and feedback on peer evaluations and project content matters. The structure of the management system provides for the necessary senior and middle management positions, but it would seem that staff turn-over during the past few years may have put the project content-specific communication in jeopardy. This point was also identified in the most recent *Institutional Review of the NRF* (NRF 2005b: 41). This aspect requires urgent attention and is fortunately on the priority list of the GMSA’s business plan (NRF 2007b: 12).

- Qualitative feedback from personal interviews and group discussions was critical of the reliability of the on-line application system. This deserves ongoing attention from GMSA – for whom this is a ‘major concern’ according to its annual performance report (NRF 2007a).

- A striking feature of the management and administrative implementation of the FAP is the potentially large amount of business information that is available to those responsible for steering research by means of this programme. Three conditions for capitalising on this strategic and operational advantage are, firstly, that the information that would really
be critical to the management of the FAP should be identified, secondly that the analysis and reporting of such information should be standardised across focus areas (and indeed funding programmes), and, thirdly, that the information should in fact be used in monitoring and dynamically managing the programme.

4 CONGRUENCE BETWEEN FOCUS AREA TERMS AND RESEARCH GRANTS

In the operationalisation of the terms of reference this evaluation dimension was defined as an analysis of a sample of research grants to determine the extent to which the grants reflected the rationale and intention of the FAL. This operationalisation overlapped significantly with the fifth evaluation dimension, namely the fit of funded projects with the frameworks of the focus areas (see Chapter 1, Section 2.5). For thematic reasons these two evaluation dimensions were also treated as one in this chapter. An important indicator of the success of the implementation of the Focus Area Programme (FAP) is the reliability with which research projects were allocated to focus areas. In the final analysis, the focus areas were intended as a steering mechanism and it follows that the success of the system in a large part depended on the extent to which projects complied with the terms of reference of those focus areas – the classification of projects in terms of the focus areas thus entails much more than semantics.

4.1 Method

As was indicated in Chapter 1 (Section 3.1.5) a random sample of 200 FAP and DP projects approved in 2007 were drawn and used as a basis for ascertaining to what extent they fit the specific focus areas. This goodness of fit process was done in the following way:

- The list of 200 projects, consisting of descriptive titles, i.e. an elaboration of the project title, was anonymised and the focus area classifications were deleted (due to editorial lapses the sample in the end consisted of 196 approved projects).

- Additional information, such as subfields, was added to the list of focus areas (more or less as reflected in Chapter 1, Table 2.2).

- A former middle management official of the NRF who has not had any involvement in the administration of the evaluation system for at least the past year, was contracted as a ‘test classifier’ to do a matching of projects to focus areas under conditions of minimum information, i.e. no information other than the descriptive titles were provided.

- The rationale for this approach was that the minimum information condition posed a very stringent challenge to the ‘test classifier’. In contrast, the actual administrative process is
an interactive and full-information one. It would consequently be reasonable to assume that the outcome of this classification task would represent the lower reliability boundaries, in other words, the actual reliability in classification should be much higher.

- Finally, the degree of congruence between the original classifications and the test classification was computed.

### 4.2 Results

The ‘test classifier’ compared each descriptive title to the list of focus areas and had to decide on the classification of the particular project. In some cases, she allocated a project to one of two possible focus areas, since the information contained in the descriptive or annotated title was just not sufficient enough to make a definitive decision – very often ‘Unlocking the future’ served as the default focus area. If one of the two classifications corresponded to the original classification, it was credited as a ‘correct classification’ in the tabulation below.

The results of this congruency analysis under minimum information conditions are summarised in Table 3.3.

**Table 3.3: Congruence between Focus Area Frameworks and Approved Projects**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Same Classification*</th>
<th>Different Classification</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers</td>
<td>One Focus Area</td>
<td>One of Two Focus Areas</td>
<td></td>
</tr>
<tr>
<td>Σ</td>
<td>147</td>
<td>23</td>
<td>196</td>
</tr>
<tr>
<td>%</td>
<td>75</td>
<td>11.73</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One Focus Area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>11.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Both of Two Focus Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

Note: * Same classification between the original GMSA process and the ‘test classification’

The results reflected in Table 3.3 show a very high congruence of nearly 87% between the original classifications recorded in the evaluation process of the Grants Management Systems Administration (GMSA) and the ‘test classification under conditions of minimum information’. Against the background of the rationale for this test there is reason to accept that the real life classification process ‘under conditions of comprehensive information’ would be very reliable and valid. This is in fact borne out by the small number of projects that get transferred form one focus area to the other. It would be correct to infer from the above empirical test on a 10+% sample of approved projects that the focus areas model is successful in at least guiding project submissions for NRF funding and that bears proof the successful implementation of the programme.
5 CONCLUDING SUMMARY

This chapter responded to Evaluation Dimension 2, namely the success of the implementation of the Focus Area Programme. In the search for evidence, a relatively wide spectrum of information was considered. In the first place, a programme such as the FAP presupposed a number of capacities, more specifically for environmental scanning, pro-active stimulation and coordination of multi-disciplinary research, high quality peer evaluation, and monitoring of the utilisation of research findings. The review showed that the implementation of FAP did not provide for environmental scanning, it lacked continuity in pro-active stimulation of multi-disciplinary research, put in place a peer evaluation system of good quality, but did not monitor the utilisation of research findings.

In the second place the review looked at the issue of funding and concluded that the funding of the programme and – therefore – of projects was insufficient and needed urgent attention.

In the third place this chapter considered the administrative dimensions of the FAP and concluded that the NRF had instituted effective administrative structures and processes to attend to a rather complex set of requirements in a professional, efficient, fair and reliable way. Concern was noted, however, with regard to the panel process and content-relevant interaction between NRF officials and researchers.

In the fourth place, this chapter considered the congruence between focus area frameworks and projects. On the basis of an empirical study it was concluded that the focus area model has so far been successful in guiding project proposals for NRF funding towards priority areas.

The results of the empirical analyses, i.e. evaluation dimensions 4, 7, 3 and 6, are presented in the next chapter.
CHAPTER 4

OUTCOMES OF THE EMPIRICAL EVALUATIONS

This chapter offers overviews of the results of empirical analyses aimed at ascertaining the functions and/or influence of the Focus Area Programme. The results of the analyses of the following evaluation dimensions (ED; see Chapter 1, Section 1.2) are presented: The alignment of the FAP with national imperatives (ED #2.4); the reception of the FAP by communities (ED #2.7); contribution to robust research (ED #2.3); and influence on the mix of research (ED #2.6).

1 ALIGNMENT WITH NATIONAL IMPERATIVES

In Chapter 2 reference was made of the fact that the planning team had conceptually demonstrated in a convincing way the extent to which national challenges/problems/priorities could be linked to the focus areas (see Chapter 2, Figure 2.2. for an example). In this section, that conclusion was cross-validated by determining the extent of overlap between imperatives listed in a sample of policy documents and the focus areas as currently defined.

‘National imperatives’ were interpreted quite broadly to include a selection of official documents listing national imperatives, challenges and priorities. The research task consisted of culling the priorities from these and determining the extent to which the nine focus areas overlapped with these priorities. More specifically, the list of focus areas was used as a master list and each of the lists culled from the documents identified below, compared to the focus area list. The task was undertaken by the project leader, the one research assistant and a person well versed in S&T policy developments.

The selected documents spanned the period from the earliest relevant policy documents, i.e. well before the development of the FAP, to the most recent listing of priorities by the South African State President in February 2007. The sample of documents was selected to cover the Departments of Education, Science and Technology, and the Presidency. The following official government publications were used as comparison sources: The government’s Reconstruction and Development Plan; the government’s Ten year Review; the presidential State of the Nation Address on 9 February 2007; White Paper on Science and Technology 1996; South Africa’s National Research and Development Strategy (NRDS; 2002); DST’s Ten Year Plan for South Africa 2008-2015; Accelerated and Shared Growth Initiative of South Africa (ASGISA); and the White Paper on Higher Education 1997. (A range of other documents was also consulted, but not incorporated in the analysis proper, and they include recent annual reports, strategic plans and budget speeches of the departments of Education, Science and Technology and Trade and
Industry; challenges listed in these were mostly aligned with documents included in the list used in the analyses.)

1.1 Results

The results of this analysis are summarised in Table 4.1.

**Table 4.1: Convergence between National Imperatives and Focus Areas**

<table>
<thead>
<tr>
<th>National Priorities</th>
<th>FAL</th>
<th>Socio-pol. impact : Globalisation</th>
<th>Conservation of ecosystem</th>
<th>Distinct SA research options</th>
<th>Economic growth</th>
<th>Educ &amp; challenge for change</th>
<th>Indigenous knowledge systems</th>
<th>ICT</th>
<th>Sustainable livelihood</th>
<th>Unlocking the future</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of the Nation Address</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Government’s 10-year review</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ASGI-SA</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>10 Year Plan for R&amp;D</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>R&amp;D Strategy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reconstruction &amp; Development Programme</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>White paper on S&amp;T</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>White Paper on HE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

1.2 Discussion

The information in Table 4.1 shows a number of salient points from a science and technology perspective; the following ones are perhaps the most salient ones. Firstly, there is a striking overlap in priorities between the official documents used here as references, notwithstanding the period of 12 years covered by them. Secondly, this overlap should not mask important changes in emphasis, though. The most striking change would be that between the Reconstruction and Development Programme’s (RDP) emphasis on development of disadvantaged sections of the population on the one hand, and the Accelerated and Shared Growth Initiative of SA (ASGISA) which focuses on conditions to attain a high economic growth rate for international competitiveness, on the other. Although both these documents emphasised human development as a priority, the primary focus of the two policies/strategies were different. (Of course, the
example is less relevant to the FAP, given its date of introduction.) The implication for the current analysis is that such deeper shifts in policy should be accounted for in focussed research support programmes. Thirdly, the focus areas cover the main priorities of the official documents, although two qualifications should be mentioned in this regard. In the first place, this analysis only looked at the generically formulated focus areas and priorities and did not analyse either at a deeper level. In the second place, time did not allow probing the extent to which approved projects correlated with detailed specifications of the priorities listed in the government documents (resembling Figure 2.2).

1.3 Conclusion

The fifth evaluation question centered on the extent to which the focus areas have addressed national imperatives over time. This question was approached by, firstly, cross-referring to the conceptual analyses done in the planning of the new strategy (Chapter 2, Section 1.3) and it was concluded that the focus areas would cover the national imperatives even at a relatively detailed level. Secondly, the present analysis sampled national imperatives over the period 1995 to 2007 and tested the focus areas, as currently defined, against those national imperatives. Taking into account a number of qualifications, the analysis indicates that the focus areas have covered the national imperatives satisfactorily at a generic level.

2 Reception by Communities

Two sets of information were considered to address this evaluation dimension. Firstly, the results of a secondary analysis of the NRF Stakeholder Survey served as quantitative input and, secondly, responses by interviewees and opinions expressed by group discussion participants served as qualitative information.

It will be recalled that selected items in the NRF Stakeholder Survey were used as proxies for attitudes towards NRF funding in general and the promotion of relevant research in particular. The key question was to what extent the NRF’s programmes had contributed towards the following outcomes: increase in quantity and quality of researchers (item 24); alignment of knowledge areas with national and international priorities facilitation of utilisation of knowledge (25); adherence to quality (29); and provision of a useful rating of researchers (34). Detail of the NRF Stakeholder Survey and the nature of the secondary statistical analyses can be found in Chapter 1, Section 3.1.3.

2.1 Results

The results of the statistical analyses are summarised in Tables 4.2 and 4.3.
Inspection of Table 4.2 shows that the four groups (grant holders, rated researchers, panel members and reviewers) differed significantly in their responses to item 26 (Facilitation of utilisation of knowledge) and the mean rating was positive. Items 24 (Increase in quality and quantity of researchers), 25 (Alignment of knowledge areas with national and international priorities), 29 (Adherence to quality) and 34 (Provision of useful ratings of researchers) show no significant differences among the four groups.

Table 4.2: Kruskal-Wallis Analyses of Group Comparisons

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median</th>
<th>Mean</th>
<th>Chi-square</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase quality &amp; quantity of researchers [24]</td>
<td>4</td>
<td>3.67</td>
<td>6.883</td>
<td>0.076</td>
</tr>
<tr>
<td>Aligned knowledge areas with national &amp; international priorities [25]</td>
<td>4</td>
<td>3.69</td>
<td>2.995</td>
<td>0.392</td>
</tr>
<tr>
<td>Facilitated utilisation of knowledge [26]</td>
<td>3</td>
<td>3.32</td>
<td>13.485</td>
<td>0.004</td>
</tr>
<tr>
<td>Adhered to quality [29]</td>
<td>4</td>
<td>3.64</td>
<td>3.661</td>
<td>0.300</td>
</tr>
<tr>
<td>Provided useful ratings of researchers [34]</td>
<td>4</td>
<td>3.66</td>
<td>3.670</td>
<td>0.299</td>
</tr>
</tbody>
</table>

Table 4.3: U tests for Differences between Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group Comparison</th>
<th>Mean Rank</th>
<th>U</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>1&amp;4</td>
<td>91.61(1), 75.12(4)</td>
<td>1927.50</td>
<td>0.034</td>
</tr>
<tr>
<td>25</td>
<td>No significant difference among all group combinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>1&amp;3</td>
<td>70.69(1), 51.58(3)</td>
<td>1042.00</td>
<td>0.002</td>
</tr>
<tr>
<td>26</td>
<td>1&amp;4</td>
<td>94.76(1), 73.24(4)</td>
<td>1753.00</td>
<td>0.004</td>
</tr>
<tr>
<td>26</td>
<td>2&amp;3</td>
<td>57.61(2), 44.28(3)</td>
<td>501.50</td>
<td>0.040</td>
</tr>
<tr>
<td>29</td>
<td>No significant difference among all group combinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>No significant difference among all group combinations</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3 shows the location of paired group differences and their magnitudes, namely

- Item 24 (increase in quantity and quality of researchers):
  - There is no significant difference among Rated researchers and Other NRF-funded researchers, Rated researchers and Reviewers, Other NRF-funded researchers and Reviewers as well as Panel members and Reviewers.
  - Rated researchers were significantly more positive than the Reviewers.

- Item 26 (facilitation of utilisation of knowledge):
  - Neither Rated researchers and Other NRF-funded researchers nor the Other NRF-funded researchers and the Reviewers or the Panel members and Reviewers differed significantly.
Rated researchers were significantly more positive than the Panel members and Reviewers, while Other NRF-funded researchers group was significantly more positively oriented than Panel members.

- Items 25 (alignment of knowledge areas with national and international priorities), 29 (adherence to quality) and 34 (provision of a useful rating of researchers) did not yield any significant differences among all the group combinations.

2.2 Conclusions

A careful reading of the items from the NRF Stakeholder Survey and the pattern of statistically significant differences support the following conclusions:

- The items themselves were by and large relevant to the current study and the results of the statistical analyses can be taken as valid indicators of attitudes towards NRF funding, including the FAP and DP programmes.

- The mean scores of all the groups were positive – five-point rating scales having been used – albeit not overwhelmingly so.

- NRF funded researchers – by definition mainly by the Focus Area Programme – were more positive than the Panel Members and Reviewers.

- Generalising across the detailed statistical findings, it can be concluded that the research community, represented by these four subsets of groups, were in a modest way positively orientated towards NRF funding strategies, which are de facto primarily represented by the FAP and DP. (This finding is more or less in line with an earlier FRD stakeholder survey which reported, among others, that more former FRD grant-holders thought the priority areas covered by the then directed themes were appropriate rather than inappropriate, namely 45% as opposed to 13%; cf. Fatti & Mashego 2000: Appendix A.)

3 Contribution to Research in General and Robust Research in Particular

By way of introduction, it should be pointed out that The Focus Area Programme proves to be productive in terms of research outputs. The year 2006/07 produced 4 338 outputs of which 58% represented peer reviewed publications. The Development Programmes in that year produced 929 outputs, 62% having been peer reviewed publications (NRF 2007e [KPI report]: 18).

The operative term in this evaluation dimension, robust, was interpreted to mean research of a high quality that can compete with the best on offer. This definition was operationalised in terms
of the publication records (in journals) of FAP grant holders, more specifically their performance in ISI as opposed to South African journals and international co-authorship. This operationalisation is based on the general assumption that one’s research would have to be of a higher quality and be more robust to be accepted by an international ISI journal; international co-authorship also represent a robustness filter.

3.1 Results

The publication preferences of the three groups of researchers can be seen in Figure 4.1 which shows that FAP supported researchers attained a much higher mean ISI article outputs than any of the other two groups. In fact, the DP funded researchers also did better than the control group of NRF-funded researchers.

Figure 4.1: Publication Preferences of FAP and DP supported Researchers

The results for the second indicator, namely foreign co-authorship is summarised in Figure 4.2. The information in this figure shows FAP funded researchers published with more foreign authors than the control group, namely other non-NRF funded researchers (18.2% as opposed to 15.4%); 11.3% of the DP funded researchers had foreign co-authors. The fact that nearly a fifth of FAP researchers co-published with foreign scholars and that this is higher than the percentage of non-NRF funded researchers can be taken as an indication of robustness of the FAP supported research.
3.2 Qualitative information

The robustness of research undertaken with FAP funding has been an issue raised directly and indirectly in several meetings, e.g. under the subjects of quality, improvement of research standards, international comparisons, contribution to the pool of knowledge, etc. The following three generalisations are based on these inputs:

- The peer evaluation system as such is expected to guarantee the quality of research funded by the FAP, since the reviewers are experienced and the standards they set are generally high. However, concern has been expressed that some panel members may not always be well enough informed and sufficiently experienced. A corollary of this conclusion was doubt expressed about the quality of evaluation applied to research projects submitted for Development Programme funding. This point was raised on a number of occasions, namely that it would appear to be relatively easy to obtain funding from those programmes.

- The fact that most of the rated researchers have to rely on FAP funding virtually guarantees that the research undertaken, would be robust and compare with the best available in the particular field.
• There is a misconception that multi-disciplinary and relevant research do (need or can) not meet the highest standards and that the same would apply to multi-disciplinary research journals. One respondent put it this way, “Multidisciplinary research can be first class in the same way that disciplinary research can be”.

3.3 Conclusions

Research financially supported by the Focus Area Programme met the two quantitative tests for robustness, namely the preference for ISI journals as publications of choice and the extent of international co-authorship. In both cases FAP researchers did better than the ‘control group’ consisting of more than 5 000 non-NRF funded South African researchers. These quantitative findings were supported at the qualitative level by inputs made in interviews and group discussions. From these findings it can be concluded that FAP research complied with the criterion of robustness.

However, the preceding positive outcomes do not necessarily mean that FAP has contributed to such robustness in a causal sense. This finding might be interpreted as meaning that FAP funded researchers tend to engage in robust research. The fact that this part of the study focussed on the publication behaviour of grant holders after they had been awarded the FAP grants militates somewhat against the latter interpretation, but still is not sufficient to proof the causal role of FAP. As argued in Chapter 1 (Section 2.3), however, finding positive associations between robustness of research and FAP funding should in its own right be accepted as validation of this objective of FAP.

4 Influence on the Mix of Research

This evaluation dimension according to the project brief required that the extent be determined to which the FAL has facilitated the disciplinary, multidisciplinary, interdisciplinary and transdisciplinary mix of research in South Africa (see Chapter 1, Section 1.2). The answers to this research question were obtained from a bibliometric analysis of the SAknowledgebase as described in Chapter 1, Section 3.1.4. ‘Mix of research’ was operationalised as a publication that is classified in two or more disciplinary field categories, which implies that it is a multi-disciplinary journal. For the purpose of this analysis, non-NRF funded researchers were defined as a control group in a kind of experimental design.

4.1 Results of bibliometric analyses
Table 4.4 reflects the results of the comparison between the *FAP* supported group, the DP supported group and non-NRF supported South African authors.

### Table 4.4: Preference for Single versus Multi-field Journals

<table>
<thead>
<tr>
<th>Funding sources</th>
<th>Number of persons with article output</th>
<th>Journal categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% One journal field category</td>
<td>% Two or more journal field categories</td>
</tr>
<tr>
<td><strong>NRF awardees</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAP only (a)</td>
<td>517</td>
<td>50.20%</td>
<td>42.92%</td>
</tr>
<tr>
<td>DP only (b)</td>
<td>148</td>
<td>44.75%</td>
<td>46.11%</td>
</tr>
<tr>
<td><strong>Non-NRF awardees</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All SA authors</td>
<td>5677</td>
<td>50.49%</td>
<td>42.44%</td>
</tr>
</tbody>
</table>

Inspection of Table 4.4 shows that the publication patterns of *FAP* supported researchers and non-NRF supported researchers were very similar, namely half in single-field journals, slightly more than 40% in multi-disciplinary journals and the remaining approximately seven per cent in unknown-field journals. The DP supported researchers tended to prefer multi-disciplinary to single-discipline journals. To understand the dynamics of these findings would require that the journals and their publication policies be studied in detail, an undertaking which was not possible within the time frame of this study. The only provisional conclusions that could be drawn from Table 4.4, within the context of the purpose of this study, is that *FAP* supported researchers appeared to manifest the same publication pattern than non-NRF supported researchers with regard to their preference for mono-disciplinary journals and that the *FAP* did not contribute to a significant shift in publication patterns and therefore in type of research. On the other hand, DP supported researchers seem to prefer, although probably not significantly more so, to publish in multi-disciplinary journals. In this regard, difference between *FAP* and DP supported researchers were relatively small (43% versus 46%) and would probably prove non-significant.

### 4.2 Conclusions on the bibliometric analyses

*Focus Area Programme* supported researchers seem to maintain a single-disciplinary orientation in their research, at least as reflected in journal preferences. This does not take away from the fact that 43% of their articles appeared in multi-disciplinary journals. The fact that their pattern is practically the same as that of non-NRF supported researchers should be interpreted as meaning that *FAP* has not encouraged multi-disciplinary research to a significant extent. The short time lag between receiving the *FAP* grant (2004) and searching a database for publication outputs over the next two years should be seen as a constraint in the design of these analyses, though.
5 CONCLUDING SUMMARY

This chapter addressed four of the nine evaluation questions, namely the alignment of the focus areas with national imperatives, the reception of the strategy by relevant research communities, the strategy’s contribution to robust research across disciplines, and its influence on the mix of research (Chapter 1, Section 1.2). The following conclusions are offered on the basis of these empirical sub-projects:

- The empirical studies covered selected aspects of the evaluation questions and should be seen as offering only part of answers to the influence of the FAL on these dimensions.

- The current focus areas cover the spectrum of national imperatives as reflected in a spectrum of imperatives, ranging from the macro to sectoral levels. It was also concluded that some of the imperatives have undergone changes over time in specific direction notwithstanding still being labelled the same way.

- The focus area strategy was initially received with reservations by the research community (see Chapter 2) and is currently accepted, but there seems to be scepticism about its effects in addressing the challenges confronting the country.

- The FAP seems to have contributed to robust research as expressed in terms of publications in ISI journals and international co-authorship; it was noted that the design of the study did not allow any causal inferences from this finding.

- A smaller proportion of FAP funded researchers published in multi-disciplinary journals than researchers funded by the Development Programmes. The fact that that proportion was approximately the same as that of non-NRF funded researchers, lead to the conclusions that the FAP was not associated with a greater degree of disciplinary mix than other South African researchers.

- The above conclusions should be read in conjunction with earlier critical comments on the incomplete implementation of the FAP, especially with regard to discontinuous provision for stimulation and coordination of multi-disciplinary research capacity building.

Chapter 5 responds to review dimension 8, i.e. an overview of the strengths, weaknesses and challenges of the Focus Area Programme.
Chapter 5

The Focus Area Programme:

Strengths, Weaknesses and Challenges

This chapter represents a distillation of the outcomes of the assessment made in the preceding chapters. The identified strengths, weaknesses and challenges are not substantiated here, since that has already been done in the previous chapters.

The strengths, weaknesses and challenges of the Focus Area Programme have evolved over the past six years as the National Research Foundation responded dynamically to its own experience in the management of the programme as well as to feedback received from the different layers of the research community. In addition, the FAP formed part of a configuration of statutory functions and instruments developed by the NRF for the promotion and support of research development in this country and it is to be expected that strengths, weaknesses and challenges would be influenced by the rest of the NRF system. One example should suffice: Qualitative information from the present study and the one undertaken on the impact of the NRF Rating System (Marais 2007) indicates that the assessment of FAP was often coloured by rated respondents’ frustration about the fact that they had to go through the laborious process of applying for research funding from the FAP.

Assessing the strengths, weaknesses and challenges of the FAP becomes even more complex when the role of the Department of Science and Technology (DST) is considered. Some past institutional and programme reviews have queried the possibility that the DST is crossing the systemic boundaries and becoming involved in functions that should more properly belong to the domain of the NRF, examples being the initiation of new programmes, such as the South African Research Chairs Initiative and DST/NRF Centres of Excellence. The consequence of such a systemic situation is obvious, namely that the FAP can really not be assessed in isolation from the institutional and political contexts within which it is embedded.

The strengths, weaknesses and challenges of the FAP are located at more than one level. For the purpose of this overview the following five levels were distinguished: the national systems level, sectoral systems level, institutional, programme and administrative levels.
1 **Strengths**

1.1 **National Systemic Level**

- At the national level, the most salient strength of the focussed research funding strategy is the fact that the NRF decided to steer the research system from self-initiated curiosity-driven to a national imperative focussed multidisciplinary approach. In this sense, the research system aligned itself thematically with the government’s objectives of economic development and improvement of quality of life of all.

1.2 **Sectoral System Level**

- The focussed research approach sensitised institutions in the higher education sector to the underlying philosophy, namely the need for relevance of research – i.e. going beyond knowledge production per se - and multi-disciplinarity. The response of universities might have been pragmatic, since they had to comply for funding, but the fact remains that *FAP* contributed to the research system redirecting their programmes more towards relevant and multidisciplinary research.

1.3 **Institutional Level**

- At institutional level, the strength of the *FAP* is that it represented a clear message that the NRF was willing to steer the research system – and not leave that to either the DST or institutions – and do so after substantive preparation and consultation. The fact that a sufficient degree of consensus among stakeholders was obtained – although by no means unconditionally so – add to the relative strength of the *FAP*.

1.4 **Programme level**

- As far as the thematic composition of the *Focus Area Programme* is concerned, it is as well designed as circumstances allowed at the time (spread of disciplines, long tradition of self-centered and self-initiated research, scepticism about steering, and incorporation of the Humanities and the Social Sciences). The fact that the themes or foci might be revisited does not detract from this strength per se. In addition, the multi-layered peer-evaluation system should be noted as contributing to the strength of the *FAP*, although elements of it are eliciting criticism.
1.5 Administrative Level

- In principle, the FAP is well administered, especially if it is considered that it requires a multi-layered administrative system. Notwithstanding a relatively high rate of staff turnover that strained the effectiveness and efficiency of the administration, especially at lower levels, the top levels of administration seem to have established a credible administration.

2 Weaknesses

2.1 National Systemic Level

- The sub-optimal level of funding of research in the country in general and of the NRF’s programmes in particularly stand out as the major weakness of the FAP at national level. This weaknesses leads to all kinds of distortions in the system, e.g. rated researchers who have to rely on FAP for funding, budgeting rules that exclude expense items that should normally form part of a public grant and the arbitrary reduction of budgets – all in all a scenario that constrains optimal exploitation of research capacity.

2.2 Sectoral System Level

- A structural sectoral weakness of the FAP (and other programmes) that is increasingly manifesting itself, is the small pool of experts that are expected to contribute to governance and peer review process. A decreasing pool of experts is being relied on to provide these essential quality-related functions. Two obvious effects are, firstly, that individuals who are not experts might have to adjudicate their seniors’ work, and secondly, the anonymity principle might even become compromised.

2.3 Institutional Level

- Two related weaknesses emerged from the study, namely the discontinuity in institutional capacity proactively to stimulate, facilitate and coordinate multidisciplinary research on the one hand and the lack of capacity to monitor the utilisation of findings from research funded by the FAP, on the other. These are cross-cutting functions and are therefore located at the institutional rather than programme level. FAP represented – and still represents – a marked change of orientation and multidisciplinary and utilisation skills do not normally form part of the socialisation of researchers – the NRF has an obligation in this regard.
2.4 Programme Level

- The main weakness of the FAP identified in the preceding chapters centres around the foci of Distinct South African Opportunities on the one hand and Indigenous Knowledge Systems on the other. The former could easily become a catch-all for projects that are not well aligned with the other focus areas and in that process become both too wide and not promote multi-disciplinary research. The exceptionally high success rate of projects in IKS represents an anomaly that causes various stresses in the system, such as fuelling the perception of ‘easy money’.

2.5 Administrative Level

- A vulnerability in the administration of the FAP is the recurring negative feedback on the uneven quality of content related feedback, especially, but not only, in the case of unsuccessful applications. If it is assumed that feedback on peer evaluations and panel discussions potentially represent a valuable learning experience, then it elevates this function from a mere administrative ‘announcement of results’ to a content rich loop in an ongoing communication. Some reasons for this weakness have been touched on elsewhere in the report and suffice here to suggest that the weakness may be associated with a weak link between the functions and role of the chairperson – and the execution of same – and the administrative staff.

3 Challenges

The report suggested a range of challenges confronting the NRF in general and the funding programmes, including FAP, in particular. In this section, however, the main challenges awaiting focussed research programmes in the NRF have been prioritised and organised in terms of the five dimensions used to organise strengths and weaknesses. This small set of challenges summarised below are obviously in many respects linked to the strengths (reinforcing) and weaknesses (remedial actions), but they are not presented in that way here.

3.1 National Systemic Level

- The development of a productive relationship with the Department of S&T (DST) is one of the key challenges awaiting the NRF as organisation and especially its focussed research promotion initiatives. This is becoming an increasingly salient issue in view of the pro-active initiatives the DST has in recent years launched and could be expected to proceed with, if its recent Ten-year plan is read carefully. The flip side of this coin would seem to be the challenge to the NRF itself to take more initiative within the NSI in steering research.
3.2 Sectoral System Level

- The analyses in this report have shown that steering focussed research in South Africa requires a spectrum of research management capacities that are scarce. A new approach (at least for South Africa) of exchange and secondment of specialists would seem to be one of the few options over the short to medium term. (This would, of course, also include the possibility of secondment of international research management experts within, for instance, the framework of bilateral agreements.) To give effect to this rather self-evident solution remains a challenge, if focussed research support programmes, like FAP, are to succeed in all respects.

3.3 Institutional Level

- Steering of research can be defined as a strategy of an organisation deliberately to direct a research effort in a particular direction by means of instruments such as establishment of institutions (Technological Innovation Agency, TIA, is an example), missions (public research institutions), themes (FAP) and funding instruments. The Focus Area Programme has (probably) been the first main funding programme involving a considerable degree of steering by the NRF. The future challenge in steering focussed research would be to develop the capacity to do so productively in a way that would strike a dynamic balance between addressing legitimate concerns of the research community on the one hand and obligations to the research system and government at large, on the other.

3.4 Programme Level

- The Focus Area Programme has offered all stakeholders a relatively unique experience in steered needs-orientated research. The main challenge at programme level is that of capitalising on lessons learnt from experience gained in the course of the life cycle of FAP since 2001 and applying them to future focussed research programmes the NRF may initiate. In this respect, the present report may serve as an input.

3.5 Administrative Level

- A continuing challenge to the administration of the funding of focussed research programmes, such as FAP, is to develop the required internal administrative skills that would include the necessary administrative professionalism and sufficient research content orientation to administer such a programme. The fundamental point of departure is that the administration of research funding is a service to an exclusive, albeit somewhat
self-centered, clientele for whom precision and reliability are paramount and who
justifiably expects similar levels of service rendering.

4 CONCLUDING SUMMARY

The report has implicitly and explicitly identified a range of strengths, weaknesses and
challenges. In this chapter, however, an attempt has been made to offer a limited set of core
characteristics of the Focus Area Programme on each of the following systemic levels: National,
sectoral, institutional, programme and administrative levels. No deliberate attempt has been
made to associate the three set of properties (strengths, weakness, and challenges), but even a
superficial reading of the preceding pages would soon show the associations. If the strengths,
weaknesses and challenges were to be summarised at a high level, it would yield the following:

- The cross-cutting strength of the FAP has been the fact that the NRF, in line with
  international trends, initiated a process of steering publicly funded research away from
  having been an almost exclusive self-initiated and (probably) curiosity-driven process to
  one in which relevance, that is going beyond knowledge production for the sake of
  knowledge production, and multi-disciplinarity have been the objectives.

- The cross-cutting weakness of the FAP could be described as the (partial) failure of the
  NRF, firstly, to have provided supporting capacity to facilitate this move in a research
  community that had not been socialised towards relevance and multi-disciplinarity and
  secondly not always having succeeded to bridge discontinuities caused by staff turn-over
  to ensure the provision of optimal administrative skills at the lower levels of
  administration.

- The overarching challenge that can be distilled from the challenges above, is the need for
  the NRF to ensure that it develops the capacity to be acknowledged as a credible
  institution to steer publicly supported research in this country (steering including
  functions, such as identifying and launching new prioritisation and funding strategies,
  stimulation, development and coordination of capacity, monitoring of outcomes, and the
  like).

The next and final chapter offers an overview of the main conclusions drawn from this project
and the recommendations, i.e. review dimension 9.
CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The preceding chapters reviewed a relatively wide spectrum of facets of the *Focus Area Programme (FAP)* which was approached as the prime example of the broader Focus Area Landscape Model, i.e. the approach of mapping the National Research Foundation’s mandated landscape and subsequently to develop programmes to address/support each one of those areas. This chapter pulls together the main findings into a small set of high-level conclusions and recommendations.

1. **CONCLUSIONS**

The findings reported in earlier chapters are summarised in this section as a limited set of conclusions. The conclusions are presented here under headings that correspond to the operationalised evaluation dimensions (see Chapter 1, Section 2); each section is introduced by a cross-reference to the relevant chapter where the particular evaluation was reported.

1.1 **Model underlying the Focus Area Programme**

Chapter 2 showed that development of the *Focus Area Programme (FAP)* was a response to four interactive dynamics. Firstly, the establishment of the NRF – that would also include the Social Sciences and Humanities - afforded the opportunity to reconsider its strategy afresh. This integration of institutions required an instrument, such as the *FAP*, that would facilitate communalities between the science cultures of Natural and Social sciences. Secondly, in the wake of government policy papers the need emerged to steer curiosity-driven research more towards multi and inter-disciplinarity and national relevance. Thirdly, the international research philosophy had by the end of the nineteen-nineties moved strongly in the direction of new modes of knowledge production, variously described as Mode 2, strategic science and post-modernism to group together thrusts that did not represent a homogeneous category. Fourthly, reputable funding agencies which had always been strongly committed to supporting self-initiated fundamental research, started more actively steering research towards what the NRF later called focus areas.

It should be noted that the NRF did its homework as well as could be expected before converting to the *FAP*. Here reference can be made to the so-called macro scan, studies of peer organisations in other countries and stakeholder consultations locally.
This review defined the FAP as a Mode 2-type of programme, since it emphasised, among others, multi-disciplinarity and relevance going beyond scientific relevance only.

The model underlying the FAP could be described as having comparative validity and although it represented a rather radical change of course in public funding of curiosity-driven self-initiated research, was received as well as could be expected by a research community often characterised by opposition to any form of steering.

1.2 Implementation of the Focus Area Programme

Four different aspects concerning the implementation of the FAP were addressed in Chapter 3, viz. four process conditions (stimulation/coordinating; adjudication/evaluation, monitoring utilisation; and environmental scanning), funding, administration, and fit between proposals and focus area frameworks; these are summarised separately below.

1.2.1 Process: Stimulation and facilitation

It was argued in Chapter 3 that the implementation of a new funding strategy involving the type of steering required by the FAP, would require more than a reactive administrative orientation from the NRF. More particularly, it was concluded that successful implementation and maintenance of the FAP would require stimulation, facilitation, coordination and support for interdisciplinary and collaborative research in South Africa, given the long tradition of disciplinary curiosity-driven and funded research at universities. This seems to have been a key objective of designated senior officials up to approximately 2004 when staff turnover led to a scaling down of this function. The following conclusion summarises this function of the NRF:

- Staff turnover caused a discontinuity of the proactive stimulation and coordination function which was left suspended in mid-air, as it were. The dynamic re-activation of this type of function is a necessary condition for successfully steering NRF funded projects towards multi and eventually inter-disciplinarity, collaboration and relevant research.

1.2.2 Process: Adjudication/evaluation

The adjudication/evaluation process was shown in Chapter 3 to be a multi-layered one which is in principle commendable. An analysis of the system and perceptions of the research community indicated concern about uneven expertise among panel members impacting negatively on the credibility of the system, hence the following conclusion:
• A critical condition for the success of any funding system is the credibility of all the components of the proposal evaluation process and questions have surfaced about this aspect of the FAP.

1.2.3 Process: Monitoring utilisation

It was assumed in Chapter 3 that the ultimate goal of research undertaken in the framework of the FAP would be to contribute directly or indirectly to economic growth and improving the quality of life in South Africa. It was shown in that chapter that utilisation was a complex function of a dynamic set of factors, but that the important point was that it has to be managed in order to take place. This would require that there should be a capacity in the NRF at least to record and monitor the outcomes of sub-sets of FAP funded projects.

• The capacity to monitor the utilisation of research findings funded by the NRF has not been provided for in the past and it must be noted as a past and current shortcoming in the implementation of the FAP.

1.2.4 Process: Environmental scanning

It was clear from Chapter 3 that the NRF had done a good job in preparatory work, including environmental scanning and consultation with stakeholders, before implementation of the new FAP. Functioning in the context of relevant research – if not demand-driven research – requires that an organisation should either define the foci so broadly that it would not be necessary to adjust them from time to time or that there should be a capacity to monitor the relevant environment to enable the adjustment or even radical change of the foci. The following conclusion is valid, irrespective of the role currently being played by the DST in this regard.

• The NRF would require an environmental scan capacity, should the Focus Area Programme be continued, even in a different form. In fact, it stands to reason that the NRF at any rate needs such a function at a corporate level.

1.2.5 Funding

Chapter 3 approached the issue of funding from the following two perspectives. In the first place, it was shown that the budget allocations have not risen in direct proportion to the growing needs and general cost increases. In the second place, and as a direct
function of these financial constraints, the NRF defined the budget guidelines rather conservatively in, for instance, the following respects: Institutions of grant holders were required to take certain ‘institutional’ costs for their account; certain essential budgetary expenses, for, e.g., staff replacement were not covered by the NRF grant; statistics showed that approved grants were often reduced to fit the available funds. Another aspect of funding that was considered in that chapter was the high success rate of applications, but it was concluded after careful consideration that the fact that the NRF functioned as the primary funding agency and that its grants were rather conservative, made it inappropriate to make international comparisons. These and related factors led to the overriding conclusions, irrespective of the future dispensation:

- Firstly, that the Focus Area Programme (FAP) in general and the successful applicants in particular were insufficiently funded; secondly, that funding levels will have to be reconsidered; and, thirdly, that in the interim the ratio of grants to applications could be expected to hover around 50%.

1.2.6 Administration, including internal capacity

The administration of the FAP requires a complex matrix of functions and skills, including, inter alia, a large amount of standardised, schedule-determined application related administration, the management of a huge amount of control information, managing a multi-layered decision-making process and content informed communication with applicants and research administrations. In this environment where a new funding programme was being established, it could be expected that administrative structures (including infrastructure) had to be amended over time to cater for the growing number of applications and the multi-layered decision making process. In addition, the NRF in general and the Grant Management and Systems Administration in particular have experienced relatively high levels of staff turnover over the past few years. The following conclusions can be drawn from the information discussed in Chapter 3:

- The standardised administration of the FAP is efficiently executed by a relatively young and dedicated staff under an able management.

- The content-related feedback communication, especially in the case of unsuccessful applications, poses a challenge that would require urgent attention, irrespective of the future funding strategy.
• Although the on-line application system has been reviewed and upgraded on more than one occasion, it is still not operating smoothly.

### 1.2.7 Fit between proposals and focus area frameworks

It may be recalled that although matching proposals to focus area frameworks is an interactive administrative process, a stringent empirical test of minimum information was designed to test this evaluation dimension. The conclusion drawn from the research to find an answer to this part of the brief can be summarised as follows:

• As a general rule, researchers succeeded well in matching their research proposals to the focus area frameworks and in this regard were constructively supported by the GMSA staff. In this sense the FAP has been successful in eliciting research proposals that are aligned to the strategic direction intended by the NRF.

### 1.3 Empirical components

The results of the empirical components of this review were discussed in Chapter 4 and the conclusions for each of the review dimensions are summarised here.

#### 1.3.1 Alignment with national imperatives

The objective in this part of the study was to determine at a high level, rather than detailed level, whether the focus areas overlapped with national priorities. The thematic convergence between the focus areas and national imperatives, as reflected in various policy statements dating between 1996 and 2007, produced the following conclusion:

• The set of nine focus areas were well aligned with the government’s priorities to the extent that it would be justified to conclude that the NRF has successfully identified nationally important objectives towards which to steer publicly supported research. In this sense the FAP has attained one of its original goals namely to develop a system that would be relevant to and have the potential to address salient South African challenges.

#### 1.3.2 Reception by the research community

The research communities’ reception of the FAP has been gauged in two ways, viz. in the form of secondary analyses of selected data generated by the NRF Stakeholder Survey and qualitative inputs to interviews and group discussions. The following conclusions are offered on the basis of these two sources of information:
• The *FAP* was initially seen as a significant change in direction of NRF funding strategy, but the consultative approach contributed towards sufficient buy-in by the research community. There are, however, variations in attitude among different components of the research community. The general orientation towards this aspect of the NRF is positive, but there is currently some scepticism about its real impact on contributing to the solving of national problems.

### 1.3.3 Robustness of research

As indicated in Chapter 4, methodological issues made it somewhat problematic to test this evaluation dimension. Nevertheless, in the end a relatively strong test was used, namely assessing the publication patterns of *FAP* supported researchers against those of DP supported ones and all non-NRF funded South African authors listed on the University of Stellenbosch’s SAKnowledgebase. The results of this test led to the following conclusion:

• *FAP* funded research complied with the criterion of robustness, i.e. research that can stand the test of international peer review and attractiveness to international co-authorship.

### 1.3.4 Mix of research

The empirical test designed to probe this evaluation dimension addressed it only partially, albeit on quantitative research output information. Nevertheless, the findings were convincing enough to allow the following conclusion:

• *FAP* funded research did not appear to be more multi-disciplinary than non-NRF funded South African researchers (proportion of journal articles in multi-field journals versus single-field journal) in contrast to researchers funded from the NRF’s Development Programmes who published slightly more in multi than in single-field journals research.

### 1.3.5 Summary conclusions on influence of the Focus Area Programme

The empirical evaluations of the functions and influence of the *FAP* were of necessity not exhaustive, relying on survey data of two years ago, samples of grants (grant holders and years), selected sets of policy pronouncements, and the like. The empirical evaluation of the functions and influence of the *FAP* produced mixed results as shown in the preceding paragraphs. On the positive side, it can be said that some functions
have probably improved the perceived image of publicly supported research to the extent that the focus areas are well aligned to national priorities and challenges. Further, the research community seems to have accepted the FAP in general and also adopted the focus area framework, not that researchers had many degrees of freedom if they wanted to qualify for NRF financial support(!). On the negative side, it could not be shown convincingly that the FAP has (so far) had positive effects on the robustness and disciplinary mix of research. However, two cautionary notes with regard to both the positive and negative findings should be repeated here. Firstly, in the case of five-year grants such researchers could at this stage at most have participated for slightly more than one cycle in the FAP and in the case of two-year grants for slightly more than two cycles. This is probably too limited a period for the intended influence of the new strategy to manifest itself, especially if the extent of the reorientation from self-initiated and curiosity-driven to Mode 2 is considered. Secondly, the FAP has probably not provided sufficient support and facilitation to stimulate and coordinate multi-disciplinary research. These two factors might well have restrained the influence of the FAP.

1.4 Strengths and Weaknesses of the FAP

The strengths and weaknesses of the Focus Area Programme were discussed in Chapter 5 which in a certain sense served as a high level summary of this evaluation study. The following conclusions are based on that chapter:

- The strengths and weaknesses of the FAP have evolved over the past six years as the NRF responded dynamically to its own experience in the management of the programme as well as to feedback received from the different layers of the research community. The strengths and weaknesses can be identified in different phases and at a range of levels of this funding programme.

- The main strengths identified in this report are the following:
  - The decision by the NRF at the turn of the century to change course from support of unrestricted disciplinary orientated self-initiated curiosity-inspired research to funding of steered relevant and multi-disciplinary orientated research and the substantive preparatory work it did as well as the consultative process it followed in introducing the FAP
  - The extent to which institutions have accepted the philosophy underlying FAP, namely the need for relevant research and multi-disciplinarity
The interpretation of *FAP* as being a readiness and commitment by the NRF to steer the research system more dynamically
- *FAP* was as well designed and implemented as the context at the time allowed
- *FAP* is well administered at higher levels of management.

- The main weaknesses of the *Focus Area Programme* include the following:
  - Non-optimal funding of *FAP* supported research
  - Exhaustion of the small pool of experts on whom the quality control of the system depends
  - Unevenness of quality of content of feedback communicated to applicants
  - The need for capacity to dynamically and proactively facilitate and stimulate multidisciplinary research as well as monitor utilisation of research findings by the NRF
  - Firstly, the focus area, Distinct South African Opportunities, often serves as safety net or catch-all and secondly the high success rate of Indigenous Knowledge Systems on the other are anomalies in the *FAP*
  - The need to upgrade the quality of feedback on various aspects of applications.

- The main challenges awaiting the NRF with respect to focussed research funding programmes are the following:
  - Establishing a credible and productive relationship with the Department of Science and Technology with regard to focussed research initiatives
  - Developing and instituting a system of staff secondments as a means for addressing staff turn-over, especially at middle and senior management levels
  - Developing an approach to steering of the research system that would balance legitimate concerns of the research community on the one hand and the research system and government on the other
  - Capitalising on lessons learnt in the first six years of *FAP* and transferring those lessons to subsequent programmes.

## 2 Recommendations

The following limited set of recommendations is supported by the evidence offered in Chapters 2 to 5 and are aligned with the conclusions listed in this chapter. The recommendations are not presented in an operational form, since the NRF first has to consider the general rationale underlying them before it would be meaningful to consider their operationalisation, also in view of the property of equi-finality that applies to an open system such as the NRF.
2.1 Continuation of focus area orientated research

This report showed that internationally relevant multidisciplinary research has for a range of dynamic reasons become a significant modality for publicly sponsored self-initiated research, a modality that should not be confused with commissioned and contracted research. It has further been argued that it would be reasonable to forecast that the South African government would give preference to funding research that would at least appear to be aligned with national priorities – especially if economic growth rates do not continue in the current positive direction.

It is consequently recommended that

- The NRF should continue to steer at least a significant portion of its funded research towards relevant focussed areas and in the process reward multi-disciplinarity.

- The NRF should maintain sufficient flexibility to be able to adjust the focussed directions towards which it wishes to steer research, should circumstances require it.

2.2 Support for disciplinary research

Chapter 2 showed that the NRF does not seem to cater for the funding of disciplinary research any longer. Yet, as was argued elsewhere (see Marais 2007), the NRF Rating System is in essence disciplinary orientated, but those researchers have to depend on multi-disciplinary orientated sources of funding such as the Focus Area Programme. Against this background the following recommendation is made

- The NRF should institute a research funding programme aimed at supporting self-initiated discipline orientated research to serve the needs of rated researchers and other bona fide discipline-orientated research projects.
  
  - The conditions for this funding programme should be so constructed that it acknowledges the scholarly and strategic legitimacy of curiosity-driven research, without becoming an avenue for funding mediocre research that is neither scientifically nor ‘societally’ relevant.

2.3 Integrated approach to steering

In Chapters 1 and 2 it was, firstly, argued that the focus area strategy instituted in 2001 represented a significant change for researchers and research administration alike away from
mono-disciplinary curiosity-driven research to relevant multi-disciplinarity. A number of conceptual and pragmatic dimensions of the concept of steering in the science policy domain were also identified and in Chapter 3 it was shown that the NRF has not throughout the period 2001 – 2007 paid sufficient attention to all these dimensions. Against this background, the following recommendations are submitted as necessary conditions for effective focussed research:

- The NRF should dynamically contribute to stimulating and capacity building in research approaches involving relevant and multi-disciplinary research, should it continue funding focussed research, albeit in modified programmes.

  o Such capacity building would have to be undertaken under the aegis of and/or by credible senior members of NRF staff and, depending on the exact focussed research strategy, include functions such as the following: Sensitisation to and promotion of national and international challenges and priorities as research opportunities; establishing multi and inter-disciplinary networks and teams; orientation to the unique methodological and project management challenges inherent in relevant and multi-disciplinary research; models of research implementation going beyond publications; and funding of network activities.

2.4 Utilisation of NRF funded research findings

In direct and indirect ways Chapters 2, 4 and 5 pointed towards the ultimate goal of Focus Area Programme supported projects being contributing towards addressing national priorities. In this regard, this was another way of saying that the intention with the FAP was to utilise knowledge generated by projects in ways that might go beyond a mere scholarly publication. Evidence offered in Chapter 2 showed that utilisation of research findings requires systematic panning beyond the design and execution of a project, hence the following recommendation.

- The NRF should establish an utilisation-of-research-findings capacity that should be responsible for functions such as

  o Monitoring utilisation of NRF funded projects; scanning research findings with a view to possible utilisation; matching research findings to identified needs in the national environment; initiate and manage an ongoing impact study of publicly funded research projects (including the development and maintenance of an appropriate data base); contribute to national capacity building in utilisation dynamics; and advise government on matters pertaining to the return on public investment in research.
2.5 Conceptual, financial and operational differentiation between knowledge production and capacity development functions

The point was made in several sections of this report that research capacity development posed unique challenges across the research support value change. A concern often expressed in the qualitative part of this study concerns the statutory complexity of the NRF’s mandate and the inevitability of comparisons between programmes which is addressed in the following recommendation.

- Conceptual and operational distinction should be made at a strategic level between the appropriate initiatives and incentives required to address the range of issues in the NRF mandate, ranging from research and institutional capacity development to promoting research excellence in a global environment.

2.6 Management of focus area orientated research funding

A funding programme, such as the FAP, represents one of the flagships of the NRF and is used by committed academic researchers as primary source of funding. It follows that the management and administration of the NRF should, across the entire spectrum of research grant functions, be commensurate with the level of its clients. The following recommendations concern the NRF’s governance and management functions within the context of support for focussed researched.

- Striving for excellence in research presupposes professionalism in all dimensions of the adjudication and grant administrative processes and the NRF should ensure that all these functions are performed in a credible and professional way.

- The NRF should, like sister organisations abroad, seriously consider the option of entering into a system of secondments of senior academic and other staff for periods of, for instance, up to three years to compensate for staff turn-over at the higher levels of the organisation.

- Addressing unevenness (inter alia with regard to quality and cost) in the peer evaluation system should be a priority and it is recommended that an instrument of such as a multi-criteria decision model (MCDM) should be developed to suit the requirements of the broader spectrum of disciplines being served by the NRF. Such an instrument can be validated to suit the unique requirements of groups of disciplines.
• In addition to the above recommendations - and irrespective of the exact nature of future funding programmes - consideration should be given to establishing a committee of panel chairpersons tasked to ‘normalise’ (even in the statistical sense) the outcomes of project evaluations for submission to the NRF executive. (Such a meeting should, in other words, be informed by statistics on the recommendations of each of the panels.)

• The NRF should consider producing three user-friendly information documents (Internet based) to assist researchers, evaluators and administrators alike with regard to facets of research funding in general and grants in particular, namely

  o A comparative overview of research grant guidelines of peer funding agencies in selected countries
  o A guide to effective applications for NRF grants
  o A guide to effective peer-evaluations of research proposals

2.7 Implementation of a new strategy

Chapters 2 and 3 assessed the preparatory actions and consultations undertaken by the NRF before implementing the FAP favourably and given the experience with regard to the current evaluation project described in Chapter 1, the following two recommendations extend the underlying rationales into the immediate future.

• The NRF should, upon approval of the outcomes of the present evaluation project – even if only in part - and before implementing any amended or new strategy, develop and approve an implementation monitoring plan and instrument(s), including the indicators to be used for such monitoring.

• Should the NRF decide in principle to retain support of focussed research in some form or another, it should implement such a system only after consultation with the full range of its stakeholders.

2.8 Strategic management and research information

The NRF Focus Area Programme, being at the nexus of diverse information and knowledge sources on research systems and performance, should establish a corporate objective to ensure the systematic and accessible storage of relevant information sets for strategic management (for example, on international research policy and strategy trends advanced human capital development, utilisation of research findings and inter-disciplinarity of projects).
3 Conclusions

The evaluation of a research funding programme, such as the Focus Area Programme, confronts all parties in the contract with a dilemma somewhat unique to evaluation research, namely how to weigh the evidence in favour of or against the continuation of the specific programme. The critical factor is often not the substantiation or implementation or management of the programme, but its reception by the intended beneficiaries. The Focus Area Programme represented a significant attempt by the NRF to steer the research funding system away from the traditional comfort zone of self-initiated and curiosity-driven research, important as that zone may have been throughout the history of science – until the late nineteen eighties, that is. It stands to reason that many researchers would not be favourably disposed to this kind of steering by a funding agency. However, it had become imperative for the NRF to bring about this strategic change.

Against the preceding background and in the light of evidence submitted in this report the overriding conclusion is that the development and implementation of the Focus Area Programme

- came at the right time,
- has been partially successful
- the rationale behind it and the model underpinning it remain valid and
- a focussed research programme should be continued – even if in an amended form - but
  should take account of the necessary conditions (as identified in this report) for
  successfully managing such a programme.

In addition to the four preceding conclusions/recommendations the study also suggests that provision should be made for a programme dedicated to promoting discipline-orientated research without it becoming a ‘soft’ option for research which is neither scientifically nor societally relevant.
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<td>Human Science Research Council</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>IKS</td>
<td>Indigenous Knowledge Systems</td>
</tr>
<tr>
<td>IF</td>
<td>Innovation Fund</td>
</tr>
<tr>
<td>ISI</td>
<td>Institute of Scientific Information</td>
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<tr>
<td>ISO</td>
<td>International Standards Organization</td>
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<tr>
<td>MCDM</td>
<td>Multi-criteria Decision Model</td>
</tr>
<tr>
<td>MSSA</td>
<td>Marketing Surveys and Statistical Analysis</td>
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<tr>
<td>NACI</td>
<td>National Advisory Council on Innovation</td>
</tr>
<tr>
<td>NRDS</td>
<td>National Research and Development Strategy</td>
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<tr>
<td>NRF</td>
<td>National Research Foundation</td>
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<tr>
<td>NSI</td>
<td>National System of Innovation</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>RDP</td>
<td>Reconstruction and Development Programme</td>
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<tr>
<td>REDIBA</td>
<td>Research Development Initiative for Black Academics</td>
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<tr>
<td>RISA</td>
<td>Research and Innovation Support Agency</td>
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<tr>
<td>S&amp;T</td>
<td>Science and Technology</td>
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<td>SARCHI</td>
<td>South African Research Chairs Initiative</td>
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<tr>
<td>SET</td>
<td>Science, Engineering and Technology</td>
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<tr>
<td>THRIP</td>
<td>Technology and Human Resources for Industry Programme</td>
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<tr>
<td>TIA</td>
<td>Technological Innovation Agency</td>
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<tr>
<td>ToR</td>
<td>Terms of Reference</td>
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<tr>
<td>UP</td>
<td>University of Pretoria</td>
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<td>USSR</td>
<td>Union of Soviet Socialist Republics</td>
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