Designing a model for the African Science and Innovation Facility to implement the Science and Technology Consolidated Plan of Action

A study commissioned by NEPAD's Office of Science and Technology

Professor Geoff Oldham, Dr John O Adeoti and Professor Sandy M Thomas

October 2006

Contents

Acknowledgements

The Project Team would like to thank all the individuals who responded to our consultations and who participated in interviews. Their perspectives and advice were invaluable. We are also grateful to the many others who engaged with us to help us in our task. Particular thanks go to Francisco Sagasti who was a consultant on the project and to Caroline Rogers who undertook research, and assisted with drafting. This report has been funded by the United Kingdom's Department for International Development (DFID). The views expressed within do not necessarily reflect official policy or the views of the Department.

Executive Summary

This report has been prepared in response to a request from NEPAD's Office of Science and Technology for a review of alternative mechanisms for designing an African Science and Innovation facility (ASIF). The preparation of such a review had been proposed by the African Ministerial Council on Science and Technology (AMCOST) as an input to its decision on how best to implement its Consolidated Science and Technology Plan of Action for African development (CPA).

The decisions taken by AMCOST at its Dakar meeting in 2005 provide the basic framework for the development of ASIF. This report draws heavily on these decisions but expands and develops them, based on consultations, interviews and the high level discussion meeting in Pretoria carried out by the ASIF Project Team.

Several examples of institutes on which ASIF could be modeled were suggested to us by interviewees and by respondents to the consultation (see Appendix A). Drawing on these examples, five possible institutional models for ASIF were considered. They included a development bank, an intergovernmental facility, a consortium, a non-governmental facility, and a limited company. After careful consideration, we have accepted the arguments in favour of an intergovernmental model but have attempted to make a clear distinction between those parts where political considerations are necessary and those where scientific and economic considerations should be paramount. This can be done by distinguishing between the process of designing the Flagship Programmes and the process of implementing them.

We propose that ASIF be established as a legal entity within the African Union. Its mission and objectives follow closely from those articulated in the Consolidated Science and Technology Plan of Action approved by AMCOST in 2005.

We propose that the mission statement for ASIF should be: "The purpose of ASIF is to facilitate the conduct of research and other scientific and technological activities at a regional level in Africa which will lead to technological innovations to meet the development challenges of the continent."

ASIF will consist of a number of elements. These are: a Governing Council; a secretariat; a Technical Advisory Board; and Programme Boards to manage the implementation of each of the Flagship Programmes. The report makes detailed recommendations regarding each of these elements.

The involvement of AMCOST members in the Governing Council will ensure that ASIF remains closely associated with NEPAD. The later programme is intimately associated with Africa's economic development and ASIF shares those same goals.

Once the Flagship Programmes have been designed, and approved by the Governing Council, the responsibility of implementing them will be devolved to independent

Programme Boards. They will work through networks of existing institutions to meet their objectives.

The principal sources of funds will include: donations and subscriptions from African governments; donations from the private sector; and donations from foreign donors which will include bi-lateral and international aid agencies, foundations, and private sector contributions.

The preference of the ASIF project team is that once ASIF is established, a simple formula based on GNP with perhaps three categories of low, medium and high should be adopted. An annual subscription for each of these categories might then be set by the Governing Council. Only those countries that paid their subscription would be eligible to participate in the ASIF programmes. For the smaller and poorer countries their annual fees might be met in part by international donors. It is further anticipated that in the first instance the annual subscriptions would be used to meet the costs of the ASIF secretariat.

Since one of the principal objectives of ASIF is to support activities which will lead to the development of technological innovations, the involvement of the private sector will be essential. This will require the negotiation of satisfactory intellectual property agreements. It is therefore likely that although business enterprises may not contribute a great deal in the early stages of many of the Flagship Programmes it will be necessary that they become more heavily involved in the later stages.

The ASIF project team thinks that there is a window of opportunity for establishing ASIF which should be seized. This will require a simple approach for its creation, with more sophisticated approaches for funding being developed and negotiated at a later stage. We therefore recommend the following steps:

- The initial funding of ASIF should be obtained by pledges from African governments. Ideally this should occur at the African Heads of State Meeting in January 2007.

- If these pledges cover the estimated costs of the initial two to three years' operations of the ASIF secretariat, then other donors should be invited to join.

- Those donors who are prepared to contribute to the full CPA package should then make their initial pledge of funds. Other international donors that are willing to support specific Flagship Programmes would be invited to contribute to these programmes once they had been fully designed.

Our suggestion regarding fund management is that this be contracted a development bank such as the African Development Bank.

The ASIF secretariat should monitor its own activities as part of its management plan. Similarly each of the Boards for the Flagship Programmes should set up its own

monitoring process so that it can learn the lessons from its successes and failures. In addition both the Secretariat and the Flagship Programmes should be subject to external reviews by international review panels at three to five year intervals

We found a great deal of interest in making use of African Centres of Excellence. We have therefore suggested ways in which ASIF might interact and strengthen these organizations. The criteria and guidelines for selecting which centres qualify should be priority issues to be addressed by the management of ASIF and its Governing Council at the outset.

Chapter One. Introduction

1. Background

The gaps in knowledge and learning between developed and developing countries are manifest in terms of level and scope of technological capabilities; varying opportunities for learning at various levels and across disciplines; and differences in innovative approaches to knowledge generation and application. While there is ample evidence of catching up based on development of science and technology (S&T) in Asia and Latin America, most of Africa remains unable to harness the resources of S&T to tackle the endemic problem of poverty, disease, inequity, and environmental degradation. S&T institutions in Africa have been limited in their capacity to generate products that are relevant to the society they are meant to serve, largely due to inadequate technical and financial resources to fulfill their mandates. Though many of these institutions were established in the post-independence decades, political support for them has been poor, and consequently they have not been given priority in development plans and strategies.

However, recent developments both at local, regional and international levels have emphasized the role of science, technology and innovation (STI) in addressing Africa's development challenges. For example, the Millennium project task force on STI stressed that meeting the Millennium Development Goals will require three important elements: a substantial re-orientation toward development policies that focus on key sources of economic growth, including those associated with new and established scientific and technological knowledge and related institutional adjustments; promotion of the use of STI for development with countries needing to adopt strategies for technological learning at the local, national, regional, and international levels; and strategies for developing STI which should involve continuous interactions between government, industry, academia, and civil society.[1] The Africa Commission Report (Our Common Interest) also shares these notions in its concern on the role of STI in Africa's development.

This new awareness on the potential of STI for poverty reduction and fostering economic growth and development has resulted in significantly improved political support for the encouragement of creative individuals and institutions devoted to the development of S&T on the African continent. At its first meeting in November 2003, the African Ministerial Council on Science and Technology (AMCOST) resolved to find ways and means of strengthening, individually and collectively, STI systems in Africa and to use innovation as means of attaining sustainable development and integration into the global economy. Subsequently, at its second meeting in 2005, AMCOST adopted the Africa's Consolidated Plan of Action on Science and Technology (the CPA) which articulates Africa's common objectives and commitment to harness and apply S&T for sustainable development. The CPA has clusters of programmes for research and development (R&D) and for improving science and innovation policies in Africa. It proposes the establishment of an African Science and Innovation Facility (ASIF) as a pan-African

[1] Juma, Calestous and . L. Yee-Cheong (2005). *Innovation: Applying Knowledge for Development, UN Millennium Project, Task Force on Science, Technology and Innovation*, Earthscan, London.

mechanism for mobilizing and directing Africa's and international resources to the implementation of the CPA.

2. ASIF as a regional public good in Africa

In effect, ASIF would be a means of generating regional public goods[2] which would have been otherwise impossible because of poor capacity at the local or national levels. The transition from acknowledging that knowledge is a key factor in African development considering that it is a 'regional public good' is not straightforward or automatic. It is heavily influenced by public awareness and political decisions, and requires collective action at the level of the African community (which includes not only national governments, but also private corporations and civil society organizations). The CPA, together with the interest shown by political leaders for the creation of ASIF, thus constitute the initial platform from which to build practical initiatives on research capacity building and knowledge generation as regional public goods in Africa.

Moreover, given that regional public goods have to be ultimately produced, utilised or provided by some individual or agent in a specific location, it is necessary to specify how far down the continuum from regional to local to draw the line between what is a 'core component' of the regional public good and the host of national and local activities and policies that are necessary for it to be not only produced but also utilised. From this perspective, the creation of the ASIF, the regional programs it will support, the institutional arrangements, and the financial and operational mechanisms it will employ to materialise its support for research capacity building and knowledge generation can be considered as the core component of the regional public good.

3. Objectives of the report

The NEPAD Office of Science and Technology (NEPAD OST), which is the technical and administrative secretariat of AMCOST, commissioned a team of international experts to provide technical advice on the design of the proposed ASIF. Specifically, the team was requested to:

- review other regions' experiences;
- consult widely with stakeholders; and
- develop and propose specific options for the mission, objectives, organizational configuration and governance of the proposed ASIF.

[2] Social returns to research investment normally exceed the private returns realized by the individual firm and hence scientific and technical knowledge possesses a public goods dimension. Thus research programs in both public and private sectors may produce public goods that have social benefits. [Dalrymple, Dana G., "International Agricultural Research as a Global Public Good:A Review of Concepts, Issues, and the CGIAR Experience", *Research Policy*, revision of draft submitted February 18, 2002]

Accordingly, the main objective of this report is to present the outcome of the review of experiences of the nature and establishment of similar facilities in other regions, propose options for an ASIF that would effectively deliver the programmes of the CPA while keeping pace with the anticipated evolution of the programmes of the CPA. Specifically, the report presents a descriptive analysis of the stakeholders' consultations; sets out models for the governance and organizational structure of ASIF and suggests most viable options based on the analyses of the strengths and weaknesses of the models; discusses the financial organization and spells out the roles for African governments, private sector, and development partners; and makes proposals for the operational procedures of ASIF.

Chapter Two. Methodology

1. Introduction

The methodology for the ASIF design project had three key elements. The Project Team began by reviewing relevant documents relating to the state and role of STI in Africa's development. Consultations with stakeholders were also held. The Project Team then examined the design of similar facilities around the world, several of which had been suggested by respondents to the consultation. These models were then compared in terms of their relative suitability for the mission of ASIF. A summary of these findings was presented to stakeholders in Pretoria in September 2006. Details of these processes are described below.

2. The consultation process

As part of the ASIF design process, consultations of the relevant stakeholders were carried out beginning from the first week in August 2006 and up mid September 2006. The consultation process was concluded with a High Level Stakeholders Workshop hosted by NEPAD OST and the African Union[3] in Pretoria, 20-22 September 2006. A questionnaire was designed to serve as the main instrument to guide the consultation process (Appendix C). In order to make the consultation as widespread as possible within the time frame of the project, two approaches were adopted for the consultation. Interviews conducted either in person or by telephone, and electronic solicitation for responses to the ASIF questionnaire.

The consultants carried out the consultations in Africa, Europe, and North America. While the African consultation focussed mainly on the African stakeholders who had participated in the processes leading to the adoption of the CPA by AMCOST, the consultations in Europe and North America were essentially aimed at the donor community and Africans residing abroad but well acquainted with the CPA. A written report for each of the stakeholder interviews was produced, and a synthesis report on the responses to the ASIF questionnaire received from web posting and direct emailing of stakeholders was also compiled.

3. Designing the questionnaire

The main instrument used for the consultation was the ASIF questionnaire designed by the team of consultants. Prior to the drafting of the questionnaire, the team embarked on review of relevant documents and international experiences to inform the design of the questionnaire. The design process involved extensive review of the background to ASIF design; a two day meeting in London to carry out the final questionnaire design; a teleconference to receive inputs from team members; and review of the draft

[3] This workshop was held in Pretoria, 20-22 September 2006 and had 26 participants made up of highly skilled and experienced scientists and policy makers. The private sector was not represented at the workshop. However, NEPAD OST is planning a forum for stakeholders from industry to examine the outcomes of the consultation and options proposed for ASIF.

questionnaire by the NEPAD OST. The final draft of the questionnaire addressed eight important issues that are critical to the design of ASIF. These were: the case for establishing ASIF; the nature of ASIF's technical activities; the relationship between the African Union, NEPAD and ASIF; the relationship between ASIF and other African regional scientific and innovation-related organizations; the governance issues; the funding strategies; organizational issues; and monitoring and evaluation of ASIF.

The ASIF questionnaire was translated into French to enable responses from the French-speaking stakeholders.

4. Scope of the consultations

The electronic consultation was carried out through web posting of the ASIF questionnaire on the NEPAD OST/AMCOST website, the SciDev website, the TWAS website, and direct emailing of individuals who were not available for interview. The electronic platform provided widespread distribution of the questionnaire. The responses accordingly came from various regions in Africa and beyond. Twenty nine usable responses were submitted, and these were used for the analysis.

The High Level Stakeholders Workshop that concluded the consultation process served as a forum to present the preliminary findings and the design options for ASIF that were beginning to emerge from the interviews and questionnaire responses. The workshop was divided into two working groups: one examined the preliminary results of the consultation and suggested models for ASIF, while the other studied the management and role for networks of centres of excellence in the implementation of the CPA. The outcomes of these working group exercises were collated as inputs into the ASIF design process.

At least 70% of the electronic responses received came from within the African continent. This might be a demonstration of the reality that Africans are genuinely enthusiastic about the role of S&T in Africa's development. It is however difficult to draw any conclusive inference from this because the brief time allotted for the consultation may also have limited the numbers of responses from non-African respondents. A total of 43 people were interviewed comprising 19 in Africa and 24 in the EU and North America.

The range of stakeholders that participated in the interviews included:

- Government: CSIR, AMCOST delegation, Ministries of S&T
- NGOs: ACTS, ATPS, SciDev
- Donors: World Bank, IDRC, CIDA,SIDA, DFID
- International organizations: UNESCO, UNCTAD
- National Academies
- Research Scientists

It was extremely difficult securing the participation of industry in the interviews, largely because of the limited time available for the consultation. It is however expected that NEPAD OST will provide a forum for industry to examine the outcomes of this project and make relevant inputs where necessary. This notwithstanding, review of experiences in other regions provided significant insights into the likely views of industry and the role it might play in working with ASIF.

Chapter Three. Summary of the consultation and interviews

1. Introduction

Eight important issues that are critical to the design of ASIF were addressed in the questionnaire which was designed to serve as the main instrument to guide the consultation process. These were: the case for establishing ASIF; the nature of ASIF's technical activities; the relationship between the African Union, NEPAD and ASIF; the relationship between ASIF and other African regional scientific and innovation-related organizations; governance issues; funding strategies; organizational issues; and monitoring and evaluation of ASIF. A French translation of the questionnaire was available for French-speaking stakeholders.

Approximately 61 responses[4] were received from Africa, Europe and North America, including the interviews. A wide range of views was expressed, as discussed below. The selection of African Interviewees focussed mainly on African stakeholders who have participated in the processes leading to the adoption of the CPA by AMCOST. In Europe and North America, the consultation was principally aimed at the donor community and Africans residing abroad who were familiar with the CPA.

Summary of views

There follows a synthesis of the responses to the consultation and the interviews that were conducted, presented with the questions that were asked of respondents. It does not aim to give quantitative results, rather, the range of views on each question are summarised with an indication of any common positions that were expressed.

1. **The case for establishing ASIF:**

(a) In your opinion, is the idea of establishing a new institutional arrangement (ASIF) the best way to mobilize technical and financial resources needed to implement regional and continental science, technology and innovation programmes of the CPA?
(b) There may be existing organizations that could also fulfil this role. If you think this is the case, which organizations do you think they are and why would they be a better option than establishing ASIF?

The majority of respondents expressed their support for the creation of ASIF, believing that there were no existing organizations that could fulfil its proposed role. There was some questioning about whether ASIF would be an implementing agency or an advisory consortium. Several respondents cautioned that ASIF should have clear targets and objectives so that the implementation of the CPA would be effective. It was suggested

[4] 32 interviews were conducted (14 in Africa involving 19 interviewees + 18 in UK, North America). XX responses were received from the electronic consultation.

that, in setting up ASIF, the experience of other organizations such as those that administer Europe-wide funding for research, should be considered. Some of those who supported the creation of ASIF, saw a role for existing organizations, particularly the African Development Bank (AfDB), the African Academy of Science and National Academies of Science. Potential advantages of creating ASIF which were cited included: the leverage of much-needed change in other institutions; increasing the funds that African countries contribute to S&T development; the potential for it to mobilise funds from both within and outside Africa; reducing 'brain-drain'; its focus on meeting current S&T challenges; and facilitating networking within the African continent (it was suggested that currently African scientific institutions principally network with non-African institutions).

A comparison was made by one respondent between S&T and approaches for dealing with HIV/AIDS. It was in fact a health problem but was of such magnitude that it seemed best to manage the issue separately at the outset. Now perhaps, in this respondent's opinion, the problem with HIV/AIDS could be reintegrated with other health issues. It was suggested a similar approach could be taken for S&T development in Africa; first establish a new body, and then integrate S&T funding provision with other established organizations.

One enthusiastic respondent captures the trend of positive responses:

> "We are putting in place a new mechanism that will boost S&T. This is new in Africa! It is true that there are various organizations for research, development and innovation policies but ASIF is a far-reaching project. The initiative i.e., the creation of ASIF will enable us to implement the programmes of the CPA…"

Other respondents were unconvinced that there was a need for a new body. They welcomed ASIF's proposed roles but believed that they (or at least some of them) could be performed by an existing organization or organizations, such as the AfDB, the AU, NEPAD OST, the African Academy of Sciences, National Science Academies, National Councils of S&T, or the Association of African Universities, although a lack of technical expertise or insufficient capacity were cited as potential problems. One proposed model was that the AFDB administer a trust fund to finance programmes determined by ASIF.

A related suggestion was that ASIF should be created as a facility within an existing organization, for example the African Development Bank. Some of the resistance to the creation of ASIF as a new and separate institution was caused by reflection that some other new African organizations had failed. One commentator described a 'sense of fatigue' in Africa about creating new institutions. Another perceived problem was that new institutions absorbed funds in administration costs.

2. What do you think are the most important technical activities that ASIF would undertake?

Many respondents thought the main role of ASIF should be a financing organization and therefore would it not need many technical staff. Representatives from one organization thought that it was important to recognise that ASIF would not only be a funding agency, but also a facility. It would therefore need technical expertise as well as funding capability. This was important to ensure that the CPA would be successfully delivered.

Many also noted that technical capabilities would be required for the competent review of project proposals and for setting priorities for research. One correspondent suggested an organization similar to the National Science Foundation in the US would be most appropriate. It was suggested that mobilizing donor support; setting standards; monitoring and evaluating funded programmes; sharing data and information and foresight projects would be important activities. Policy research activities might also be undertaken, although other organizations already had a role here. The general trend was that policy should not be a significant priority.

Several respondents thought that ASIF should not employ its own staff to carry out S&T programmes and that it should not build laboratories nor offer higher education. Rather, it should focus on oversight. It was also proposed that ASIF should outsource technical activities. Others suggested that ASIF should facilitate capacity building in S&T and upgrading of infrastructure in universities and research institutes. People could then be trained in Africa and those trained abroad could return to contribute to strategic research and development activities.

A number of respondents raised development issues alongside S&T capabilities. It was suggested that, in addition to establishing a S&T base in African countries, the CPA strengthen contributions to attaining the Millennium Development Goals and help achieve economic growth. It was also proposed that development partners could be encouraged to contribute to S&T development. There was concern that ASIF 'should not re-invent the wheel' and that African countries needed to be able to take advantage of sciences and technologies developed elsewhere through adaptation, adoption, and modification.

Others proposed that that the technical functions of ASIF should include the means to develop knowledge about the obstacles to innovation in Africa. It would therefore need innovation policy expertise, in addition to S&T expertise. One respondent went further, stating that the main focus of ASIF should be on innovation, particularly taking results from research to the market. Another described various skills, knowledge and financial gaps in S&T in Africa and recommended that ASIF acquire the technical capabilities to bridge these various gaps.

One individual felt that 'the commercial side of ASIF should be designed into it right from the starting point'.

One respondent captured the general theme of several responses by suggesting that ASIF's activities should be to:

- encourage networking, coordination and communication between stakeholders;

- provide technical oversight of the implementation of the CPA;
- provide limited policy advice to NEPAD, AU and member states;
- coordinate donor support (including member states and the private sector);
- monitor and evaluate the *impact* of the CPA (or ASIF's activities) at programme and project level;
- disseminate and communicate information (programme and sub-programme level); and
- manage funds and projects,

Another respondent specifically suggested a model that could be adapted for ASIF:
"I think we must go the US National Science Foundation way, adapted appropriately to Africa, funding R&D as well as commercialization of scientific results with economic and social significance (innovation). Brazil and China are the best examples of copying this successful model. South Africa seems well on its way. Nigeria is starting. For example ASIF must take an interest in a project building commercial tissue culture labs in Ghana…"

2. Relations between the AU, NEPAD and ASIF

The creation of ASIF will mean that the functions and responsibilities of those three bodies will have to be carefully designed. What do you consider to be the key issues in this relationship, and what are their implications for the design of ASIF?

While respondents cautioned on the need for independence of ASIF, there was a general view that the AU, NEPAD and ASIF should have a mutually beneficial relationship that would advance the cause of science, technology and innovation in Africa's development. There was agreement that relationships between the bodies should be carefully explored as some respondents felt that there was currently confusion. Clear and modest objectives would be important to avoid 'mission drift'. A number of respondents proposed that ASIF should be related in some way to NEPAD and NEPAD should report to the AU. ASIF would therefore be the tool for NEPAD to implement the CPA. ASIF would depend on the AU and NEPAD for support, direction and policy. The European Union Framework Programme was proposed as an example that could provide a model; the AU could have the role of the EU and ASIF would report to NEPAD, which would have the role of the EU Commission (to which the Framework programmes report). The reason stated for why ASIF should not report directly to the AU was that the AU was primarily a political organization and did not have a scientific arm.

It was felt that clarification would be useful on how the Office of S&T (OST) of NEPAD related to the other NEPAD activities that had science, technology and innovation inputs (e.g. environment, agricultural and business programmes). The respondent felt that, if ASIF were also created as part of NEPAD, clarification on this matter would be especially important. Two respondents questioned the need for both ASIF and the NEPAD OST and suggested that the latter's activities should be absorbed by ASIF. However, it was proposed by others that OST should be responsible for oversight of

ASIF to hold the latter accountable for delivery of an agreed programme of work and measures of success.

It was also proposed by one respondent that ASIF should not be linked to the other two organizations due to his view that both the AU and NEPAD had many deficiencies. He suggested that NEPAD could usefully generate the political support that ASIF will need. Another thought that ASIF should have its own legal backing and should operate independently of the AU, NEPAD and governments. It was felt that this would ensure that it was run in efficient manner and that political problems would be avoided. The link with the AU and NEPAD could be retained, perhaps at the board level.

4. Relations between ASIF and other African regional scientific and innovation related organizations: The purpose of ASIF is to implement the CPA by mobilizing the technical and financial resources. In doing this it will need to work closely with the African scientific community and a range of other groups to ensure that technological innovation occurs. What do you think are the types of organizations that should be considered as partners for ASIF? Can you give specific examples for each of the groups you identify?

Several respondents cautioned that ASIF should not be a competitor to other African regional S&T organizations nor marginalize existing bodies. It must therefore be clear about how it intends to collaborate. Respondents were unanimous in suggesting that ASIF should closely relate with existing African regional scientific and innovation-related organizations, and should be 'an enabler rather than competitor'. ASIF should make particular effort to use existing regional bodies when they exist to achieve its goals; it was thought that the scope for this was broad. Existing agencies should be ASIF's 'implementing arms' to achieve the objectives of the programmes and projects of the CPA. Examples suggested were ACTS (supported by five African governments mostly in East Africa) and ATPS (which had focal points in many countries but apparently operating with little funding). It was suggested that FARA was an example of a highly professional regional organization that could be usefully involved in the biotechnology aspect of the CPA and linked with ASIF.

Examples of international bodies with an interest in science in Africa and the NEPAD agendas included ILRI, UNESCO and WHO. It was also suggested that ASIF could develop links with important players in S&T in developed countries, such as the National Science Foundation (USA), the Royal Society (UK) and major donors or facilitators (e.g. Association of Commonwealth Universities) that wished to strengthen ties with Africa. It was also suggested that the AU Regional Economic Committees would need to be consulted in establishing the operation of ASIF. It was recommended that the funding pattern of ASIF should encourage cooperation among S&T institutions and among countries.

Many respondents wanted to see collaborations between ASIF and existing regional S&T organizations. One respondent suggested that ASIF should therefore be a 'first among equals'. It was proposed that ASIF could play a significant role in strengthening existing

regional scientific organizations through 'information flows and consultation'. Existing agencies might submit proposals for funding to ASIF.

One respondent, however, thought collaboration with other institutes was needed but the focus should be on innovation – "Africa has spent too much effort on building science capability and not enough on linking knowledge to product improvement"

There was general support for collaboration and cooperation although variations on the exact mechanisms that should be established were suggested as described above. The proposals of one respondent on regional bodies seem to be representative of a majority of the others:

> "These institutions should be the actual executing agencies of the CPA. They should cooperate and serve as nodes for implementing the CPA. The national and regional STI institutions know the S&T needs of their environment and are better placed to execute the programmes that directly affect the local environment. They should go to ASIF for support."

Respondents suggested the following types of organizations with which ASIF could collaborate:

- regional education-training and research institutions such as the Group EIER-ETSHER now 2iE (International Institute of Water and Environmental Engineering), a specialized sub regional institution based in Ouagadougou, Burkina Faso;
- the African Institute of Sciences and Technology (AIST), Abuja Campus (currently under development) and its network of specialized centres;
- research and development institutes at national and regional levels;
- the African Organization of Intellectual Property;
- African Regional Centre for Technology (ARCT) Dakar, Senegal;
- African development finance institutions such as the AfDB and the Arab Funds;
- African Academy of Sciences and National Academies of Sciences;
- NGOs and private sector companies;
- international research organizations such as the resident CGIAR centres on the continent (ILRI, ICRISAT, IITA, ICRAF, etc);
- commercial and merchant Banks with regional or continental coverage;
- educational institutions including universities and colleges;
- the African Capacity Building Foundation, Harare, Zimbabwe;
- development commissions and programmes such as the Economic Commission for Africa of the United Nations (UN-ECA), United Nations Environment Programme (UNEP), World Food Programme (WFP), etc.;
- Civil society groups
- Regional S&T organizations like CORAF; ASARECA; FARA; AAB; AATF; and
- regional networks such as WABNET; ABNET; ATPS; ACTS; NAROs (agriculture), NIRIs (industry) and investment agencies,

5. Governance issues

Governance structure and instruments will depend on the type of institutional arrangement that ASIF becomes.

(a) What type of institution do you think is the most appropriate? Possible options might be an intergovernmental organization; an international non-governmental organization such as a foundation. We would like to solicit your views on these and other organizational frameworks.

There was no clear agreement on the type of institution that would be most appropriate for ASIF. The suggestions were as follows: an intergovernmental institution, a foundation; an international NGO and a limited company.

The reasons mentioned by those who suggested an intergovernmental organization included:

The need to ensure ownership by African governments: if ASIF was not owned by the governments, little support and commitment could be expected from them. However, it was also thought that if ASIF was set up as an intergovernmental body, recruitment would almost certainly be political and the key decisions would not rest with scientists. Another felt that intergovernmental organizations took too long to make decisions, citing the CGIAR as an example. Several respondents believed, therefore, that it would probably be preferable to set up ASIF at arms length from government. Nevertheless, it was observed that to obtain funding from African governments there might have to be some mechanism for ensuring that they are involved in the governance. It was generally agreed, that whatever the final shape of the governing structure, African governments and donors would need to be represented. One suggestion was that there should be a minimum financial contribution to allow participation in the governing board.

The reasons provided by those who suggested a foundation included:

- the need for ASIF to have substantial independence of government interference; and
- the need to minimize bureaucracy and avoid governance structures that would require large overhead costs.

The reasons given in support of an international NGO were:

- the need to deliver results and efficiency; and
- the need to be independent of political pressures.

It was apparent that respondents were strongly in favour of a governance structure that though owned by African governments, but at the same time relatively independent of governments in its operations. One respondent thought that the AFDB may have difficulties in dealing with a non-governmental body. Respondents advised considering the experience of other bodies as part of the process of designing the structure of ASIF. They could possibly serve as models. Suggestions included IETA (an intergovernmental

organization based in San Jose in Costa Rica concerned with agricultural innovation in Latin America), the Asian Institute of Technology in Bangkok; the National Science Foundation in the US; DARPA in the US (a defence-related agency); the Canadian Foundation for Innovation; and the GEF (See Appendix A).

(b) What criteria should be taken into account in designing the governance structure? For example, what balance should there be between government and non-government representatives? Should an effort be made to have gender and geographic balance? How can the voice of the users be heard?

The following points were mentioned by respondents as important for the design of the governance structure of ASIF:

- representatives from the major geographical regions of Africa should participate in the governing council;
- ASIF functions should be guided by a broad-based Board with due consideration to disciplinary and geographic coverage;
- it should have a lean and efficient Secretariat;
- gender balance should be sought and should not compromise on technical and managerial competence;
- user feedback should be solicited annually;
- linguistic balance;
- balance between policy expertise and technical competence;
- scientific and business expertise should be included in the governing body (reflecting the areas in the CPA); and
- transparency and accountability need to be fundamental principles.

Some important suggestions made by respondents were as follows:

> "… (ASIF should be) managed by an international board of governors, the majority of which should be from Africa. However, wider representation will build confidence external to the continent and likely facilitate an inflow of resources to boost the $157 million (indicative budget). The Board should have no more than 12 members plus a chairperson and should aim to have a strong female representation."

> "Approximately 25 % governmental representatives drawn from national academies (i.e. not representing their institutes, but aware of developments in educational practice at university level), 25% NGO, 50% international science and innovation experts (from Africa and elsewhere), including from Foundations, with experience of fundraising and governance, and from business."

Various suggestions were submitted on the most appropriate structure for a governing body and sub-committees. For example, ASIF could have three divisions: administration to manage finance and personnel issues; international cooperation to handle relations with countries on technical programmes; and a technical department to assess grants on competitive basis and other funding modes. The Director General would be advised by the technical committee, and he/she should report to the board.

(c) How can ASIF be designed to be innovative, flexible, non-bureaucratic, and transparent?

The following were suggestions made aimed at ensuring that ASIF becomes an innovative, flexible, non-bureaucratic and transparent organization:

- recruit visionary leaders and managers who share quality attributes;
- as far as possible ASIF should work through relevant existing institutions and should add value through networking and through promotion and recognition of achievements;
- most technical assignments should be contracted out through competitive bidding;
- ASIF should be a secretariat with good fundraising capabilities;
- ASIF can be made flexible by regular revision of the representatives of the various structures and bodies;
- the Board including the Chief Executive must be selected and designed to be semi-independent and hence can be innovative and flexible.
- the Board should be required to report half-yearly to the AU through NEPAD and a performance review/audit conducted annually;
- transparency could be achieved by periodic audits commanded by the steering committee or board of ASIF;
- set the agenda of ASIF every three years, with the involvement of scientists, policy makers, NGOs and donors;
- ASIF should not be a huge organ, but a lean technical organization covering the most needed functional expertise;
- avoid a top-heavy management structure: chief executive should be on a rotational basis with a fixed term, renewable once, establish ASIF to be free of political interference and influences, allow freedom of operation at technical level, adopt good and modern management systems, recruitment of the chief executive to be done by an independent and professional body/committee, adopt management practices that are effective, efficient and transparent; and
- staff should be independent of government.

6. Funding

The CPA proposes that ASIF will explore various options for developing funding mechanisms and policies to secure African and external sources of finance.

(a) How can African countries be encouraged to develop national instruments to ensure financial contributions to regional programmes? Are there innovative ways of achieving this?

One respondent described ‘co-funding’, a mechanism which had been introduced in South Africa, as possibly useful to mobilize African funds for ASIF. Co-funding involved the bringing together of national funds and private sector funds to execute scientific projects that provided public good and some benefits to the private sector. There could

also be contributions in kind such as skills, facilities and equipment. These in-kind contributions could be valued in monetary terms and serve as matching grants to donor funds.

One respondent recommended a package of measures aimed at mobilising funds:

> The funds should therefore be targeted at projects that have immediate impacts on people's lives. An award and recognition ceremony for companies and individuals that contribute into ASIF can also help stimulate others to contribute. A marketing organization can help lobby African governments and the private sector to contribute into ASIF. A proper packaging of ASIF can be very helpful in mobilizing funds.

One respondent thought that it would be difficult to find a formula for funding regional organizations. It was suggested that it should be reasonable for African countries to contribute between 10 and 20% of the total ASIF budget. One respondent asked, if particular African countries did not contribute financially to ASIF, would scientists from that country be eligible to receive funding?

(b) Is there a place for non-voluntary contributions to regional programmes from African countries? If so, how should they be assessed?

The majority of correspondents believed that funding must be voluntary, as non-voluntary contributions would not be agreed to. One suggestion was a voluntary subscription that functioned as a membership fee whereby ASIF would only invest in countries that invest in it. It was proposed that unless African countries contribute, foreign donors should not be approached. However, another noted that most of the funds for science in Africa have come from external donors and that it would be very difficult to persuade African governments to commit to funding ASIF. Many were already behind in their payments to the AU, NEPAD, and even the UN. However, it was thought that ASIF could encourage African governments to provide a percentage of their S&T budgets for the regional programmes that would be implemented by ASIF.

However, others thought that non-voluntary contributions could be beneficial, or indeed necessary. It was suggested by one respondent that, if a certain amount of funding was required from each country, then those countries which could least afford it would take the greatest interest in gaining national benefits from it, which might have a positive effect. It was suggested that it might be worth exploring a mechanism whereby African countries donated a certain percentage of their money from the World Bank to ASIF. Another proposed that, if ASIF derived its budget from the AU it would be simpler to obtain funds from governments since funds would be appropriated for it like any other arm of the AU.

(c) What kind of common policies can be put in place to encourage the private sector to contribute to the development of regional public S&T-related goods?

There was broad agreement that involvement of the private sector would be beneficial, although a challenge. One suggestion was that national governments could give tax incentives for companies to participate in regional programmes. Another cautioned that, in a country such as Tanzania most industry was in the public sector, and therefore it would take time to get the private sector involved in supporting the production of regional public goods.

The challenge was voiced in the following way by one respondent:

> "We don't have thriving private sector in most of Africa. So it would be difficult to have significant contribution from the existing private sector. The challenge now should be to empower the private sector so that they can become agents that can contribute to ASIF."

ASIF should encourage the private sector to disclose its needs to ASIF and ASIF should embark on programmes that address these problems. It would be easier to then ask the private sector to contribute. Powerful companies could also be encouraged to endow programmes or projects.

Other incentives that were suggested included:

- policies that would encourage the private sector to invest in contracted research, which will give such investors first priority to access any information that would lead to new technologies;
- putting into place of clear intellectual property guidelines;
- a S&T levy (say 0.5%) of every company's net profits;
- waivers on imports of S&T materials; and
- matched funding.

(d) What measures and actions are required to encourage donors to contribute to ASIF according to the principles set out in the Paris Declaration and the Monterey Consensus to provide unified programmes, with common monitoring and evaluation procedures?

There was some scepticism that the Paris Declaration would be honoured. It was thought that donor harmonization would be impossible in the short term at least until ASIF had become established. Donor organizations had their own priorities and therefore were likely to want to 'cherry pick' for the foreseeable future. However, it was seen as important that ASIF was designed in such a way as to encourage donors to endorse the 'full package', i.e. funds from donors would be put into a common basket.

(e) The effective implementation of the CPA programmes requires diverse approaches to funding. What criteria should be developed and applied by ASIF to select institutions and individuals to be funded to implement regional programmes?

The general view was that ASIF should operate a competitive system to award funding for its programmes. It was suggested that the GEF model of calling for proposals was followed. One respondent warned that, in their opinion, politicians wanted to see immediate returns from their investments in S&T and were therefore reluctant to support work that only produced results in the long term.

One correspondent made the following suggestion:

> "ASIF should set priority areas especially in consonant with the CPA. ASIF should start with projects in three or four areas of the CPA and ask organizations in these areas to bring proposals. Softer calls that allow for wider participation can also be considered especially at a later stage after ASIF is well established. Transparency should be a key principle that should guide ASIF funding. It is important to avoid being accused of bias. ASIF should not have several templates for assessing tenders for projects. ASIF should develop a template that clearly shows the criteria for project selection and that can be applied across the CPA programmes/projects. Excellence should be a major selection criterion. "

Suggestions for criteria included:

- multi-disciplinary nature of the project and group participation;
- innovativeness of projects as determinant of the level of funding;
- potential for visible and sustainable impacts of projects;
- prospects for commercialisable result;
- likelihood of an institution to develop into a centre of excellence;
- geographic coverage of proposed projects;
- location of the participating institutions in a socio-politically stable region;
- accountability and transparency in project management;
- efficiency, cost effectiveness and ability to deliver the CPA; and
- evidence of a strong research background / experience for individuals and progressive and supportive research environment for institutes.

(f) How should research programmes be balanced between responsive [5] and directive modes of funding? Are there other approaches?

Where opinion was expressed, it was most often in favour of a directive mode. One suggestion was that most of the work should be directive but 10% could be in responsive mode. Another was that a directive mode of project finance should dominate in the first five years, followed by a responsive mode after this time.

The main reasons presented for a preference towards directive mode were the requirement for ASIF activities to deliver against the CPA targets; and the need to ensure that the most crucial S&T issues in Africa's development would be addressed. One

[5] The responsive mode of funding is where no constraints are placed on the field of research. It seeks to encourage the best researchers and the highest quality research. By contrast, the directive mode of funding is where the funding organization seeks to set the research agenda in some way, by prior specification of topic, method or outcome.

respondent also suggested that it might be appropriate to have a small fund for 'blue sky' research, perhaps no more than 10% of overall funding.

(g) Would ASIF commission research projects? If yes, what criteria would it apply to determine the kinds of research areas/issues and projects?

The respondents were unanimous in affirming that ASIF should commission research projects, emphasising the need for projects that address relevant local S&T problems identified by stakeholders.

Suggestions on how ASIF can mobilise resources from African governments included:

- African countries must first and foremost have confidence and accept the fact that ASIF is their own organization and not foreign-imposed, and that for it to contribute meaningfully to development of the continent it has to be supported financially, materially and morally.
- For funds to be committed to ASIF by African governments, policy makers and stakeholders in ASIF must be aware of the reasons for ASIF and the impact that ASIF could have on their local environments.
- An innovative approach which has been tried in Southeast Asia has been the requirement to link new externally funded development infrastructure projects with country-level capacity building. In practice this has meant a requirement for more local staff to be employed on technology-focused development projects.
- It was recommended that ASIF could learn from the successful E-commission for Africa.

On funding, it was cautioned that participation and decision making in the affairs of ASIF should not be dominated by the relatively rich and powerful African countries as this will make smaller and poor countries loose their sense of ownership.

7. Organizational issues

The internal organization of ASIF will depend on the decisions taken about its legal status, missions and functions. At this stage in the exploratory process on the development of the proposed institutional arrangement it is only possible to consider the general principles which will guide the shaping of the organizational structure.

(a) What principles or criteria should guide the organizational structure of ASIF?

It was proposed that the principles should include an interest in Africans, autonomy from politicians, international peer review, monitoring, competition and a non-bureaucratic focus. There were varying views of how ASIF should be organized depending on the respondents' views of the most appropriate function for the organization. Some suggested that managers with technical knowledge should lead ASIF, while others said that experts in funding should head the organization, with technical functions outsourced.

Further principles and criteria suggested for the organizational structure of ASIF were:

- transparency and accountability;
- cost effectiveness;
- division of responsibilities;
- professionalism;
- quality management practices; and
- regional balance in order to meet the desires of the stakeholders across the continent.

(b) In your view, what should be the balance within ASIF between the technical staff and the fund management staff? Why do you suggest this balance?

The most common view was an emphasis on a 'lean' administration. There was a diversity of views on the balance of technical and fund management staff, ranging from 80%:20% technical: fund management to a tilt in favour of up to 70% funding staff. Most commonly, there was a preference for more technical staff. The need for efficiency was stressed.

General points

It was recommended that ASIF should keep its administrative costs in line with international best practice, for example less than 3-5% of total costs. The following insights were provided by commentators:

> "Beware of bureaucracy. It needs to be a body that can take the lead in research on the continent – not at all by trying to do the research but by involving the necessary expertise and wisdom as discussed above. This cannot be done by 'clerks'; the staff should have sufficient technical insight and credibility to be able to talk to scientists – and politicians and donors. But behind them they need a lean administrative system to dispense funds and keep the books clean."

A commonly expressed view is summarised by the following quote:

> "The staff of the Fund could be mostly administrative while the bulk of technical experts required for proposals reviews and advice could be sourced 'on need basis' externally from a pool across Africa and elsewhere. A few thematic technical experts must be hired permanently by the Fund."

8. Monitoring and evaluation

The CPA envisages that ASIF will monitor and evaluate the implementation of CPA programmes and projects. How should ASIF itself be evaluated? What should be the criteria for measuring its success?

It was widely agreed that monitoring and evaluation would be essential. It was recommended that evaluation should be carried out by an independent international panel consisting of people who have had successfully funded science and innovation projects. The AU could possibly appoint independent consultants. Science administrators should also be involved. It would be important to decide on indicators for success, although innovation was difficult to measure. African stakeholders should suggest indicators that are relevant to African situation for assessing the success of ASIF. Measures of success suggested included: level of funds mobilized, level of funds disbursed, impacts made on S&T development, research and development products released, awareness creation for S&T on the continent, number of projects and countries supported and level of CPA programme implementation achieved.

With regard to timing, it was agreed that there should be ongoing monitoring by ASIF itself. Progress reports should be published. This should be followed by an external evaluation. The interval recommended between evaluations differed from a year to every five years. If it was assessed that ASIF was not achieving its goals, it was recommended that review panels were asked to ascertain why, and not simply be punitive. It was observed that effective monitoring and evaluation to ensure that funds are achieving the stated objectives encourages donors.

Further points for consideration

The need to provide wide publicity for CPA and ASIF was emphasised by respondents to enable important stakeholders make their contribution and views known. Common themes were the recommendation that political interference should be avoided and that ASIF should be ‘managed by Africans and for Africans’. It was imperative for respondents that ASIF should avoid corruption.

Chapter Four. Institutional models for ASIF

1. Introduction

The institutional model chosen for ASIF is arguably one of the most important decisions to be made in implementing the CPA. The CPA in its current form is a strategic plan. The effective delivery of the Flagship Programmes requires the generation of detailed workplans to enable the high level of coordination that will be required between the regional centres of excellence and ASIF. The effectiveness with which ASIF is able to implement the CPA will depend to a very great extent *inter alia* on its overall structure, its governance, the quality of the advice it receives and dispenses, and funding. Some of our respondents and interviewees were of the view that a new institution was neither justified nor advisable. However, few made suggestions of alternatives. Our aim has therefore been to identify the guiding principles which should help frame the institutional structure of the proposed facility, whether it is created afresh or by a reconfiguration of existing organizations.

Several organizations were suggested as examples for ASIF during interviews and in the consultation. Of these, a total of ten were selected and their governance, financial management and other issues were examined in detail (see Appendix A):

- The Global Environment Facility (GEF)
- The Consultative Group on International Agricultural Research (CGIAR)
- The African Economic Research Consortium (AERC)
- The Networks of Centres of Excellence (NCE) Program (Canada)
- The National Science Foundation (NSF) (United States of America)
- The European Research Council (ERC)
- The Chilean Millennium Science Initiative (MSI)
- The Agence Nationale de la Recherche (France) (ANR)
- The European Science Foundation (ESF)
- The Canadian Foundation for Innovation (CFI)

While none of this group was found to give a precise template for ASIF, several features were found to be relevant to ASIF's mission. These, together with other international examples, were used to guide the development of five candidate generic models. We begin by offering an evaluation of these models in terms of their strengths and weaknesses in the context of their institutional structures. These models were selected using a number of criteria that are derived from global best practices (see Appendix B). In examining these models, we acknowledge at the outset that some have obvious limitations. But identifying those features which are desirable *per se* has been an instructive means of helping to determine the optimal institutional structure which is presented as a single institutional option. We also draw on this analysis presented in this chapter to discuss our recommended model in more detail, suggesting the functions, governance, and operating principles in Chapter Five.

2. A development bank/ financial facility

A key role for ASIF will be to mobilise financial resources. It is envisaged that the main sources of funding will be from African governments, the private sector and development partners (ie donors). ASIF will need to work with these potential funders of the CPA to secure resources, in the first instance, for the flagship Programmes. It will therefore be necessary for ASIF to have the appropriate legal status, directly or indirectly, to enable investors in the CPA to deposit funds, and for their disbursement regionally to researchers who have submitted successful bids. At least three approaches to financial management for ASIF can be contemplated. First, the management of funds could be undertaken internally within ASIF itself. Secondly, the financial element of ASIF could be outsourced to an existing body with the requisite expertise and experience or thirdly, the entire facility could be transferred across to the existing body. Here, we evaluate the latter option – an ASIF located within an existing financial body such as a development bank. Possible examples might be the African Development Bank (AfDB) located in Tunisia, the Development Bank of Southern Africa, located in Midrand, South Africa, and the Islamic Development Bank.

Strengths

Two key advantages of this model can be identified. First, the role of the ASIF with regard to the management of financial resources would be undertaken by a body with financial acumen and experience, and in the case of the AfDB, a proven record of financial management for development projects. For example, AfDB currently manages the African Water Facility which was established by AfDB in 2004 at the request of African Ministers' Council on Water (AMCOW) "to mobilise resources from donors to finance water infrastructure and water investment facilitating activities in Africa" (AfDB, 2005)[6]

In addition, the proven record of sound financial management could allay possible fears of lack of accountability in fund management and generate donors' confidence in the security of the funds especially in the early stages of ASIF's existence.

Weaknesses

In our view, there are at least three critical weaknesses which severely limit the potential of this model. First, a development bank may not be able to draw on existing technical experience to facilitate the implementation of the CPA, and subsequent programmes. Science, technology and innovation (STI) are not traditional purviews of development banks and capacity to manage STI projects would need to be built. Thus, as a financial facility, it would lack scientific credibility with the scientific community. We also have doubts about whether the AU and NEPAD would be willing to concede ownership of the CPA to a body of this kind. Finally, the environment of a development bank is likely to be risk-averse and this feature could hinder the encouragement of innovation within the CPA. This model was supported by a minority of interviewees. However we consider that the weaknesses are of sufficient magnitude that the model should be discounted.

[6] AfDB (2005). African Water Facility: Operational Procedures, November 2005, AfDB, Tunis, Tunisia.

The management of funds for the CPA and subsequent programmes could also be achieved directly by either establishing a financial arm to ASIF or indirectly by linking with a development bank or similar financial body to outsource financial management. It could be argued that it would be prudent to use existing expertise within an established and respected regional intergovernmental body such as the AfDB. Several interviewees and respondents proposed the AfDB as an organization well placed to assume the responsibility of receiving and disbursing funds. Equally however, there is a counter–argument which points to the need to create a novel, self sufficient, organization which is competent to administrate both the financial and technical components of regional programmes in science, technology and innovation, independently of external funding facilities. All the remaining models considered below are compatible with either approach.

We accept that one advantage of a relationship with a development bank is that implementation of the ASIF could be expedited more quickly. Donors have different budget cycles and sophisticated financial expertise is required to coordinate these so funds are available for specific programmes. [7] For this reason many substantial research organizations rely on banks to manage their funds. For example the GEF uses the World Bank for this purpose (see Appendix A). However, the establishment of a financially-competent ASIF in the longer term is attractive. A further option would be for an ASIF to establish a partnership with a development bank for an interim period to hasten implementation of the CPA, with a view to developing its own competence in the following five years.

3. An intergovernmental facility

An intergovernmental model would entail a facility which was essentially an instrument of the member governments of the African Union (AU). Intergovernmental organizations are options used by governments when a common commitment is most easily implemented through the agency of a single body. Establishing an ASIF as an intergovernmental body was supported by several interviewees and respondents to the consultation. It was also suggested to us at the Pretoria Workshop[8] that this is the model that is likely to find favour with members of the African Ministerial Council on S&T (AMCOST) who have already committed their support to the CPA. If an intergovernmental ASIF had the appropriate legal status, it could manage the funding component of the facility within the organization. Alternatively, it could work with an external financial organization such as the AfDB. Examples of inter-governmental bodies which were suggested as models for ASIF included the Global Environment Facility (GEF), and the CGIAR (Box 4.1, Appendix A). One member institute of the CGIAR group, the African Rice Center (WARDA) was also highlighted as a possible model. The US National Science Foundation (NSF), a national government organization, was also put forward as an institution whose structure might be adapted for the purposes of

[7] F Sagasti (2006) Personal communication.
[8] High Level Group Workshop on ASIF and Centres of Excellence, Pretoria, 20-22 September 2006.

ASIF implementing a regional set of programmes across the African continent (Box 4.2). An important feature of the NSF in this context is that it is a scientifically-driven funding agency which is independent of the National Science Board (NSB) which establishes the overall policies of the agency.

Box 4.1 The Global Environment Facility (GEF)

- **The GEF** is an intergovernmental body serves as the 'financial mechanism' for four UN Conventions
- **The GEF Assembly** is the *governing body* of the GEF in which representatives of all 176 member countries participate.
- **The GEF Council** functions as an *independent* board of directors; it develops, adopts, and evaluates all GEF programmes. There are 32 Members, 16 from developing countries, 14 from developed countries, and two from transitional economies
- **The Scientific and Technical Advisory Panel** of the GEF (STAP)[1] was established to provide objective scientific and technical advice to the GEF on strategy and programmes.
- **A voluntary network of NGOs** has formed (comprising 'Regional NGO Focal Points') to coordinate GEF-NGO consultations and participation of NGOs at GEF Council Meetings
- **The GEF Secretariat** serves the Assembly and the Council

Strengths

A strength of an inter-governmental facility is that it is likely to command strong support from African governments. In addition, this model would by its very nature reflect the African ownership of the CPA. It could also accord legal status to ASIF which would enable donors to provide funds in support of the CPA, and subsequent programmes. Secondments for staff from member governments would also be likely forthcoming.

Weaknesses

Despite these substantive strengths, the intergovernmental model has significant weaknesses which must be addressed. Two were of particular concern to several interviewees and respondents. First, it was felt that there was a serious risk that ASIF would be a target of political influences from different member governments of the AU which could compromise the objectives of the CPA. It could be difficult for the facility to have sufficient independence to drive the science and innovation programmes forward freely without interference in its decision-making. For example, the location of the ASIF itself, and decisions about which centres of excellence would be selected to participate in the Flagship Programmes could be subject to political pressures. There might also be pressures to accept particular members of staff on secondments. Some interviewees observed that such a weakness could lead to a consequent lack of respect and support

from the wider scientific community. We were also aware of the very real concern of several of those who were in contact with us that an intergovernmental facility would be overly bureaucratic, and would stifle creativity. There is also doubt about the extent to which the private sector would want to engage with what would be seen as a politically–driven body. Other weaknesses include the possible provision of staff on a quota system which would mean that critical appointments would not be made by means of open competition to identify the best candidates from the continent. We note that the GEF was criticised for its failure to obtain critical scientific review of its projects.[9]

Box 4.2 The US National Science Foundation (NSF)

- An independent federal agency providing funds for research
- A Director who oversees 1,700 NSF staff
- A 24-member National Science Board (NSB) of eminent individuals that establishes the overall policies of the NSF.
- Members of the NSB are appointed by the President and confirmed by the US Senate.
- The Office of the Inspector General examines the NSF's work and reports to the NSB and Congress.

Issues relating to staff or salary privileges are also likely to be raised. Finally, it was suggested that the intergovernmental model could be exposed to a greater risk of corruption. As a consequence of these various weaknesses, we have the view that there is a serious risk that scientific priorities might become distorted to the detriment of the CPA, and subsequent programmes.

4. A consortium

A third possible model for ASIF to be configured from a consortium of existing bodies to act together as a virtual facility to deliver the CPA. Membership of the consortium could include *inter alia* national research councils, national and regional academies of science, research institutions, large and small companies, the African Technology Policy Studies Network (ATPS), and others. In order to function effectively, given its dispersed nature, a consortium would need a central secretariat. Clearly defined roles for member organizations would also be required. The African Economic Research Consortium (AERC) is an example of an independent, international consortium which has been effective in mobilising funding, while maintaining an independent system of governance

[9] See: Christoffersen LE (2002) Globalizing benefits *Our Planet* (the UNEP magazine), available at: http://www.ourplanet.com/imgversn/133/chris.html; Bostanci A (2002) Cast-strapped fund struggles to make science a priority *Science* **296**: 1596–7.

and enhancing the capacity of locally-based research, and its applications in a policy context (see Box 4.3, Appendix A).

Strengths

A major strength of using a consortium in the form of a network of national institutions as a model for an ASIF is that it would strengthen existing organizations within a regional framework. The CPA has been conceived as a regional programme and it is predicated on the premise that linking and strengthening national institutions is an efficient and cost effective means of developing STI across the continent. By making the ASIF itself a regionally structured body, the regional dimension would be enhanced. A consortium would be best served by having a central secretariat. The AERC for example is based in Nairobi. Other member organizations could be responsible for

Box 4.3 The African Economic Research Consortium (AERC)

- **A public not-for-profit consortium** devoted to advanced policy research and training in economics
- 12 members including donor governments, private foundations, and African and international organizations
- **The Board of Directors** takes responsibility for the overall management and financial health of the Consortium
- **The Programme Committee** sets the research and training agendas, assess grant applications, and evaluates the Research Programme.
- **The Secretariat,** under the direction of the Executive Director, implements the approved programme of work and manages the budget.
- **The AERC is based in Nairobi**, Kenya, where it is recognised as an international organization
- The AERC is supported by **16 funders**

specific functions of the ASIF. These could include management of the Flagship Programmes, monitoring and evaluations, financial management, and so on. As these bodies are unlikely to be able to mobilise the skills and experience required to manage the funds, a development bank or similar body in the consortium would probably be the best option. The Networks of Centres of Excellence (NCE) Program (Canada) is an ambitious research programme based on an extensive network of over 1,000 different institutions which shares some common aims with the CPA (Box 4.4). In terms of how it is managed, three federal bodies together provide funding, and administration for the programme. Although these responsibilities are shared between these three government bodies, this is a national consortium managed by government bodies. We return to this example in Chapter Five when we consider the management of centres of excellence in the CPA.

Weaknesses

Although superficially appealing in terms of the regional dimension, there are a number of potential weaknesses in adopting a consortium as a model for ASIF which invite caution. Efficient and effective administration of ASIF is crucial to the effective implementation of the CPA. If the facility itself is distributed across a number of national organizations, possible dissimilarities in policy, operating principles, administration and so on could make it difficult to achieve a coherent facility. While the AERC appears to be well regarded, and effective as a consortium, it is a relatively small organization. By contrast the CPA will necessarily entail the management of 12 major networks in the first instance. A second potential weakness, closely linked to the first, is the effect of fragmentation. Unless the consortium is tightly governed and well-integrated, the association of dispersed components across different part of Africa could make the management of the CPA flagship programmes, themselves regionally framed, very difficult. In a similar context, the BecA initiative has experienced major administrative problems in transferring funds between countries to fund regional research institutes.[10] Because the CPA is a regional programme, it would probably be necessary for the facility coordinating the network of research to be centralised. The AERC is for example, based in Nairobi. There is a risk however that those countries which have already established effective bodies, for example, South Africa, Egypt, Nigeria, Tunisia, Kenya, Uganda,

Box 4.4 Networks of Centres of Excellence (NCE) Program (Canada)

- **The aim** is to translate research and entrepreneurial talent into economic and social benefits.
- **NCEs are partnerships** among universities, industry, government and not-for-profit organizations by coordinating Centres to address strategic research questions
- NCEs have been formed in engineering and manufacturing, health, human development and biotechnology, information and communications technologies, natural resources, the environment and water quality.
- **The NCE Program is funded and administered** by three federal granting agencies – the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research, and the Social Sciences and Humanities Research Council – in partnership with Industry Canada.
- The Program is managed by a **Steering Committee** made up of the Presidents of the three granting agencies and the Deputy Minister of Industry Canada.
- **Day-to-day administration** is provided by the NCE Directorate made up of staff from the three granting agencies.

[10] See http://www.biosciencesafrica.org/index.html

Botswana, would be over-represented in a networked ASIF while the many countries which lack capacity to fund or promote significant research activities would not be in a position to participate readily in the consortium. This lack of balance, crucial to the success of the CPA needs to be avoided. We can foresee two additional disadvantages. Setting up a consortium is likely to entail lengthy negotiation between prospective member institutions, and concomitant problems in making new staff appointments. On balance, the advantages of a regionally-based facility are insufficient to compensate for the obvious weaknesses of this model. Moreover, we observe that promotion of regional networks through the strengthening of national STI institutions is fundamental to the CPA itself. A two tier regional structure comprising an ASIF consortium *and* the networks of centres of excellence may be unstable.

We add a caveat. Once ASIF is established and has been running for five or so years, it may be that certain components of its activities can be delegated to institutions based in other countries. This is a possible strategy that should be given serious consideration within the development strategy for the ASIF.

5. A non-governmental facility

Several of the interviewees and respondents to the consultation argued that the ASIF should be an NGO that can function as an independent foundation. The overriding reason put forward was that, unless ASIF was structured as an NGO, it would not have sufficient independence to function effectively, and ensure that its governance was driven by scientific rather than political objectives. Nor would it have the capacity to resist the overly bureaucratic nature that blights many such organizations. Notwithstanding this support, the concept of an ASIF as an NGO was roundly rejected by representatives from AMCOST at the Pretoria meeting. It was argued that as AMCOST had conceived and adopted the CPA, management of the CPA by its very nature would require it to be an agency of government ie. an inter-governmental body. There were also concerns from the same quarter about the lack of experience which could be expected in a *de novo* NGO facility. Put simply, the point was made that as a political body, AMCOST could not contemplate a non-governmental body to manage its programme. However, while it is important to pay attention to the preferences of those speaking for AMCOST, the views of scientists and the many others we consulted also require careful examination.

An ASIF structured as an NGO would be largely independent of political influences. As a consequence it would have greater freedom to shape its organization and governance, and avoid the excessive bureaucracy that is often a feature of governmental organizations. An additional strength, fundamental to its mission, would be the capacity to implement an unfettered scientific (rather than political) basis for priority setting. Its independence could also offer greater opportunity for interaction with the private sector. Several individuals suggested that the involvement of the private sector in the CPA, crucial to effect innovation, and already a formidable challenge for the continent, would be reduced if the ASIF were to be intergovernmental in nature.

Despite these persuasive arguments, we have serious concerns about the potential lack of support for this model from national governments, the AU and its committees, and some development partners. If a non-governmental ASIF is viewed with suspicion by the very organizations which have conceived the CPA, it is unlikely to succeed. Political support at the highest level is essential. Nevertheless the advantages that are offered by the NGO model deserve serious consideration if not as a model in its entirety then as features to be sought in another institutional setting.

6. A limited company

Although not an obvious choice at first sight, a limited company is another model worthy of consideration. There is some experience of national facilities being organized in this way, the Innovations Hub in South Africa being one example. The strengths of a facility structured as a limited company are that it would be straightforward to set up, and there would be international recognition of its legal status. Other desirable features are those already identified for the NGO model namely an independence from political influences and bureaucratic pressures, a concomitant freedom to shape the organization, and emphasis on scientifically-driven priority setting. A potential for greater interaction with the private sector, and therefore a greater assurance of innovation could also be expected to be forthcoming. However, even if shareholders were national governments, it seems likely that political support from national governments and the AU and its committees is likely to be mixed. The case for this model as it stands is not compelling.

7. Combining attributes of different models

The analysis thus far clearly shows that no one model is suited to the purposes of ASIF. But there is wide support, albeit from different stakeholder groups for two very distinct forms: the intergovernmental body, and the non-governmental body. Although the NGO model is attractive we conclude that support from national governments and the AU would be lacking. However the potential shortcomings of the inter-governmental model are severe enough for us to consider how these potential weaknesses could be addressed. Recognising the need to be pragmatic we therefore propose an alternative which we believe combines the best features of these two forms, with the strengths of one compensating for the weaknesses of the other.

The table below illustrates how the strengths of the intergovernmental and NGO models could serve to compensate for the shortcomings of the other. If ASIF were established as an intergovernmental body, but governed and organized in such a way that several of the features of an NGO were adopted, some of the pitfalls of the former would be avoided. As an intergovernmental body dedicated to the development of S&T to promote innovation for development, ASIF would have support from governments and the AU; it would have strong ownership of the CPA, and it would have the legal status to receive funds from development partners. To achieve the strengths of the NGO model which we consider to be important, the ASIF would have elements of its governance and organization that were scientifically controlled and other elements which were politically

controlled would have to be governed and organized in such a way as to secure an appropriate measure of independence from AMCOST, and the AU. It would allow minimisation of bureaucracy, corruption, and issues relating to staff privileges. If ASIF is perceived rightly as a scientifically-driven body, engagement with the private sector, and its collaboration within the CPA and subsequent research programmes is more probable.

Table 4.1 Strengths and weaknesses of the hybrid model

Intergovernmental model	**NGO**
Strengths	**Weaknesses**
Likely support from governments	Lack of support from governments, donors
Strong ownership of CPA	Possible lack of experience
Facilitate funds from World Bank	Inappropriate legal status
Weaknesses	**Strengths**
Prone to strong political influence	Lower risk of political influence
Excessive bureaucracy	Lower risk of bureaucracy
Distortion of scientific priorities	Scientific basis for priority setting
Private sector not engaged	Private sector engagement
Staffing on quota system	Facilitate secondments based on merit
Issues of staff privileges	Freedom to shape organization
Greater risk of corruption	

On the question of financial management, two options which are compatible with such a model: partnering with a financial facility such as the AfDB to effect receiving and disbursement of funds, and establishing a division within the ASIF to do this. As we have said, both are feasible, and a partnership might serve during an interim period before an internal division could be established.

In the next section we elaborate this model which we have termed the 'two tier' model in more detail.

8. The 'two tier' intergovernmental model

A defining feature of this model is that it is a two-tier system for managing the CPA. We think it crucial that the *design* and *funding* of the Flagship Programmes is separated from their *execution*. This division will enable a much more dynamic, flexible and cost-effective set of outcomes.

The first tier comprises ASIF in the form of an intergovernmental facility. Its primary function would be to design programmes within each of the designated programme clusters of the CPA, to secure the necessary funding, and to launch the programmes. [11] We envisage that the fund raising and design functions would be carried out in parallel.

[11] There are four Programme Clusters, sometimes referred to as the Flagship Programmes, in the CPA, each with a number of defined programmes within them, 12 in total. There is an additional set of six programmes aimed at improving Policy conditions and building innovations mechanisms.

ASIF itself would consist of a secretariat, a Technical Board and a Governing Council. The secretariat would have the main responsibility for working with donors (ie development partners, African governments, the private sector). It would also support the Technical Board, and the Governing Council. Membership of the Technical Board would need to include experts from scientific and technological fields, agriculture, industry, telecommunications, and services. The Governing Council, which would have members drawn from AMCOST, the private sector, and others, (see Chapter Five for details about membership) would have strategic oversight of ASIF. We envisage that once ASIF has been established, a workplan will be developed to decide which programmes within the four Cluster Programmes will be taken forward for development in the first instance. The process managed by ASIF would be as follows:

The Technical Board, supported by the secretariat, would design the programmes already outlined in the Cluster Programmes. By this we mean identifying the critical areas within each programme which should be given priority for funding. We endorse the Principles and Criteria identified in the CPA [12]which would be used to make these judgements. Those considered particularly important by the Project Team include, *inter alia*, the relevance to regional development priorities, the potential for investment, the capacity for the work to be done, and the potential for innovation with the Programme to improve the quality of life. Given the very wide range of scientific and technological fields within the purview of the CPA, a roster of consultants would be needed to support this process for each Cluster Programme. The Technical Board, supported by consultations, expert studies, and the secretariat, would produce for example, 7-8 potential candidates for programme to be taken forward to the Governing Council for approval (stage 1). Those given high priority, perhaps three or so, would be selected and approved. Each would be developed into a full programme of activities over a 6-9 month period (stage 2). This would entail consideration being given to funding, research, training, industrial participation and so on.

Iterative negotiations with potential funders would need to take place concurrently. Those funders with interests in specific areas identified at the start of the process would be invited to submit expressions of interest. Negotiations would be then opened by the secretariat. Those development partners committed to providing non-specific development funding for S&T could commit funds at this point. By the time specific programmes were approved by the Council, and ready for detailed development (stage 2) funding would need to have been confirmed. Partnership with the AfDB would be the preferred option for management of the funds for the various programmes. At the end of the development period (ie stage 2 completed) each programme would then be launched and handed over to the **second tier.**

The **function of the second tier** would be to execute the programmes. Each would be managed by a Programme Board appointed specifically for each individual programme. For some of the programmes in the CPA, specific organizations have already been

[12] Africa's S&T Consolidated Plan of Action (2005), p. 10-11.

identified who would be likely members of the Programme Boards. Once the programmes were launched, the Programme Board for each programme would mount calls for research proposals, and manage their implementation. This would entail managing peer review, managing the programmes once funded, monitoring and evaluation. The calls for proposals would be framed so that different forms of organizations would be encouraged to apply: research institutes, universities, private companies, NGOs, and innovation hubs/technology parks to encourage research collaboration and to optimise the development of innovation.

If the two tier structure is accepted, ASIF itself would not need to be involved in programme management. This could be largely devolved to the regional Programme Boards, although a coordinating oversight role would be required. Confining ASIFs role to funding and designing the programmes has some important implications. First, ASIF would only need to be modest in size (10—20 people). It could therefore be funded by contributions from African governments and could be set up relatively quickly. In its first 2 years, ASIF could realistically launch 5-6 programmes, and reach the maximum of 10-12 within in 10 years or before. Experienced gained in first 5 years should increase the pace of programme launch. It should be noted that individual programmes will vary widely, both in their scope, structure, and funding. This variation would need to be borne in mind. Consideration should also be given to setting up demonstration programme.

Chapter Five. The recommended model for ASIF

1. Introduction

Following on from the discussion of the strengths and weaknesses of the different models in Chapter Four we now put forward our own favoured design. In this we have accepted the arguments in favour of an intergovernmental model but have attempted to make a clear distinction between those parts where political considerations are necessary and those where scientific and economic considerations should be paramount. This can be done by distinguishing between the process of designing the Flagship Programmes and the process of implementing them.

We propose that ASIF be established as a legal entity within the African Union. Its mission and objectives follow closely from those articulated in the Consolidated S&T Plan of Action approved by AMCOST in 2005.

Mission Statement

The purpose of ASIF is to facilitate the conduct of research and other scientific and technological activities at a regional level in Africa which will lead to technological innovations to meet the development challenges of the continent.

Enabling characteristics

In pursuit of this mission ASIF may identify regional priority programmes and activities; raise funds for the implementation of these programmes; identify partners to carry out research and other scientific and technological activities which will lead to the development of technological innovations; disburse funds to these partners; facilitate links between regional ST&I activities and those at national and international levels for mutual benefit; provide advice on science, technology and innovation policies to those who require and request such advice; help develop national capabilities to do research and develop innovations through its regional programmes; and to carry out any other activity which will help it achieve its mission.

General Objectives

The general objectives of ASIF are:

- To significantly increase the capacity of African public, private, academic and civil society institutions to generate and utilize scientific and technological knowledge and to promote innovation.

- To reduce disparities between Africa and other world regions in science, technology and innovation and to reduce disparities within Africa through special

programmes to assist those countries with relatively less science, technology and innovation capacities.

- To promote regional cooperation in science, technology and innovation by designing, launching, and supporting regional programmes across the whole range of science, technology and innovation (from basic research to commercial applications of technology).

- To involve private sector actors (including farmers, producers, associations, small and medium sized enterprises, foreign corporations, diaspora entrepreneurs, among others) in the design and implementation of policies and initiatives to promote innovation.

- To support and provide services related to science, technology and innovation to public, private, academic and civil society entities in African countries.

Specific objectives

Specific objectives of ASIF as defined in the CPA[13] are:

- To mobilize technical expertise and financial resources required to develop and implement the consolidated S&T Plan of Action.
- To develop and implement guidelines, principles, and procedures for mobilizing and allocating African and international funding.
- To monitor and evaluate the implementation of the CPA programmes based upon agreed policies and procedures.
- To provide technical back-stopping to the African Union Commission to implement those S&T and innovation policies adopted by the African Ministerial Council on S&T (AMCOST).
- To facilitate the development of partnerships between African R&D networks and international ones.
- To support the AU Commission to develop capacity for S&T policy formulation and implementation**.**

2. Governance structure

ASIF will consist of a number of elements. These are a Governing Council; a secretariat; and a Technical Advisory Board; and Programme Boards to manage the implementation of each of the Flagship Programmes.

The Governing Council will have overall responsibility for ASIF and will prioritise the Flagship Programmes to be undertaken at any given time. It will choose the CEO of ASIF

[13] Africa's S&T Consolidated Plan of Action (2005), p.51

and will appoint the members of the Technical Advisory Board. The Governing Council will consist of 17 members, 6 of whom should be members of AMCOST and the other 11 appointed by AMCOST from the stakeholders including three members of the African S&T community (possibly including members of the African Diaspora); four members of the business community, and agriculture; two members nominated by international donors but appointed by AMCOST and two members from civil society. The chairperson of the Governing Council will be the Chair of AMCOST.

The Secretariat will be responsible for formulating detailed action plans of the priority programmes identified by the Governing Council. In this they will draw on the advice of a Technical Advisory Board. They will also be responsible for raising the funds needed to finance their own activities and for the implementation of the Flagship Programmes. The secretariat will also monitor the progress of each Flagship Programme, and where appropriate will suggest opportunities for cross links between the different Flagship Programmes. In addition the Secretariat will have responsibility for those elements of the CPA which call for Building Science and Technology Policy Capacity, Improving regional Cooperation in S&T, and Building Public Understanding of S&T. The extent to which these functions are contracted out to external bodies or are carried out in house will be a decision of the Governing Council. The latter organization will have oversight of all of the activities of the Secretariat.

The secretariat will service both the Governing Council and the Technical Advisory Board. The Chief Executive Officer will be chosen and appointed by the Governing Council following an open process of advertising and interviews. The term of the CEO will be for four years and may be renewed for a further four year term at the discretion of the Governing Council.

The Technical Advisory Board (TAB) will advise both the secretariat and the Governing Council on the scientific and technical design of the Flagship Programmes. There should be 12 members of the TAB who will be appointed by the Governing Council on the recommendation of the CEO of ASIF. Membership of the TAB would need to include experts from scientific and technological fields, agriculture, industry, telecommunications, and services. The TAB will be responsible for ensuring the scientific and technical soundness and integrity of each of the proposed programmes, but the final choice of programmes to be implemented will be made by the Governing Council from the wider range of programmes submitted by the TAB.

Once the Governing Council has chosen the programmes to be given priority then ASIF mounts its second tier of activities. These will be the implementation of the selected programmes. Since each programme will have different goals and objectives the methods of implementation are likely to be different and should be tailor-made according to the individual requirements. What they will have in common will be their own governance structure which provides each of them with a high level of independence. Each will have its own Programme Board made up of leading authorities in the chosen programme area (including scientists, engineers and business people). It is expected that each Board will

consist of between five to seven people, and that they will meet twice a year. The costs of these Boards will be quite modest.

Each Board will be free to choose its method of work to achieve the objectives set for that particular programme. The institutions chosen to collaborate in the programme will be selected on the basis of competitive bids. Financial allocations will be made by the AFDB according to the decisions of the Board. The way in which the Boards operate to achieve their objectives will vary and will draw on best practices. For this reason no general method of work can be prescribed for the Boards at this time. It is however likely that many of them will make use of Africa's Centres of Excellence, and for this reason we have elaborated on ways in which this might be done in a later section of this chapter.

It is expected that each Flagship Programme will last for five to seven years and will then be disbanded unless the Governing Council consider that the activities should be continued for a further period of time. This policy would encourage institutional flexibility and avoid ASIF becoming overburdened.

ASIF should endeavour to launch up to five Flagship Programmes in its first two years of operation and eventually have 12 running at any given time with new programmes replacing closing programmes.

A further function of the ASIF Secretariat will be to monitor the progress of each of the Flagship Programmes and to report progress to the Governing Council. Each programme will also be subjected to an external international review at the end of each three year period. Continued funding will depend on the judgement of the review team based on their assessment of progress made toward the attainment of the programme objectives.

We recognise that our proposed two-tier structure may not appeal to all stakeholders with an interest in the structure of ASIF. It is our view that separation of the activities of ASIF , its Governing Council and the TAB from the regional operation of the Programme Boards is a crucial feature of the governance structure. One alternative could be for the TAB to be enlarged and strengthened to take on this role. Each of the 12 Flagship Programmes could have a programme committee, each with two members (one from industry, one from the research community) sitting on the TAB. The responsibility for fund mobilisation and implementation of a flagship programme would fall to a designated ASIF programme expert.

3. Ways in which ASIF might work.

So far in this chapter we have described a way of designing ASIF such that it will gain the greatest support from most stakeholders. This is not the design which will please everyone but we have carefully considered the various ideas put forward in the consultation, interviews and at the Pretoria meeting, and the outcome is the model described above. The objective is to design a mechanism for implementing the CPA, to ensure the continued evolution of that Plan, and the development and implementation of

other research programmes. The CPA has attracted international attention and support since it is an African initiative dedicated to regional programmes which will lead to the development of technological innovations which will benefit African people. ASIF is intended to facilitate the implementation of the CPA and is not intended to be an African Research Council, although some basic research may be supported if this is needed to attain the goals of the CPA, and other programmes which follow.

In the course of our consultation we posed many questions and received many useful ideas. We have summarised much of this in Chapter Three, but here we wish to draw some conclusions which are directly relevant to our recommended model of ASIF

Relations with the AU and NEPAD

Although our questionnaire opened up the possibility of ASIF being established independently of the AU, and some respondents felt that this was desirable, we have chosen to recommend the 'intergovernmental model' where ASIF is firmly rooted in the AU. We also believe it should remain closely associated with NEPAD. The later programme is intimately associated with Africa's economic development and ASIF shares those same goals.

More problematic is the relationship between ASIF and the Office of S&T (OST) within NEPAD. Many of the functions of the OST could usefully be transferred to ASIF, but other functions such as servicing the wider activities of AMCOST and perhaps the independent monitoring of ASIF are best fulfilled by the OST. If our model is accepted by AMCOST then this is an issue which they will have to resolve. Also other issues which will need resolution are the relationship between ASIF and the AU Commission for Science and Technology, and between ASIF and the other science and technology programmes of NEPAD. These are issues which we were unable to address in this project.

Relations with other African regional scientific and technological institutions.

Just about everyone consulted was of the view that maximum use should be made of other regional and national institutions. Many examples were cited of institutions which could serve as partners. No-one was in favour of ASIF establishing itself as a research institute conducting its own research. Rather it should facilitate the work of existing institutions provided they can contribute to the objectives of the chosen programmes of the CPA. Which institutions are chosen as ASIF partners will be the decision of the independent programme Boards and for the most part will be based on competitive bids.

4. Funding

Funding will be required for a number of different activities. These will include the establishment and running costs of the secretariat of ASIF; meetings of the Governing Council and the Technical Advisory Board; and the costs of implementing each of the

chosen Flagship Programmes. As mentioned in the previous chapter, it is proposed that the ASIF secretariat will have responsibility for designing the various Flagship Programmes but that the implementation of these programmes will be set up as separate entities, each managed by an independent board and with its own financial arrangements. Funds will be required both for the secretariat activities and for each of the programmes.

The principal sources of funds will include: donations and subscriptions from African governments; donations from the private sector; and donations from foreign donors which will include bi-lateral and international aid agencies, foundations, and private sector contributions. In our consultations there was much discussion about the likelihood of funding from each of these different sources. Several Africans stressed the importance of substantial African funding. Some suggested that unless African governments committed substantial financial resources, then ASIF should not be established. They suggested that only when African commitment had been demonstrated with firm financial pledges, should international donors be approached for additional funding.

There was a further suggestion that as a minimum, African governments should undertake to meet the full costs of establishing and running the ASIF secretariat. Foreign donors would then be assured that their contributions would be fully used for meeting the costs of the various Flagship Programmes. At the same time it was also recognized that African governments would be expected to contribute substantially to each of the Flagship Programmes

There was also debate on whether the African governmental contributions should be based on a formula or should be entirely voluntary. Those who favoured a formula approach suggested a percentage of such national indicators as GNP; expenditures on R&D; expenditure on S&T; amount of World Bank loans received. Others felt that the time to negotiate such formula-based arrangements would be protracted and that in the first instance ASIF should be established on the basis of pledges by individual African governments. Such initial pledges, they thought, should be made at the African Heads of State Meeting in January 2007.

The preference of the ASIF project team is that once ASIF is established, a simple formula based on GNP with perhaps three categories of low, medium and high should be adopted. An annual subscription for each of these categories might then be set by the Governing Council. Only those countries that paid their subscription would be eligible to participate in the ASIF programmes. For the smaller and poorer countries their annual fees might be met in part by international donors. It is further anticipated that in the first instance the annual subscriptions would be used to meet the costs of the ASIF secretariat.

Donations from the private sector

There was considerable discussion about whether the private sector would be willing to contribution to the generation of regional public goods. This was an issue which will require further exploration as in the time available for our study we were unable to arrange interviews with either the African or international business communities.

Since one of the principal objectives of ASIF is to support activities which will lead to the development of technological innovations, the involvement of the private sector will be essential. This will require the negotiation of satisfactory intellectual property agreements. It is therefore likely that although business enterprises may not contribute a great deal in the early stages of the Flagship Programmes it will be necessary that they become heavily involved in the later stages.

International donors

The response of staff from donor agencies consulted in the ASIF project was cautiously welcoming to the establishment of ASIF. Several felt that this would provide an opportunity to do something new in Africa with greater focus on the application of S&T to the development needs of the continent. They supported the focus proposed in the CPA of the development of technological innovations. The main concern was whether a governance structure could be defined such that although ASIF would be an inter-governmental organization, it could be managed in such a way that it could take risks and foster innovations unimpeded by political interference. If this fear can be overcome, then it is our impression that considerable international funds might be mobilized.

Some of the donors interviewed were of the opinion that all donors should be encouraged to contribute funds to the CPA and other programmes in their entirety. The allocation of these funds between the different programmes would be the responsibility of the Governing Council. This approach, they argued, would be consistent with the Paris Declaration on donor harmonisation, and would relieve ASIF from the onerous task of preparing many different reports and accounts for each of the donors.

Other donors however pointed out that they were operating within their own strategic plans which identified those sectors in which they could work. It was not possible at the present time to fund for them to fund the CPA, and later programmes as a whole, but they may be in a position to support specific programme areas when there was an overlap with their own priorities.

Our own view is that donor support for the entire CPA, and subsequent programmes, is a desirable objective in the long run, but in the short term it is more desirable to get multiple donor contributions. These will be more likely to be forthcoming if there is flexibility in the way in which these funds are allocated.

Recommended Procedures

The ASIF project team thinks that there is a window of opportunity for establishing ASIF which should be seized. This will require a simple approach for its creation, with more sophisticated approaches for funding being developed and negotiated at a later stage. We therefore recommend the following steps:

1. The initial funding of ASIF should be obtained by pledges from African governments. Ideally this should occur at the African Heads of State Meeting in January 2007.

2. If these pledges cover the estimated initial two to three years operations of the ASIF secretariat then other donors should be invited to join.

3. Those donors who are prepared to contribute to the full CPA package should then make their initial pledge of funds. Other international donors that are willing to support specific Flagship Programmes would be invited to contribute to these programmes once they had been fully designed.

Once operational, the ASIF Governing Council may consider other more sophisticated funding mechanisms which would require negotiation.

During our consultations, questions were raised as to whether organizations within countries whose governments do not contribute to the funding of ASIF should be eligible for ASIF grants. Another question was whether business enterprises, both African and foreign, should be eligible for financial support. These are questions which should be resolved by the ASIF Governing Council, but our own recommendation is to respond in the affirmative to both questions provided particular Programme Boards recommends the participation of the specific organizations and enterprises. We have fully embraced the widespread view that ASIF should work through existing institutions and should promote networks and international collaboration between partner institutions. However since the goal is to implement the CPA, and subsequent programmes, each programme will be tightly defined and institutions invited to tender bids oriented towards the objectives specified in each programme outline. Due consideration will be given to geographic representation of partner institutions and scientifically stronger partners will be encouraged to help strengthen scientifically weaker partners. This means that most of the work will be in the directive mode or commissioned by each ASIF Programme Board, although some programmes may lend themselves to operating more in the responsive mode. The decision on the balance between responsive, directive and commissioned modes will be made by each Programme Board.

There will be other funding issues which are bound to arise and which will need to be addressed by the Council. At this stage we can draw the attention of AMCOST to the experiences of other national and international bodies that have attempted to find a ways of ensuring scientific and political compatibility. We were struck by the approach of the Chilean Millennium project. When bids are received for funding they are first of all scrutinised by a scientific peer review process. Only those which receive high rating are passed on to the political body for final choice according to national needs. In this way scientific and political considerations are given due and appropriate consideration. Our recommendation is that a similar approach is adopted by ASIF.

Fund Management

Our suggestion regarding fund management is that this be contracted to the African Development Bank. We suggest the AfDB because it was this bank which was recommended by most respondents in our interviews and to our questionnaire. In fact there was very strong support for this proposal. The AfDB has established a good reputation and already manages several other similar funds.

5. Monitoring and Evaluation

All our respondents agreed that there was a need for both internal monitoring so that ongoing learning could take place, and also evaluation made by international peer review panels of the work of the different Flagship Programmes every few years.

Applying these principles to the model we have proposed means that the ASIF secretariat should monitor its own activities as part of its management plan. Similarly each of the Boards for the Flagship Programmes should set up its own monitoring process so that it can learn the lessons from its successes and failures. The ASIF secretariat will also need to monitor the progress of each of the programmes and prepare periodic reports to the Governing Council. International evaluation panels will also be required to carry out full independent reviews of each of the Programmes every 3 to 5 years. Their reports will inform the Programme Boards and the Governing Council.

6. Centres of Excellence

As mentioned above each Programme Board will choose its own ways to achieve its programme objectives. Nevertheless there is a great deal of interest in making use of the African Centres of Excellence. We have therefore decided to illustrate ways in which ASIF might interact with these organizations.

The implementation process of the programmes of the CPA, and subsequent research programmes is conceived to involve four sets of institutional actors, which include policy-making departments, R&D centres, industry and funding agencies. The R&D centres are envisaged to form continental networks of Centres of Excellence engaged in executing the 12 Flagship Programmes. The CPA has grouped these 12 Programmes into four Programme Clusters based on their interrelationships and potential of establishing inter-related networks of implementing institutions (Box 5.1).

An important aspect of the consultation was the defining of the Centre of Excellence that would be suitable for the delivery of the programmes of the CPA, and others, and the requirements for an ASIF that can successfully facilitate their emergence and maintenance.

Box 5.1. Flagship research and development programmes of the CPA

PROGRAMME CLUSTER 1: BIODIVERSITY, BIOTECHNOLOGY AND INDIGENOUS KNOWLEDGE
1. Conservation and Sustainable Use of Biodiversity
2. Safe Development and Application of Biotechnology
3. Securing and Using Africa's Indigenous Knowledge Base

PROGRAMME CLUSTER 2: ENERGY, WATER AND DESERTIFICATION.
1. Building a Sustainable Energy Base
2. Securing and Sustaining Water
3. Combating Drought and Desertification

PROGRAMME CLUSTER 3: MATERIAL SCIENCES, MANUFACTURING, LASER AND POST-HARVEST TECHNOLOGIES
1. Building Africa's Capacity for Material Sciences
2. Building engineering capacity for Manufacturing
3. Strengthening the African Laser Centre (ALC)
4. Technologies to Reduce Post harvest Food Loss

PROGRAMME CLUSTER 4: INFORMATION AND COMMUNICATION TECHNOLOGIES AND SPACE SCIENCE AND TECHNOLOGIES
1. Information and Communication Technologies
2. Establishing the African Institute of Space Science

Source: Africa's CPA on S&T (2005)

Consensus was reached on the following key features and criteria for the Centres of Excellence that would participate in the implementation of the CPA, and other subsequent programmes. They should have or be:

- performance driven
- capability to adopt, adapt and generate new technologies
- specialized but multidisciplinary in approach
- adequate skills that form a critical mass
- human and physical infrastructure that strongly relate to mandate
- capability of integrating different skills
- capacity to attract funding on a sustainable basis
- visibility outside its environment (international visibility)
- ability for self-renewal when confronted with new challenges

The current state of development of S&T in Africa makes it difficult to find African R&D centres that meet most of these criteria. A few that appreciably satisfy some of these criteria are international research institutes that are based in Africa (e.g. CGIAR centres). Major countries such as South Africa, Egypt and Nigeria also have a few national research centres that may qualify for Centres of Excellence especially in the

African region.[14] The consultations suggest that, at its initial stages, ASIF should carry out a comprehensive inventory and assessment of existing R&D centres in Africa. Centres that are doing fairly well should be identified and ASIF should invest in them to enable improved performance and subsequent upgrading into Centres of Excellence that meet some of the above criteria. We think it important that these major hubs should not operate as islands, but rather link their activities with national R&D centres especially in solving specific national problems that are part of the regional or continental challenges enunciated by the CPA Programme Clusters. For the Programme Cluster on "Biodiversity, biotechnology and indigenous knowledge" we note that there are already four programme hubs at various stages of development,[15] and that there is also a hub for the Programme Cluster "material sciences, manufacturing, laser and post-harvest technologies".[16]

The most developed of these hubs is the Bioscience Eastern and Central Africa (BecA). BecA is a facility that has demonstrated the feasibility of using existing research institutions that have some of the features of Centres of Excellence to implement the programmes of the CPA. BecA was launched in 2003 and established in the campus of the International Livestock Research Institute (ILRI), Nairobi, Kenya. BecA is expected to pave the way for a network of African Centres of Excellence that would actively

Box 5.2. Transforming existing institutions into Centres of Excellence: the case of BECA

Establishment of *Biosciences eastern and central Africa* was been made possible by an initial investment of more than CAD$30 million by the Canada Fund for Africa through the Canadian International Development Agency. The facilities are hosted by the International Livestock Research Institute (ILRI), in Nairobi, Kenya. The Canadian grant will be used primarily to refurbish existing laboratory facilities, to provide new facilities and equipment (including additional biosafety containment facilities) as necessary for a centre of excellence in biosciences, and to develop capacity in biosciences amongst African scientists through fellowships and educational and training activities in ways that complement existing programmes at national, regional and international levels.

The Gatsby Charitable Foundation, the Rockefeller Foundation and the Syngenta Foundation for Sustainable Agriculture are also supporting the design phase which includes national and regional consultations to identify high-priority programme and project areas. The Doyle Foundation has sponsored the development of the concept through consultations in Africa and with prospective partners internationally. NEPAD is actively seeking the involvement of other partners in Africa and in the international development and science communities to join in co-financing the research programmes and the capacity-building activities that will be undertaken by African scientists working at the new facilities.

Source: Background Brochure on BecA, BecA homepage

[14] For example, the South African Laser Centre, Pretoria; Sheda S&T Complex, Abuja, Nigeria.
[15] The four hubs serve each of four regional networks on biosciences. These networks are BecA with a hub at ILRI, Nairobi, Kenya; Southern Africa Network for biosciences (SANbio) with a hub at CSIR, Pretoria; Northern Africa Biosciences Network (NABNet) with a hub at the National Research Centre (NRC) Cairo, Egypt; and West African Biosciences Network (WABNet) with a hub at Dakar, Senegal.
[16] The programme hub for the Cluster 3 programmes is located at the Africa Laser Centre, CSIR, Pretoria.

promote the application of genomics, proteomics and bioinformatics in the areas of agriculture and food security, human health and the environment. The immediate goal is to support eastern and central African countries to develop and apply bioscience research expertise to produce technologies that help poor farmers to secure their assets, improve their productivity and income and increase their market opportunities (see Box 6.2). Since ASIF is a facilitating agent, we agree that ASIF should not directly engage in carrying out research. A broad spectrum of respondents indicated that ASIF should set clear guidelines for research centres to qualify for executing ASIF projects, receiving ASIF approval for projects that can add value to existing programmes of the CPA, and design an operational framework for effective delivery of continental public goods.

Using ASIF to manage Centres of Excellence should enable these organizations to incorporate the innovation phase into the process of their research activities. Some of our respondents felt that it was very important that basic research should not be neglected. However, there was broad support from many of the stakeholders who were interviewed or responded to the consultation that using S&T to address current development challenges requires deliberate emphasis on linking research with the market place. ASIF would need to facilitate the emergence of Centres of Excellence that are able to conduct not only research that advance basic knowledge but also contribute significantly to knowledge required for tackling current development problems of poverty, unemployment, and the lack of competitiveness of African industry.

It appears to us that ASIF's management of Centres of Excellence would essentially entail organizing and building networks of existing institutions that have potential for effective delivery of the CPA when given the required technical and financial assistance. The criteria and guidelines for selecting which centres qualify should be priority issues to be addressed by the management of ASIF and its Governing Council at the outset. The criteria listed above should of course serve as a guide after an inventory of existing relevant institutions have been carried out for each of the CPA Programme Clusters.

7 Some remaining issues

With the time and resources available for this study we were unable to address a number of issues which need to be addressed before ASIF comes into existence. These include the following:

- Learning the lessons from the existing Flagship Programmes. It had been our intention to do this during our interviews, but we were unable to contact many of the key individuals during the month of August, which was the only month available to us for interviews.
- Exploring the experience of other NEPAD programmes, especially the agricultural programme. In particular we would have liked to review the experience of the Forum for Agricultural Research in Africa (FARA) as a possible model for ASIF. Time and availability of key personnel during August was the reason for not pursuing this.

- Unravelling the complexities of the relationship between AMCOST, the AU Commission on Science and Technology, NEPAD and its Office of Science and Technology and ASIF. This we felt would require a visit to the different institutions and this was not feasible within the time and resources for the study.
- Identifying staffing needs of the AU and NEPAD to cope with their responsibilities with regard to ASIF. This will depend on the model chosen for ASIF by AMCOST.

Chapter Six. Next Steps

This report represents the end of the first phase of a continuing process leading to the design and creation of ASIF. The following points below are some suggestions for next steps together with dates for their implementation.

1. Exploring the legal implications of the suggested options and drafting the legal instruments that will be needed to create the chosen options. Suggested time: end of October 2006.

2. Presenting the options to the AMCOST meeting in November 2006.

3. AMCOST chooses its preferred option for ASIF for submission to the African Heads of State Meeting in January 2007.

4. The African Heads of State are asked to approve the AMCOST proposal to establish ASIF and to pledge initial funding.

5. The skeletal framework of ASIF is developed into a more comprehensive design. Suggested time: February to April 2007.

6. Stakeholder fora. There will be a series of meetings with different ASIF stakeholders. Their purpose will be to provide an opportunity for agreeing on the ASIF design and to get support from the different stakeholders before ASIF is officially launched. The stakeholder fora would include African governments and development banks; the African scientific community (academies, research councils, universities, etc.; African and foreign business communities; and international donors. Suggested timing: May and June 2007.

7. The choice of location for ASIF should be made by AMCOST and the African Union. Suggested timing: before June 2007.

8. The formal establishment of ASIF. Suggested timing: July 2007.

Appendix A. Structures of research funding bodies and international collaborative organizations

1 Global Environment Facility (GEF)
2 Consultative Group on International Agricultural Research (CGIAR)
3 African Economic Research Consortium (AERC)
4 Networks of Centres of Excellence (NCE) Program (Canada)
5 National Science Foundation (NSF) (United States of America)
6 European Research Council (ERC)
7 Chilean Millennium Science Initiative (MSI)
8 Agence Nationale de la Recherche (France) (ANR)
9 European Science Foundation (ESF)
10 Canadian Foundation for Innovation (CFI)

1 Global Environment Facility (GEF)[17]

www.gefweb.org

- Established in 1991
- Independent financial organization
- 176 member countries, at all levels of economic development

Mission statement
The Global Environment Facility (GEF) is an organization that secures funds from donor countries in order to provide grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities. Grants from GEF are used to support projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

The GEF serves as the 'financial mechanism' for four conventions on the environment: the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, the United Nations Convention to Combat Desertification and the Stockholm Convention on Persistent Organic Pollutants. The organization provides funding to assist developing countries to meet the objectives of these conventions and other agreements on the environment. The Conventions provide broad strategic guidance to the GEF Council, using which it develops operational criteria (guidelines) for GEF projects. The GEF operates under an Operational Strategy, which is due to be updated.

Governance
GEF Council
The GEF Council functions as an independent board of directors, with primary responsibility for developing, adopting, and evaluating all GEF programmes. The Council has 32 Members; 16 representing developing countries, 14 representing

[17] The information in this section was sourced from the GEF website, except where stated otherwise.

developed countries, and two for countries with transitional economies (Members' constituencies frequently cover several countries). Meetings are held twice-yearly and all decisions are made by consensus. The Council has an 'open door policy' towards non-governmental organizations and representatives of civil society, which it describes as making it "unique" among international financial institutions.
The *GEF Instrument* (establishing document) provides that Members and 'Alternate Members' representing a constituency shall be appointed by the participants in each constituency (meaning the responsible government officials). Unless the constituency decides otherwise, each Member of the Council and each Alternate shall serve for three years or until a new Member is appointed by the constituency, whichever comes first. A Member or Alternate may be reappointed by the constituency. The Alternate Member has full power to act for an absent Member.

GEF Assembly
The GEF Assembly is the governing body of the GEF in which representatives of all 176 member countries participate. It meets every three to four years to review the policies and operations of the GEF and its membership. The Assembly is also responsible for considering and approving proposed amendments to the Instrument, the set of rules by which the GEF operates. The Assembly meetings combine plenary sessions, exhibits, side events and GEF project site visits. Prominent environmentalists, parliamentarians, business leaders, scientists, and NGO leaders discuss global environmental challenges within the context of sustainable development and other international development goals.

Country representatives
Each country has one or more government officials who are designated GEF representatives, called 'Focal Points'. Some of these representatives will be Members of the GEF Council. 'Political Focal Points' (all member countries) are responsible for GEF governance issues, policies and communications with their constituencies. 'Operational Focal Points' are responsible for programme coordination of GEF projects and other operational activities within their country (only relevant for countries eligible for GEF funding).[18] Designating individuals as 'Focal Points' is aimed at helping to ensure that projects address valid priorities within each country.

GEF Secretariat
The GEF Secretariat serves the Assembly and the Council, coordinating the implementation of projects and programmes, and formulating policies and operational strategies. There are 40 staff, based in Washington, DC, headed by the GEF Chief Executive Officer and Chairperson. The Secretariat includes specialists, communications personnel, support staff and an Evaluation Office.

Organization
Management of GEF Projects
GEF projects are proposed and managed by 'GEF Implementing Agencies', namely the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the World Bank. Since 1999, seven other international

[18] For some countries, these roles are carried out by a single designated person.

organizations, 'GEF Executing Agencies', have also contributed to the management and execution of GEF projects. These are as follows: the African Development Bank (AfDB), the Asian Development Bank (AFDB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IDB), the International Fund for Agricultural Development (IFAD), the UN Food and Agriculture Organization (FAO) and the UN Industrial Development Organization (UNIDO).
Additionally, non-governmental organizations (NGOs) participate in GEF activities in a variety of roles, assisting in the design, execution, and monitoring of projects. A voluntary network of NGOs has formed (comprising 'Regional NGO Focal Points') to coordinate GEF-NGO consultations and participation of NGOs at GEF Council Meetings. Ten slots at GEF Council meetings are reserved for NGOs.

Scientific and Technical Advisory Panel of the GEF

The Scientific and Technical Advisory Panel of the GEF (STAP)[19] was established to provide objective scientific and technical advice to the GEF on strategy and programmes. The Panel comprises 15 experts in the GEF's key areas of work, and also involves a number of experts who advise on individual projects. Its work is supported by a Secretariat based at the United Nations Environment Programme (UNEP) headquarters in Nairobi. The Panel meets twice a year, prior to the GEF Council. It provides advice to the GEF through a variety of activities, based on a work programme agreed with the GEF, in consultation with the 'GEF Implementing Agencies' (see above), the UNEP, the UNDP and the World Bank.

"STAP's objectives are:

- To identify and provide strategic advice on scientific and technical priorities, the scientific and technical coherence of GEF operational programs and strategies, and on emerging issues and gaps relevant to the implementation of operational programs.
- To provide scientific and technical advice aimed at strengthening the scientific and technical quality and underpinnings of GEF projects.
- To enhance and improve the collaboration with other scientific and technical bodies, communities and private sector in areas of relevance to the GEF priorities.
- To advise on capacity building efforts in S&T relevant for development and implementation of GEF projects.
- To advise on targeted research relevant to GEF strategic priorities.
- To advise on monitoring and evaluation indicators for focal areas and cross-cutting issues."

STAP, in accordance with its Terms of Reference[20], is additionally responsible for providing a forum for the GEF and the natural and social science communities and relevant technologists. STAP promotes the development of research policy and projects and reviews research projects.

STAP should advise on a number of areas including:

[19] Further information can be found at the STAP website, http://stapgef.unep.org/.
[20] STAP's Terms of Reference are available at: http://stapgef.unep.org/docs/folder.2005-12-08.7258554031/folder.2005-12-06.1499852866/TOR-10-95-1.pdf.

- the state of scientific, technical and technological knowledge related to each focal area of the GEF, highlighting policy and operational implications for the GEF;
- scientific coherence of GEF operational strategies and programmes; and
- research that would improve the design and implementation of GEF projects, and by reviewing the research work of the 'Implementing Agencies' (see above) and the GEF Secretariat.

Funding

GEF funds are contributed by donor countries. Since 1991, the Global Environment Facility has provided $6.2 billion in grants and generated over $20 billion in co-financing from other sources to support over 1,800 projects in 140 developing countries and countries with economies in transition. For example, in 2002, 32 donor countries pledged $3 billion to fund operations between 2002 and 2006.

Operational programmes

The GEF provides grants through 15 operational programmes reflecting its 'focal areas' (biodiversity, climate change, international waters, ozone depletion, land degradation and persistent organic pollutants).

Eligibility criteria

Any eligible[21] individual or group may propose a project, which must meet two key criteria: it must reflect national or regional priorities and have the support of the country or countries involved, and it must improve the global environment or advance the prospect of reducing risks to it. GEF project ideas may be proposed directly to UNDP, UNEP, or the World Bank (the 'GEF Implementing Agencies').

Resource Allocation Framework

In 2005, the GEF Council adopted the Resource Allocation Framework (RAF), a new system for allocating resources to recipient countries to increase the impact of GEF funding on the global environment. The RAF allocates resources to countries based on each country's potential to generate global environmental benefits and its capacity, policies and practices that mean it could successfully implement GEF projects.

Engaging the private sector

The GEF encourages the private sector to seek opportunities to collaboratively engage in the identification of project concepts and objectives as well as in the financing, and monitoring and evaluation of GEF projects. The World Bank should play the primary role in ensuring the development and management of investment projects.

Internal monitoring and evaluation

The GEF Evaluation Office was established as an independent evaluation entity within the GEF, and reports directly to the GEF Council on monitoring and evaluation matters. The Mission Statement of the Evaluation Office is as follows: "Enhance global

[21] Further information on eligibility criteria for countries is available at: http://www.gefweb.org/Operational_Policies/Eligibility_Criteria/eligibility_criteria.html.

environmental benefits through excellence, independence and partnership in monitoring and evaluation."[22]

The Office is responsible for three main areas: evaluation of the effectiveness of GEF projects and programmes, establishing monitoring and evaluation standards, and oversight of monitoring and evaluation of GEF projects and programmes by the Implementing and Executing Agencies (which have their own evaluation offices). An Annual Performance Report is prepared by the Office for the GEF Council on the results of completed projects and factors affecting accomplishments. Every four years, the Office arranges for a comprehensive study of the GEF's overall performance.

External evaluation
A review commissioned by the Council of the GEF in 2002 found that the GEF had achieved significant results in addressing global problems. The GEF was criticised for its efforts to obtain critical scientific review of its projects.[23]

2 Consultative Group on International Agricultural Research (CGIAR)[24]

www.cgiar.org

- Established in 1971
- Strategic alliance of members, partners and international agricultural centres
- More than 8,500 CGIAR scientists and staff now work in over 100 countries
- Sixty-four members, including developing and industrialised countries and foundations

Mission
"To achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, forestry, fisheries, policy, and environment."

Objectives
The Consultative Group on International Agricultural Research (CGIAR) is a strategic alliance of countries, international and regional organizations, and private foundations that support 15 international agricultural centres (13 of which have their headquarters in developing countries). The Alliance aims to mobilise agricultural science to reduce

[22] The *GEF Monitoring and Evaluation Policy* is available at: http://thegef.org/MonitoringandEvaluation/MEAbout/documents/Policies_and_Guidelines-me_policy-english.pdf.
[23] See: Christoffersen LE (2002) Globalizing benefits *Our Planet* (the UNEP magazine), available at: http://www.ourplanet.com/imgversn/133/chris.html; Bostanci A (2002) Cast-strapped fund struggles to make science a priority *Science* **296**: 1596–7.
[24] The information in this section was all sourced from the CGIAR website, except where stated otherwise.

poverty, foster human well being, promote agricultural growth and protect the environment.

Governance

Membership

Membership of the CGIAR is open to international organizations, governments, and private foundations that support the mission of the CGIAR, participate in policy making, and provide support for the conduct of research at the 15 international centres. There are 64 members that provide financing, technical support, and strategic direction; these comprise 25 developing and 22 industrialised countries, four private foundations, and 13 regional and international organizations. The Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Development Programme (UNDP), and the World Bank serve as co-sponsors. The roles, responsibilities and functions of the main organs of the CGIAR, details of eligibility and conditions of Membership are contained in the *Charter of the CGIAR System*.[25] Also included are the internal rules and regulations of the CGIAR research centres.

The Chair of the CGIAR is nominated by the President of the World Bank. The Director, selected through an international process, functions as the Chief Executive Officer (CEO) and heads the CGIAR Secretariat.

Executive Council

The Executive Council (ExCo) is a subsidiary body of the CGIAR, chaired by the Chair of the CGIAR. It is a committee of 21 shareholders and stakeholders, incorporating representatives from all components of the CGIAR System. Certain positions within the CGIAR, e.g. the Chair of the Science Council (see below), have a permanent place in the ExCo. Other members are rotating and identified by the constituency concerned. The CGIAR Director is its Executive Secretary.

Functions of the Executive Council include:

- acting on behalf of the CGIAR between Annual General Meetings;
- facilitating the CGIAR's decision-making by reviewing major policy issues and submitting recommendations for consideration;
- providing oversight during implementation of the CGIAR's decisions;
- reviewing and extending or curtailing, as appropriate, the terms of CGIAR committees;
- considering ways in which the CGIAR could improve its dialogue with other organizations and the private sector;
- reporting regularly to the CGIAR; and
- assigning specific tasks and responsibilities to the Secretariat.

Organization

The primary institutions in the CGIAR System are:

- the Consultative Group on International Agricultural Research (CGIAR/the Group);

[25] The Charter of the CGIAR System is available at: http://www.cgiar.org/pdf/cgiar_charter_2004_nov8.pdf.

- the independent Science Council; and
- the 15 international agricultural research centres.

The three components of the CGIAR System are interdependent. They are supported by the Executive Council (ExCo) (see above), a broad range of partners, various standing committees, and the System Office, a 'virtual' combination of service units.

The 15 international agricultural research centres supported by the CGIAR are independent institutions, each with its own charter, board of trustees, director general, and staff. The CGIAR increases the global impact of the centres through collaborating with many hundreds of partner organizations and supporting regional federations of agricultural research institutions.

CGIAR Science Council

The Mission of the CGIAR Science Council is:
"To enhance and promote the quality, relevance and impact of science in the CGIAR, to advise the group on strategic scientific issues of importance to its goals and to mobilize and harness the best of international science for addressing the goals of the international agricultural research community."

Additionally, the Council is responsible for assessing the impact of research carried out under the auspices of the CGIAR. The Council works by means of four standing panels, providing services directly to the CGIAR System through:

- participating in priority setting and planning;
- analysing the Centres' strategic plans and priorities;
- giving advice on science policy;
- reviewing activities and outputs and assessing the quality and relevance of science in each centre; and
- carrying out impact assessments.

System Office

The CGIAR System Office is a term for a 'virtual' combination of eight service units, under the categories of strategic planning and development, monitoring and evaluation, communication and management. The units include the Secretariat, the Central Advisory Service for Intellectual Property and an Internal Audit Office. The System Office objectives are described as helping to capture wider opportunities by identifying and pursuing opportunities to increase effectiveness, reduce costs, and enhance the funding of the CGIAR as a whole.

The Secretariat is the principal central service unit of the CGIAR System, and its focal point for relations with external partners, from legislative decision makers and scientific communities in the public and private sectors, to civil society institutions and the general public. The World Bank, as a CGIAR co-sponsor, houses the CGIAR Secretariat in Washington, DC, and all Secretariat staff are employed by the World Bank.

Funding
Individual members make voluntary contributions to the centres, projects or programmes of their choice, with the aim of allowing funds to be targeted to areas of research and regions that align with development priorities. Each centre directly receives and spends funds and provides accountability through their externally audited financial statements. CGIAR members contributed approximately US $450 million in 2005, with industrial countries accounting for more than two-thirds of CGIAR financing.

Operation
Research forms the majority of projects and activities at CGIAR centres. Components may be executed by one or more centres and/or jointly with national agricultural research systems, other research institutions, and non-governmental organizations. Centres develop their agendas and work programmes in collaboration with partners, whilst complying with criteria set out by the CGIAR.

Evaluation
The Independent Evaluation Group (IEG) of the World Bank has recently completed a meta-evaluation of the CGIAR as part of an overall evaluation of the World Bank's involvement in 70 global programmes. The IEG concluded that the CGIAR has been a unique instrument of international cooperation. Its productivity-enhancing research has had sizeable impacts on reducing poverty by increasing employment, raising incomes, lowering food prices, and releasing land from cropping. Moreover, further improvements in sustainable agricultural productivity are critical to meet the international community's Millennium Development Goal of halving poverty by 2015. However, the Report also observes that the CGIAR faces huge challenges, and that it was less focused on enhancing agricultural productivity than it used to be.[26]

3 African Economic Research Consortium (AERC)[27]

www.**aerc**africa.org

- Established in 1988
- Public not-for-profit organization devoted to advanced policy research and training in economics
- Twelve members including donor governments, private foundations, and African and international organizations

Mission

[26] See: World Bank Independent Evaluation Group (2003) *The CGIAR at 31: An Independent Meta-Evaluation of the Consultative Group on International Agricultural Research*, available at: http://www.worldbank.org/ieg/cgiar/.
[27] The information in this section was sourced from the AERC website, except where stated otherwise.

The African Economic Research Consortium's (AERC) mission rests on two premises:

1. that development is more likely to occur where there is sustained sound management of the economy, and
2. that such management is more likely to occur where there exists an active, well-informed group of locally based professional economists to conduct policy-relevant research.

Hence, the mandate of the AERC is threefold: enhancing the capacity of locally-based researchers to conduct policy-relevant economic inquiry; promoting retention of such capacity; and encouraging its application in the policy context.

Objective

To strengthen local capacity for conducting independent, rigorous inquiry into problems pertinent to the management of economies in Sub-Saharan Africa.

Governance

The Consortium has three principal organs: the Board of Directors, the Programme Committee and the Secretariat. The Board of Directors takes responsibility for the overall management and financial health of the Consortium. The Programme Committee sets the research and training agendas, recommends the individual grants made under the Research and the Training Programmes, and evaluates the Research Programme. The Secretariat, under the direction of the Executive Director, implements the approved programme of work and manages the budget.

The Board of Directors

The Board of Directors is a mixed body comprising both institutional Directors and Directors-at-large who meet at least once annually. The former are appointed by Members of the Consortium; donors who contribute or expressly commit themselves to contribute a minimum of $100,000 per annum for core activities (i.e., funding that is not earmarked) for the subsequent fiscal year to the AERC (see below). The latter are elected by the Board following nomination by the Nominating Committee on the basis of the candidates' expertise and knowledge of the policy environment in Africa. The Executive Director of the AERC and the Chair of the Programme Committee are *ex officio* members of the Board with voting rights.

The Board manages the affairs of the AERC and has the following tasks:

- to approve the AERC's multi-year Strategy and its annual Programme of Work and budget;
- to appoint the Executive Director and the other international officers of the Secretariat;
- to approve the AERC's policies and procedures;
- to approve the AERC's annual report and audited financial statements;
- to commission evaluations of the AERC's performance;
- to take appropriate measures to ensure the AERC's long-term financial viability;
- to appoint the Officers of the Executive Committee; and
- to take any other action that is in pursuance of the objects of the AERC and consistent with the Board's responsibility to manage the affairs of the Consortium.

Executive Committee
The Directors elect a Chair, a Deputy Chair, a Treasurer, a Secretary, and one or more Directors who together make up the Executive Committee, each serving for a three-year term. The Committee meets three times a year. It has been recent AERC practice to elect a Board Chair who is not on the staff of a donor agency.

The Programme Committee
The international Programme Committee is composed of 13 members, drawn from senior African scholars, policy analysts, policy makers and international resource persons. The Executive Director is an *ex officio* member of the Committee with the right to vote. The members of the Programme Committee elect their Chair who becomes an *ex officio* member of the Board of Directors with the right to vote. The Committee Chair and the Executive Director jointly appoint members to fill vacancies on the Committee. The Programme Committee carries out the following functions:

- setting the Consortium's research agenda and determining its training priorities;
- considering the Consortium's proposed multi-year Strategy;
- reviewing the proposed Programme of Work for each year;
- approving recipients for grants, awards, scholarships and fellowships; and
- recommending the commissioning of evaluations of the Research and Training Programmes.

AERC Network
An AERC Network has been formed, comprised of current and former AERC researchers as well as resource staff, lecturers, members of the academic boards and students and representatives of institutions supported by the AERC. The AERC provides members of the Network with professional information and opportunities to exchange experiences and share research ideas. Members of the Network influence the AERC's decisions through membership on the Programme Committee and through various consultation channels.

Organization
The AERC is based in Nairobi, Kenya, where it is recognised as an international organization through a Host Country Agreement with the Government of Kenya. The AERC supports a research programme and a postgraduate training programme.

AERC Research Programme
The AERC Research Programme aims to use a flexible approach towards improving the technical skills of local researchers, allowing for regional determination of research priorities and strengthening national institutions concerned with economic policy research. The programme also fosters closer ties between researchers and policy makers.

The AERC offers small grants to groups of individuals from both academia and policy institutions to conduct research on a set of pertinent themes. The AERC also supports Collaborative Research Projects carried out by teams of African researchers and their counterparts elsewhere on mutually agreed themes. Such research is designed to give rise

to new, high quality research output and literature of interest to the African academic and policy communities.

AERC Training Programme
The Training Programme manages and supports postgraduate courses and studies in economics and helps to improve the capacities of departments of economics in public universities across Africa. A comprehensive communications and outreach strategy encourages the application of AERC outputs to economic policy making. The training programmes contribute to the regional retention of scarce capacity of teaching staff as professional opportunities for excellence have been enlarged. The AERC has also embarked on building an electronic network among the universities participating in the collaborative PhD and MA programmes. This is aimed at facilitating information sharing and improved access to world resource centres. The training programmes are managed by the Secretariat through academic boards.

AERC policy
With regard to policy, six seminars have so far provided a forum for the discussion of policy-oriented syntheses of AERC research and for obtaining feedback from policy makers on the AERC research agenda.

Funding
The AERC is supported by 16 funders, of which 12 are members of the Consortium and are charged with the duty of electing a Board of Directors (see above). These include the development departments of governments of developing countries, foundations and the World Bank. Non-member funders include charities and the Commission of the European Union.

Evaluation
An evaluation of the AERC was published in 1996 by E Thorbecke.[28] The Report described the AERC research programme as "an extraordinarily successful operation", although it recommended that the Consortium seek to better understand the various dimensions of poverty that is so endemic to the region.[29] Further evaluations are in progress.[30] A 2005 Paper by the Executive Director of the AERC describes the *Experience of AERC in Research, Capacity Building and the Development of Collaborative Training Programmes*.[31]

---

[28] For further details, see *The AERC Research Programme: An Evaluation*, available at: http://ideas.repec.org/p/fth/afrirc/21s.html.
[29] Report not available on the Internet, for quotes see Lang S (1996) Economist leads effort to relieve poverty in sub-Saharan Africa *Cornell Chronicle*, available at: http://www.news.cornell.edu/chronicle/96/8.29.96/Thorbecke.html.
[30] See AERC (2004) Newsletter *Phase VI - Shaping the future of AERC*, available at: http://www.aercafrica.org/newsletter/newsletterarticle.asp?newsletterid=95&quarter=23&title=Issue%C2%A023&month=May%202004.
[31] Lyakurwa WM (2005) *Experience of AERC in Research, Capacity Building and the Development of Collaborative Training Programmes*, available at: http://siteresources.worldbank.org/INTDECCAPBUIECO/Resources/WiliamLyakurwa-revised.pdf.

4 Networks of Centres of Excellence (NCE) Program (Canada)[32]

www.nce.gc.ca

- Established as a permanent programme in 1997
- A programme to support partnerships between researchers in universities, industry, government and not-for-profit organizations
- 830 companies, 266 provincial and federal government departments and agencies, 51 hospitals, 194 universities, and more than 365 other organizations from Canada and elsewhere involved in the NCE programme (2004–5)

Mission

The goal of the federal Networks of Centres of Excellence (NCE) Program is to mobilise Canada's research talent in the academic, private and public sectors and apply it to the task of developing the economy and improving the quality of life of Canadians. This goal is consistent with, and reinforces, the three pillars of the federal S&T strategy: sustainable job creation and economic growth, improved quality of life, and advancement of knowledge.

NCEs are partnerships among universities, industry, government and not-for-profit organizations aimed at turning Canadian research and entrepreneurial talent into economic and social benefits. The research partnerships are nation-wide, multidisciplinary and multi-sectorial. NCEs are "institutes without walls", formed by coordinating Centres to address strategic research questions. NCEs have been formed in areas as diverse as engineering and manufacturing, health, human development and biotechnology, information and communications technologies, natural resources, the environment and water quality.

Objectives

The NCE Program is aimed at fostering powerful partnerships between universities, government and industry. The Networks funded by the Program are designed to develop Canada's economy and improve the quality of life of Canadians.

Governance

The NCE Program is jointly funded and administered by three federal granting agencies – the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research, and the Social Sciences and Humanities Research Council – in partnership with Industry Canada. The Program is managed by a Steering Committee made up of the Presidents of the three granting agencies and the Deputy Minister of Industry Canada. Day-to-day administration is provided by the NCE Directorate made up of staff from the three granting agencies.

Organization

[32] The information in this section was sourced from the NCE website, except where stated otherwise.

There are currently 19 established NCEs and five new initiatives. Recently the Networks of Centres of Excellence Program has launched a pilot initiative to expand the international reach of the NCEs.

Funding

NCE Program funds are invested in national research networks that must meet certain objectives, such as stimulating internationally competitive, leading-edge fundamental and applied research in areas critical to Canadian economic and social development. Funding is distributed by competition. Universities, affiliated hospitals and research institutes, and post-secondary institutions with a research mandate may apply for funding from NCE. An industry consortium may also be eligible to receive funds to administer a network. The NCE Program annual budget stands at $82.4 million annually. Funding from the Government of Canada is channelled through the three granting agencies (see above).

5 National Science Foundation (NSF) (United States of America)[33]

www.nsf.gov

- Established in 1950 by US Congress
- An independent federal agency providing funds for research
- Each year, NSF supports approximately 200,000 scientists, engineers, educators and students at universities, laboratories and field sites in the US and elsewhere

Mission

"to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…"

The National Science Foundation (NSF) is the funding source for approximately 20 per cent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.

Governance

NSF leadership has two major components: a Director who oversees NSF staff and management responsible for programme creation and administration, merit review, planning, budget and day-to-day operations; and a 24-member National Science Board (NSB) of eminent individuals that meets six times a year to establish the overall policies of the NSF. The Director and all Board members serve six year terms. They are appointed by the President of the United States and confirmed by the US Senate. At present, NSF has a total workforce of about 1,700 at its Arlington, VA, headquarters, including approximately 1,200 career employees, 150 scientists from research institutions

[33] The information in this section was sourced from the NSF website, except where stated otherwise.

on temporary duty, 200 contract workers and the staff of the NSB office and the Office of the Inspector General. NSF is tasked with identifying and funding work at the frontiers of science and engineering. The Foundation aims to operate from the 'bottom up', monitoring research across the US and internationally. The Office of the Inspector General examines the NSF's work and reports to the NSB and Congress.

Organization

The NSF principally issues limited-term grants to fund specific research proposals that have been judged the most promising by a merit-review system. Currently approximately 10,000 new awards are made per year, with an average duration of three years, mostly to individuals or small groups of investigators. Other grants provide funding for research centres, equipment and facilities.

Specifically, the NSF's legislation authorises it to engage in the following activities:

- initiating and supporting scientific and engineering research to strengthen potential in these areas and appraise the impact of research upon industrial development and the general welfare;
- awarding graduate fellowships in the sciences and in engineering;
- fostering the interchange of scientific information among scientists and engineers in the US and other countries;
- fostering and supporting the development and use of new methods and technologies for research and education in the sciences;
- evaluating the status and needs of the various sciences and engineering and taking these into consideration in correlating its research and educational programmes with other programmes;
- providing a central clearinghouse for the collection, interpretation and analysis of data on scientific and technical resources in the US;
- determining the total amount of federal money received by universities and appropriate organizations for the conduct of scientific and engineering research;
- initiating and supporting specific scientific and engineering activities in connection with matters relating to international cooperation, national security and the effects of scientific and technological applications upon society;
- initiating and supporting scientific and engineering research, including applied research, at academic and other non-profit institutions and, at the direction of the President, supporting applied research at other organizations;
- recommending and encouraging the pursuit of national policies for the promotion of basic research and education in the sciences and engineering; and
- supporting activities designed to increase the participation of women and minorities and others underrepresented in S&T.

Organization

National Science Board

The National Science Board is an independent policy body with dual responsibilities to:

- oversee and guide the activities of, and establish policies for, the NSF; and

- serve as an independent national science policy body that provides advice to the President and the Congress on policy issues related to science and engineering that have been identified by the President, Congress or the Board itself.

Funding
The NSF operates with an annual budget of about $5.5 billion from federal funds. The Foundation both publishes notice of a funding opportunity, inviting researchers to submit proposals, and also accepts unsolicited proposals for research and education projects. Proposals are confidentially and independently reviewed by a panel of experts. Approximately 50,000 experts each year serve on review panels, reviewing the 40,000 proposals received, of which 10,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships.

6 European Research Council (ERC)[34]

http://erc.europa.eu

- Expected to start operations in early 2007
- Autonomous research council will award grants from EU research funds to researchers across Europe

Objectives
The European Research Council (ERC) is a recent initiative designed to boost European excellence in science, technology and the humanities, through the creation of a new, autonomous funding agency to support frontier research, selecting projects on the basis of excellence through pan-European competition.

Governance
The ERC consists of a Scientific Council which establishes the scientific strategy, supervises its implementation and ensures the integrated operation of the ERC, and a Dedicated Implementation Structure which is in charge of the ERC's operational management.

The Scientific Council (ScC):
- defines and decides on the ERC scientific strategy;
- monitors and controls the quality of ERC operations; and
- communicates with the scientific community and other stakeholders.

The Dedicated Implementation Structure (DIS):
- operates and manages the ERC in accord with the ScC strategy;
- implements the funding procedures according to the guidelines established by the ScC, e.g. for proposal submission, the peer review evaluation and selection process, and grant management.

[34] The information in this section was sourced from the ERC website, except where stated otherwise.

Organization

Scientific Council of the ERC

The Scientific Council was established in advance of the start of operations of the ERC itself. The Mission of the Scientific Council is as follows: "The ERC Scientific Council will be the policy-setting supervisory body of the European Research Council. It will act on behalf of the scientific community in Europe to promote creativity and innovative research. It will direct the scientific strategy and oversee the operational management of the ERC, including the selection of proposals and funding decisions. It will ensure the independence and transparency of the ERC's operations."

In detail, the ERC Scientific Council's mission is to:

Decide on a scientific strategy

> The Scientific Council defines and decides on the overall scientific funding and management strategy of the ERC, including an annual work programme where the calls for proposals and the corresponding funding rules and selection criteria are defined.

Monitor and control quality and performance

> The Scientific Council decides on and oversees the ERC's operational management and the implementation of the work programme, including the outcome of calls for proposals, the execution of peer review and selection processes, the selection of experts, and the grant management. It will also assess the quality and achievements of operations, and make recommendations for improvements and future actions.

Establish a communication strategy

> The Scientific Council ensures the transparency of ERC operations by establishing an open information strategy in communicating with the scientific community and stakeholders on the activities and achievements of the ERC.

The Scientific Council has 22 members from across Europe, who are scientists spanning the spectrum of S&T fields. The 22 founding members were nominated by the European Commission following an identification process involving wide consultation with Europe's research community. The Scientific Council elected its own Chair and Vice-Chairs.

Funding

The ERC was included in the European Commission's proposal for the Seventh Framework Programme for Research (2007–2013), published in April 2005. The creation of an 'autonomous European Research Council' to support research carried out by teams competing at European level, across all scientific and technological fields, as well as social science and the humanities has since been agreed by EU Ministers. The European

Commission has proposed a budget of approximately €1.5 billion per annum, although this has yet to be agreed.

It is foreseen by the Scientific Council that awards will be made and grants operated according to simple procedures that maintain the focus on excellence, encourage initiative and combine flexibility with accountability.[35] Peer review will be used to assess applications from researchers for funding by the ERC.

7 Chilean Millennium Science Initiative (MSI)[36]

www.mideplan.cl/milenio/ingles/index1.htm
Worldwide MSI: www.msi-sig.org

- Launched in 1999, has since supported four research institutes and 17 smaller research groups, called 'nuclei'
- The MSI was established to increase scientific and technological research resources in Chile
- Chile was the first country to establish an MSI, other developing countries have since developed their own MSI projects, usually with the involvement of the World Bank

Mission of the worldwide Millennium Science Initiative
The Millennium Science Initiative (MSI) strives to create and nurture world-class science and scientific talent in the developing world. The primary goals of the MSI are to:
- foster innovative research and applications of specific value to the host country or region;
- educate and train future generations of scientists and engineers; and
- develop linkages with educational and research institutions, the private sector, and the global scientific community.

Objectives of the Chilean Millennium Science Initiative
The MSI intends to contribute to the use of human scientific and technological research capacities, as they are important factors in sustainable economic and social development. The MSI aims to develop teams of researchers and offer an adequate environment, for example in terms of equipment, remuneration and critical mass of professionals, in order that their capabilities can be realised. It is hoped that, as a result, the 'brain drain' to other countries might decrease and Chilean or other scientists might be attracted to working in Chile.

Governance

[35] Described in ERC Scientific Council (2006) Strategy note: *The ERC Launch Strategy*, available at: http://erc.europa.eu/pdf/launch-strategy_en.pdf.
[36] The information in this section was sourced from the Millennium Science Initiative and the Chilean Millennium Science Institutes websites, except where stated otherwise.

Worldwide, the Science Initiative Group (SIG), founded in 1999, provides strategic direction, quality monitoring, and scientific guidance for the Millennium Science Initiative.

The structure of the Chilean MSI consists of a Board of Directors, a Program Committee and an Executive Secretariat. The Board of Directors is composed of eight members who are nominated by the President of the Republic to represent academia, business and public activity.

The Program Committee, composed of a group of international highly qualified scientists, aims to guarantee high quality projects and transparency of the process of project selection. The eight members represent a wide range of specialist fields. Members are nominated by the President of the Republic and their mission is the scientific guidance of the MSI. In particular, the Program Committee proposes the bidding conditions for scientific institutes and nuclei, recommends the selection of the winners, and is in charge of their permanent evaluation.

The Executive Secretariat is a small unit headed by an Executive Director responsible for the general administration of the MSI.

Organization

The MSI operates by financing larger institutes and smaller research 'nuclei' centres. The research institutes that have been created are expected to establish their own Executive Council (optional for the nuclei). The MSI planned to fund the institutes for an initial five-year period which may be extended for an additional five years. The nuclei are funded for a three-year period, after which they again may compete in the process of selection.

Monitoring and Evaluation

The institutes and nuclei produce annual reports covering their progress in research, networking and outreach activities as well as the administrative aspects. The Program Committee analyses the reports and prepares its own for the Board of Directors, which is subsequently submitted to the World Bank for approval, and afterwards made public.

It is expected that institutes should be evaluated every three years by expert panels, nominated and supervised by the Program Committee. The ensuing reports are presented to the Board of Directors and the World Bank. Nuclei are evaluated at the close of the second year by similar panels of peer experts convened by the Program Committee.

It is intended that an external panel of international specialists will evaluate the operation and performance of the MSI every five years. The composition of this panel will be established based on the recommendation of the Board of Directors to the President of the Republic who then will nominate the members after the approval of the World Bank.

Funding
The Chilean MSI was financed initially through Government funds and a loan from the World Bank. It is now fully funded by the Chilean Government.

Evaluation
A recent progress assessment reported that the Chilean MSI had substantially increased scientific publications and trained more than 300 young researchers in its first four years. However, it was also noted that the MSI has not succeeded in boosting patent applications.[37]

8 Agence Nationale de la Recherche (France) (ANR)[38]

www.agence-nationale-recherche.fr

- Established in 2005
- Funding body established to distribute grants to researchers assessed by peer review of proposals
- Main priority is life sciences research, funding also distributed to research in nanotechnology, energy technologies and social science research

Mission
The Agence Nationale de la Recherche (ANR, or National Research Agency) distributes funding to projects chosen by peer review on the basis of scientific excellence. The Agency marks a new mechanism for research funding in France. Collaborative industry/academic research will form an important part of the agency's portfolio.

Governance
The ANR was established with a light structure which delegates programme management to other participants in research in France such as relevant public research organizations. For example the agricultural research agency (INRA) will be responsible for evaluation and selection of projects in the food and nutrition programme. The ANR has set out the peer review procedure to be used by the organizations implementing its programmes. Following calls for proposals, an evaluation committee of scientists sends proposals for review to at least two experts independent of the evaluation committee. For collaborative industry/academia projects, evaluation committees and reviewers should include both public and private sector researchers. The evaluation committee presents its results to a steering committee of representatives of research organizations, government departments funding the programme, the ANR itself and representatives of the private sector and civil society. The steering committee then decides which projects should be funded on the

[37] See: Leighton P (2006) Chilean science initiative boosts research output *SciDev Net*, available at: http://www.scidev.net/News/index.cfm?fuseaction=readnews&itemid=2801&language=1. Report available at: http://www.mideplan.cl/milenio/noticia_68.htm. For further information on reviews, see MSI http://www.mideplan.cl/milenio/ingles/evaluacion.htm.

[38] The information in this section was sourced from the British Embassy in France (http://www.britishembassy.gov.uk/servlet/Front?pagename=OpenMarket/Xcelerate/ShowPage&c=Page&cid=1132595446797), except where stated otherwise.

basis of the scientific excellence criteria assessed by the evaluation committee, and any other criteria agreed by the committee, e.g. project management criteria or potential of project results for commercial exploitation. Funding ministries have a right of veto over the final list of projects financed.

Organization

Internal evaluation

The ANR itself will be responsible for retrospective programme evaluation, although it is not yet clear how these evaluations will be conducted.

Funding

The ANR was established in 2005 with a budget of €350M budget for its first year. Funding was increased to €800M for 2006 for research projects of up to four years.[39] The budget is designated to four main areas: response mode funding for original projects across all scientific disciplines; 'programmed mode' academic research in specific areas; 'programmed mode' industry/academia collaborative research; and non-project funding (e.g. for infrastructure).

For industry/academic collaborations, funding will be delivered through France's existing Research and Technological Innovation Networks (RRIT), which bring together academic and industrial partners to exploit public sector research results in a particular technology area.

Technology transfer

A new ANR call for proposals aims to address problems in technology transfer by providing funding for public research establishments to improve their activity in this area. Funding will not cover research and development projects directly, rather it will be available for activities such as systems to identify promising research results, work to agree intellectual property protocols between universities and public research organizations, management of an institution's intellectual property portfolio and development of marketing strategies.

9 European Science Foundation (ESF)[40]

www.esf.org

- Established in 1974
- Independent European association of national organizations responsible for the support of scientific research[41]
- Funded by 78 member organizations in 30 European countries

[39] Agence Nationale de la Recherche *Missions*, available at: http://www.agence-nationale-recherche.fr/Agence (in French).

[40] The information in this section was sourced from the website of the European Science Foundation, except where stated otherwise.

[41] For example, this includes Research Councils, the Royal Society and the British Academy in the UK.

Mission
"The European Science Foundation promotes high quality science at a European level. It acts as a catalyst for the development of science by bringing together leading scientists and funding agencies to debate, plan and implement pan-European initiatives."

Objectives
- "To advance European cooperation in basic research;
- to examine and advise on research and science policy issues of strategic importance;
- to promote the mobility of researchers and the free flow of information and ideas;
- to facilitate cooperation in the use of existing facilities and in the planning and provision of new facilities; and
- to plan and, where appropriate, to manage collaborative research activities."

Governance
The Annual Assembly
The Assembly is the main decision-making body of the European Science Foundation (ESF). It meets once a year and all Member Organizations are represented. The Assembly appoints the President, Vice-presidents, Executive Board and the Chief Executive of the ESF. It also approves the reports of the committees, the budgets and the accounts, and admits new members. It provides a venue for debate and interaction between the Member Organizations.

The Governing Council
The Governing Council is responsible for setting, approving, directing and monitoring the overall strategy direction of the Foundation. It is chaired by the President and is composed of one representative from each 'national group' of Member Organizations (two representatives from France, Germany, Italy and the UK). The representatives are normally at the level of Directors of Member Organizations. The Governing Council meets twice a year.

The Executive Board
The Executive Board consists of the President, the two Vice-Presidents, up to four other members, and the Chief Executive, who is present as a non-voting member. The Executive Board reports to both the Assembly and the Governing Council. It is responsible for implementing the strategy and policy set by the Governing Council under the overall guidance of the Assembly. The Executive Board is assisted by sub-committees dealing with such matters as Finance and Membership.

The ESF Office
The office of the ESF, based in Strasbourg, manages the day-to-day business of the ESF. The ESF Office is directed by the Chief Executive who is appointed by the Assembly. He/She is assisted by a small international staff.

Organization
ESF's scientific activities employ six main instruments: exploratory workshops, networks, research conferences, longer-term programmes, cooperative research projects and forward look projects. The ESF's networks and programmes typically have participants from no fewer than six countries with the average for programmes being 12 countries.

Individual groups of scientists submit proposals for networks which are put before the Network Group. As regards proposals for programmes, these may be submitted by individual scientists or member organizations. They are considered by the relevant standing committee or committees for the scientific disciplines involved.

Standing Committees
The ESF operates through a series of scientific standing committees and their associated committees and boards. The committees, comprising scientists and representatives of member organizations, are responsible for identifying scientific priorities, formulating relevant strategies and developing research agendas.

Funding
The ESF is an independent organization, and is funded through the contributions of its member organizations. The funding for 2003 was approximately €6.6M. The amount that member organizations contribute is calculated pro-rata on the basis of net national income. In addition, member organizations contribute specifically to the scientific programmes in which they are participating.

0 Canadian Foundation for Innovation (CFI)[42]

http://www.innovation.ca/index.cfm

- Established in 1997
- Independent corporation created by the Government of Canada to fund research infrastructure[43]
- Since its establishment the CFI has been granted $3.65(CAN) billion by the Government

Mission and Mandate
The Canada Foundation for Innovation (CFI) is an independent corporation created by the Government of Canada to fund research infrastructure. The CFI's mandate is to strengthen the capacity of Canadian universities, colleges, research hospitals, and non-

[42] The information in this section was sourced from the website of the Canadian Foundation for Innovation, except where stated otherwise.
[43] The CFI defines research infrastructure as: "the state-of-the-art equipment, buildings, laboratories, and databases required to conduct research".

profit research institutions to carry out world-class research and technology development that benefits Canadians.

Objectives

"Support from the CFI enables institutions to set their own research priorities in response to areas of importance to Canada. This allows researchers to compete with the best from around the world, and helps to position Canada in the global, knowledge-based economy. CFI support is intended to:

- strengthen Canada's capacity for innovation;
- attract and retain highly skilled research personnel in Canada;
- stimulate the training of Highly Qualified Personnel through research;
- promote networking, collaboration, and multidisciplinarity among researchers, institutions, and sectors; and
- ensure the optimal use of research infrastructure within and among Canadian institutions.

The research enabled by CFI support is also creating the necessary conditions for sustainable, long-term economic growth, including the creation of spin-off ventures and the commercialisation of discoveries, and supporting improvements to society, quality of life, health, the environment, and public policy."

Governance

The CFI was established as an independent, non-governmental organization with a Board of Directors which meets three to four times a year. An annual public meeting is held each year and is widely publicised in several of Canada's leading newspapers.

Members

The Board of Directors reports to Members who form a higher governing body (similar to a company's shareholders) representing the Canadian public. Members are responsible for the appointment of eight of the 15 Board Directors. They receive audited financial statements, appoint auditors, and approve the annual report at their annual meeting.

Board of Directors

The Board of Directors is made up of 15 individuals, seven of whom are appointed by the Government of Canada, from a variety of backgrounds. The Directors are appointed for a three-year renewable term and have expertise in the private, institutional, academic, research, and government sectors. One Director on the Board is a representative from one of the federal granting agencies.[44]

The Board of Directors makes final decisions on projects to be funded and sets strategic objectives in the context of the funding agreement. It approves annual plans and objectives, and reviews the outcomes of these objectives each year. It regularly reviews

[44] With regard to remuneration, the Board has chosen to use the guidelines established by the Government of Canada entitled *Remuneration Guidelines for Part-Time Governor in Council Appointees in Crown Corporations*. This entitles Directors to receive some remuneration for their involvement in the CFI.

issues from a risk-assessment perspective and aims to ensure that appropriate mitigation steps are in place.

Audit and Finance Committee

The Board of Directors oversees responsibilities for financial reporting through its Audit and Finance Committee. This Committee reviews the financial statements and recommends them to the Board of Directors for approval which subsequently submits them to the Members for approval. The Board of Directors is accountable to the Members who approve the CFI's financial controls and audits. Other important responsibilities of this Committee include reviewing the budgets, internal control procedures, investments, and advising the Directors on auditing matters and financial reporting issues.

Governance and Nominating Committee

The Governance and Nominating Committee aims to ensure that the proper framework is in place for the CFI to operate in an efficient and accountable manner. For example, this Committee is responsible for amendments to by-laws, human resources policies, succession planning, the annual performance evaluation of the President, and the code of conduct that governs the Board of Directors, CFI employees, and reviewers.

Organization

Selection process for CFI support[45]

Eligible Canadian institutions can apply for CFI support. Applications are assessed using the following criteria:

- quality of research and need for infrastructure;
- contribution to strengthening the capacity for innovation; and
- potential benefits of the research to Canada.

CFI support is awarded following a thorough merit-based assessment process that involves researchers, research administrators, and research users from Canada and abroad who review proposals and make funding recommendations. These volunteers are selected based on their expertise and reputation.

Funding

The CFI normally funds up to 40 percent of a project's infrastructure costs which are invested in partnership with eligible institutions and their funding partners from the public, private, and voluntary sectors who provide the remainder. Based on this formula, the total capital investment by the CFI, the research institutions, and their partners, will exceed $11 billion by 2010.

Internal Evaluation

The CFI aims to be publicly accountable and therefore evaluates the impact of its investments. The CFI has a signed funding agreement with the Government of Canada on investments and disbursements, and must operate within this framework.

---

[45] The *CFI Policy and Program Guide* is available at: http://www.innovation.ca/programs/index.cfm?websiteid=253.

To ensure that the institutions that receive support are providing the best possible results for the benefit of Canadians, the CFI requires that they be accountable in a number of ways. Institutions are requested to develop and periodically update strategic research plans and priorities to reflect the changing environment which are made public. All approved projects over $4 million are subject to a contribution audit at the institution. Further, a sampling of all other projects is also subject to audit. The CFI also conducts regular monitoring visits to confirm sound fiscal accounting practices at the institutions.

The Minister of Industry tables the CFI annual report in Parliament and it is widely distributed by the CFI each year. The CFI also makes regular appearances and submissions to the Standing Committees on National Finance and on Industry, S&T, and provides briefings to Members of Parliament, Senators, and senior Government officials.

Appendix B. International support for S&T in developing countries: A summary of best practices

A feasibility study[46] for the establishment of a "European S&T for Development" foundation has identified a list of best practices for foundations, development assistance agencies and international organizations to follow:

- Support for S&T in developing countries requires ***a clearly enunciated goal*** with attendant thoughts on how to measure progress toward that goal. Most foundations and development agencies describe their focus in sweeping and vague terms such as 'to empower the citizens of the world', 'to eliminate global poverty, inequality and injustice, to promote public involvement in civic affairs', which make it impossible to measure either success or failure.

- Significant change is rarely easy or quick and ***long-term commitment*** is required. Institutions, cultural patterns, laws, and values al change slowly. The experience of the past thirty years demonstrates amply the very few programs are successful if they do not have staying power. The most successful of the foundation programs have taken decades to realize their potential.

- ***Scale and critical mass*** must be taken into account. Successful support programs have taken seriously the requirement to match resources with problems. Real progress on any significant issue requires large amounts of money; it is impossible to build or test any significant theory or to bring about major capabilities without a funding scale that relates to the problem.

- ***Patience and tolerance of errors*** are essential. Capacity building does not occur without mistakes and disappointments. To be effective it is necessary to learn how embrace error. Foundations have a particular comparative advantage in this connection. Compared with governmental and intergovernmental organizations, the flexibility of foundations affords them a major advantage in capacity building.

- ***Follow-through and systemic approaches*** are required. Long-term support is one thing, but follow-through is quite another. A mayor lesson from previous experience has been that support for science without support to technology and innovation has limited significantly the benefits that have resulted. Foundations, bilateral agencies and international organizations can forever seed new programs and then jump on to newer subjects. Seeding new programs is indeed exciting, but unless someone is around to water the seedlings, weed them, harvest the grain, and bake the bread, seeding itself is useless.

[46] Extracted and adapted from Keith Bezanson and Geoffrey Oldham, "Issues and Options concerning a European foundation for research for development, Brighton, Institute of Development Studies (2000).

- ***Risk taking*** is increasing among the newer and better foundations. Funders interested in supporting new approaches and ventures have identified a need for this sector to take greater risk in its work. This involves financing start-up ventures, new entrepreneurs and projects that take bold approaches to achieving social and environmental objectives.

- ***Leadership development*** is key, as good people are at the heart of most successful programs and projects. There is a growing trend for new funders recognize and finance outstanding talent.

Appendix C. The ASIF questionaire

Background

At its first meeting in November 2003, the African Ministerial Council on S&T (AMCOST) resolved to find ways and means of strengthening, individually and collectively, science, technology and innovation systems in Africa and to use innovation as means of attaining sustainable development and integration into the global economy. Subsequently, at its second meeting in 2005, AMCOST adopted the Africa's Consolidated Plan of Action for S&T (hereafter CPA) which articulates Africa's common objectives, commitment to collective actions, and twelve Flagship Programmes and projects. The CPA also proposes the establishment of an African Science and Innovation Facility (ASIF) as a pan-African mechanism for the implementation of the programmes and projects of the CPA. ASIF is expected to facilitate the mobilization and provision of technical and financial resources required for successful implementation of the CPA.

The NEPAD Office of S&T (NEPAD OST) has requested a small team to review other regions' experiences, consult widely with stakeholders, and to develop and propose specific options for the mission, objectives, organizational configuration and governance of the proposed ASIF. The following set of questions is accordingly aimed at eliciting information on your views and ideas about the structure of the proposed ASIF. The report of this consultation is expected by NEPAD OST in September 2006 and therefore the time required for this consultation is brief. We would therefore much appreciate your responses by the deadline on the 31 August 2006. Your responses are expected to be your personal views and not a representation of any institution or affiliation.

The questions

2. **The case for establishing ASIF**:
   In your opinion, is the idea of establishing a new institutional arrangement (ASIF) the best way to mobilize the technical and financial resources needed to implement the Consolidated Plan of Action (CPA). There may be existing organizations that could also fulfil this role. If you think this is the case, which organizations do you think they are and why would they be a better option than ASIF?

3. **ASIF Technical activities:**
   AMCOST has suggested that ASIF should have both technical and financial responsibilities. What do you think are the most important technical activities that ASIF should undertake?

4. **Relations between the AU, NEPAD and ASIF:**
   The creation of ASIF will mean that the functions and responsibilities of those three bodies will have to be carefully designed. What do you consider to be the

key issues in this relationship, and what are their implications for the design of ASIF?

5. **Relations between ASIF and other African regional scientific and innovation related organizations:**
   The purpose of ASIF is to mobilize the technical and financial resources to implement the CPA. In doing this it will need to work closely with the African scientific community and a range of other groups to ensure that technological innovation occurs. What do you think are the types of organization that should be considered as partners for ASIF? Can you give specific examples for each of the groups you identify?

6. **Governance issues**
   Governance will depend on the type of institutional arrangement that ASIF becomes.
   What type of institution do you think is the most appropriate? Possible options might be an intergovernmental organization; an international non—governmental organization such as a foundation. Your views on these and other organizational frameworks are solicited.

   What criteria should be taken into account in designing the governance structure? For example, what balance should there be between government and non-government representatives? Should an effort be made to have gender and geographic balance? How can the voice of the users be heard? How important do you thin it is that the organization strives to be innovative, flexible and non-bureaucratic, and transparent?

6. Funding

The CPA proposes that ASIF will mobilise financial resources to develop and implement S&T programmes, and to develop guidelines for doing so. ASIF will explore various options for developing funding mechanisms and policies to secure African and external sources of finance.

1. How can African countries be encouraged to develop national instruments to ensure financial contributions to regional programmes? Are there innovative ways of achieving this?
2. Is there a place for non-voluntary contributions to regional programmes from African countries? If so, how should they be assessed?
3. What kind of common policies can be put in place to encourage the private sector to contribute to the development of regional public goods in S&I?
4. How can ASIF encourage donors to contribute to a central fund according to the principles set out in the Paris Declaration, and the Monterey Consensus to provide unified programmes, with common monitoring and evaluation procedures?

5. The effective implementation of the CPA programmes requires diverse approaches to funding. How should recipient institutions and individuals be selected?
6. How can research programmes be balanced between responsive and directive modes of funding? Are there other approaches?
7. What are the options for commissioning research projects?

7. Organizational issues:

The internal organization of ASIF will depend on the decisions taken about its status and objectives. At this stage in the development of the organization it is only possible to consider the general principles which will guide the shaping of the organization. Hence this section of the questionnaire will be brief.

1. What principles or criteria should guide the organizational structure of ASIF?

2. In your view, what should be the balance within ASIF between the technical staff and the financial staff? Why do you suggest this balance?

8. Monitoring and evaluation

The CPA envisages that ASIF will monitor and evaluate the implementation of the programmes, as well as monitoring its own activities.

1. How should ASIF itself be evaluated?

2. What should be the criteria for measuring the success of ASIF?

Dear Reader,

Request for your view on the design of ASIF

NEPAD's Office of S&T has commissioned a consultation about the best ways and means for implementing the Consolidated Plan of Action (CPA). The Council of S&T Ministers (AMCOST) which oversaw the development of the CPA has asked NEPAD to explore the options for creating a new African Science and Innovation Facility (ASIF) to mobilize the technical and financial resources needed to implement the Plan. This consultation is a part of the process of designing ASIF.

If you are interested in participating in this consultation we would be grateful if you would send your responses by email to ASIF@nepad.org, following the numbering system on the questionnaire. We would also be grateful if you would indicate in which country you currently reside and state the sector in which you work. For example, government, university, business, NGO, aid agency, other (please identify).

Thank you for your collaboration.

Yours faithfully,

The ASIF Project Team