



Royal Society submission to the Department for International Development consultation on the Science and Innovation Strategy

September 2005

The Royal Society welcomes the opportunity to respond to DFID's consultation on its science and innovation strategy and acknowledges the steps DFID is taking to ensure that science, engineering, technology and innovation (SET&I) play an essential and increasingly important role in DFID's work as they are crucial components for development and poverty alleviation. We acknowledge the increased engagement by DFID to interact with UK's science community, and international and developing country stakeholders in SET&I.

This document has been approved on behalf of the Council of the Royal Society by Professor Dame Julia Higgins FRS, Foreign Secretary and Vice-President. It has been prepared in consultation with Fellows of the Royal Society and other leading experts. Details are given in Annex 1.

We have not directly addressed all the questions listed in the DFID consultation paper, but have given a broader response to areas in which DFID should consider.

Summary of recommendations

- DFID and the international community should promote SET&I and help demonstrate their link to poverty alleviation and development to decision-makers at the highest level. We support DFID's approach to direct budget support as strategies are then owned by countries rather than dictated by external forces. However, the move away from sector specific aid makes it even more crucial to highlight the importance of including SET&I as a cross-cutting theme in poverty reduction strategies to developing country central planners. This will in turn improve the treatment of SET&I in Country Assistance Plans (CAP).
- Technical assistance to help developing countries make the necessary links between SET&I, national development needs and poverty alleviation should be made available to developing country planners to ensure that SET&I are properly represented in Poverty Reduction Strategies (PRS).
- DFID should aim to support initiatives which will help to build the critical mass of science policy advisors for developing country governments. It can support projects as outlined in NEPAD's Plan of Action or initiatives which help to strengthen national science academies to provide science advice to their governments. A good example is the US National Academies of Sciences (NAS) African Science Academy Development Initiative (ASADI). Provision of training and access to data and resources to government officials and scientists will enable them formulate national policies on science, engineering, technology and innovation (SET&I) which will have a direct impact on poverty and development.
- Centres of Excellence are needed to enhance scientific capacity in developing countries. We hope DFID and the international community will provide long-term support to centres of excellence and assist with NEPAD's Africa Plan of Action to help establish networks of centres of excellence in its priority areas.

- The Royal Society encourages DFID to take a holistic approach to education, looking not only at primary, but secondary and tertiary levels as well. DFID's Higher Education Links has been a very good programme to address the need for science partnerships between developed and developing countries and we recommend expansion and enhancement of this programme. We hope that DFID will take forward recommendations from the Commission for Africa report and encourage participation by the international community to raise the necessary funds to strengthen Africa's higher education.
- The Royal Society encourages DFID to increase further its in-house SET&I expertise. It will need skilled personnel who can identify, manage, review and scrutinise research effectively under its Chief Scientific Advisor (CSA). He should be supported by a core multi-disciplinary team of competent SET&I professionals and skilled technologists.
- The Royal Society would like to see the CSA take control of the DFID research budget and indicate how the £136 million will be spent. This will help to develop coherence on the overall vision for different research areas under the Central Research Department and ensure there are proper linkages to the Science and Innovation Strategy.
- DFID should create more effective linking systems between development demand and SET&I input. There should be more integration between DFID research programmes and the country programmes. DFID country offices should also have more involvement in setting the tasks for research in coordination with communities, developing country scientists and country sectors and informing UK research institutions about demand issues.
- DFID should consider undergoing a review of how SET&I are used and represented across the organisation to ensure effective systems are maintained and resources are not duplicated. The Royal Society would be happy to suggest experts for this task and help to develop a framework for the review.
- We hope DFID will outline in the Science and Innovation Strategy a long-term strategic plan for research in terms of reorganisation of funds which was not proposed in the Research Funding Framework. DFID should undertake horizon-scanning exercises looking 20-30 years ahead. It could consider working jointly with the Office of Science and Technology (OST) Foresight Team to develop horizon-scanning projects and fully exploit the strengths of the two departments. It will also be important to work jointly with developing countries to ensure their needs are properly represented and to help build capacity in horizon-scanning exercises.
- The Royal Society recommends a review to identify the areas where the UK science community holds comparative advantage and outline mechanisms to link these with the work of DFID. DFID could also consider joint funding of research programmes on SET&I topics relevant to development with the UK Research Councils in collaboration with developing country science communities.

SET&I and achievement of the Millennium Development Goals (MDG)

In general, the international community needs to encourage the development of indigenous scientific expertise and programmes of research and innovation. Past mechanisms have not been adequate because of their short-term nature. Developing country scientists need continued, predictable support in order to perform effective research which will have real impacts for development and poverty alleviation and will help to address national needs. Short-term, low-level funding will only demonstrate lip service to addressing an MDG but not allow for exploitation and long term technology transfer into the developing country.

The science needs to be developed and supported to a much greater extent in the developing world with research agendas set in dialogue with indigenous scientists and collaborating with the most advanced science in the developed world.

Developing countries are at differing levels of SET&I capability and assistance must be structured accordingly. Some countries like Rwanda have detailed national Science and Technology strategies which the international community and DFID could provide assistance in implementing. Other countries have not developed a systematic SET&I linkage to poverty reduction and development and will need support and technical expertise to show how the SET&I capacity of a country can be matched with strategies for poverty alleviation.

Capacity development and retention of country scientists

There is a need to develop approaches that enhance capacity building but also ensure retention of scientists within the developing countries. An enabling environment for scientists in the country which will provide working conditions conducive to good research through adequate resources and better wages is crucial. Additionally, developing country scientists need access to knowledge and data. It is important for the international community to help these countries obtain access to information communication technology (ICT) to gain the necessary knowledge and data for doing good research in the country.

Strengthening higher education in developing countries

We would encourage DFID to take a holistic approach to education, looking not only at primary but secondary and tertiary level as well. Higher education has an important role to play in economic and human development through the training of skilled professionals. Those particularly trained in SET&I are crucial for detecting opportunities from S&T and innovation and to develop useful policies in resource management, poverty alleviation, development and wealth creation. Furthermore, SET&I training can develop fundamental understanding of the world, logic and evidence-based reasoning skills that are highly valued in industrial and good government environments.

Research capacity in Africa is far below the level that is needed to fully exploit the gains that can be made through the creation, dissemination and adaptation of SET&I. DFID's Higher Education Links Programme has been a worthy initiative which has addressed the need for partnerships between higher education institutions in the developed and developing countries. We welcome DFID's new approach to the scheme, now titled Development Partnerships in Higher Education, which recognises that greater attention should be paid to science and technology, capacity building and gender equality. A strong case could be made to expand and enhance this programme within the country plan context to allow more ambitious science partnerships to develop.

DFID could also consider supporting the professional development of researchers and research managers in developing countries through schemes like joint PhDs with UK research institutions and fellowships for developing country scientists. However, support must be long-term and programmes must ensure that steps are taken to ensure that returning scientists are not left isolated and are provided means to continue their links with host institutions in the developed country. We hope DFID will take forth recommendations from the Commission for Africa report and push for participation by international donors to raise the funding required and address the major challenges to Africa's higher education.

Supporting Centres of Excellence

The Commission for Africa recommendation to develop and strengthen more centres of excellence is also very much needed to enhance scientific capacity in developing countries. Biotechnology is one area which many developing countries have stressed an urgent need for. Climate change and loss of biodiversity are other research areas which African countries need enhanced capacity to assess more completely the risks and impacts they may entail, and to develop strategies for as many of the predicted problems as possible. The NEPAD Africa Plan of Action has identified networks of centres of excellence dedicated to specific R&D and capacity building programmes as key to developing an African system of research and technological innovation. The international community and DFID should provide long-term support to centres of excellence and continue to encourage collaborations with suitable institutions in the developed world. The Royal Society and the National Research Foundation have supported a programme which has helped to develop research capacity and centres of excellence in the historically disadvantaged universities in South Africa. The scheme supports a joint programme of scientific exchanges between the UK and South Africa with the aim to develop expertise and excellence in selected areas of science, engineering and technology. We would be pleased to share with DFID our experience in running this programme.

Science Policy in developing countries

Developing countries will also need sound science and innovation policies to determine how, why and where resources are allocated to research and development. Many African countries do not have a sufficient pool of people who have specialised skills in science, technology and innovation policy analysis. In the knowledge-based economy, science advice is critical. Leaders and governments need science advisers to make sound decisions on national and international issues, particularly to make effective use of emerging technologies. Technologies like ICT, nanotechnology and biotechnology have huge implications for social and economic development. Science, technology and innovation need to be infused into the minds of government departments across the board and should be placed at the heart of the development process.

Science and technology are increasingly global and countries must have suitable advice to take part in international negotiations and diplomacy. Many international issues, particularly ones linked to science, are borderless and developing countries need the capacity for scientific analysis to have a voice in negotiations and cooperation in areas like climate change, biodiversity, energy and intellectual property. DFID should aim to support initiatives which will help to build the critical mass of science policy advisors to developing country governments. NEPAD has outlined a number of projects in its Africa Plan of Action to stimulate the development of this critical mass. The NAS African Academy Development Initiative is another project in place to help strengthen the role of academies to provide science advice in health issues to their governments. Other developed nation science academies are also looking to help strengthen the science advice role that African academies play in more general areas of SET&I. These kinds of initiatives are important as academies need to be strengthened to draw upon the country's expertise and provide an independent voice on crucial SET&I issues from which governments can draw advice from.

Policy and practice*Improving SET&I representation in Poverty Reduction Strategies and Country Assistance Plans*

It is very important to raise the ability of developing country officials to be sufficiently literate in science policy formulation and to increase the ability of scientists to communicate their areas of work at a policy level to ensure that SET&I are well-represented in Poverty Reduction Strategies. If the science community and government officials are adequately supported through training programmes and given access to the necessary information and resources, then these professionals will be enabled to formulate national policies on SET&I which will have a direct impact on poverty and development.

We support DFID's approach to direct budget support as strategies are then owned by countries rather than being dictated by external forces. Budget support also reduces the 'scattergun' effect by donors who fund project by project, and it allows for more coordination and pooling of aid from different donors. However, the move away from engaging in sector specific aid makes it even more important to support the representation of SET&I as cross-cutting themes in Poverty Reduction Strategies. Many in the developing country science communities have expressed their concern that SET&I have not been appropriately represented in Poverty Reduction Strategies and have articulated the difficulties they face in trying to influence their policy-makers and ministries of finance to appreciate the critical roles of SET&I in socio-economic planning. A number of our developing country respondents to the DFID submission had stressed the need for DFID and the international community to promote SET&I and help demonstrate the link to poverty to decision-makers at the highest level. Messages by DFID and the international community that SET&I are integral to poverty alleviation and development will do much to highlight the importance of including SET&I as a crucial component to the Poverty Reduction Strategies and in turn will improve the treatment of SET&I in Country Assistance Plans.

Also important is the provision of technical assistance to enable national research systems to convey the real and potential benefits of SET&I which are relevant to the PRS process and Country Assistance Programmes. We are aware that it is not DFID policy to provide technical assistance apart from limited support in areas like health and education, however, DFID could consider earmarking funds to outsource technical expertise to help developing countries make the necessary links between SET&I, national development needs and poverty alleviation and reflect this in their PRS.

An approach by DFID to fully promote SET&I to developing country decision-makers at the highest level and to assist with providing technical support on how to include SET&I into their country plans will allow DFID to retain its policy to provide direct budget support and it will increase the impact of its work.

Although DFID does not provide aid to support specific sectors, it will be crucial to engage with developing country sectors as it is these officials who will be best able to devise the key researchable questions relevant to national needs. There must be mechanisms for which these sectors can provide inputs to Poverty Reduction Strategies and Country Assistance Plans. Central planning ministries and Treasuries which mainly produce the Poverty Reduction Strategy Papers (PRSP) in developing countries should be encouraged to seek input from sectors and national agencies responsible for SET&I. Again, DFID could do much through the promotion of SET&I and highlighting the prominent role SET&I should have in the PRSPs to those at the highest levels.

As previously mentioned, different developing countries will have different levels of SET&I in place, some will have well-developed national strategies for SET&I and others won't be quite so well-developed or will be nonexistent. A number of countries have in place detailed plans but no implementation strategies and limited resources to realise their plans. DFID and the international community will need to take into consideration these country differences when determining how they will support SET&I in Poverty Reduction Strategies and Country Assistance Plans.

Ensuring that DFID is able to use and support SET&I for the achievement of the MDGs

In-house expertise

The Royal Society has previously stressed the need for DFID to develop a stronger scientific ethos throughout the organisation and although it is taking steps to develop this, we encourage DFID to further increase its in-

house SET&I expertise. DFID needs to be able to identify, manage, review and scrutinise research effectively through a science management infrastructure under its Chief Scientific Advisor. He should be supported by a core multidisciplinary team of competent SET&I professionals and technologists. He will need people who can evaluate important researchable questions and properly judge SET&I in coordination with DFID's social scientists.

Review of SET&I in DFID

We encourage DFID to undertake a review of how SET&I are used and represented across the organisation. This step will ensure that resources are not duplicated, effective mechanisms are maintained and ineffective systems are not replicated or reused. A thorough review of science across DFID and how it engages with its partners in developing countries, the international community and the UK science base will provide the necessary information to then develop an informed strategy for science and innovation. The Royal Society would be pleased to identify expertise to help with this exercise and assist with developing a framework by which to judge DFID's use of SET&I in its work.

SET&I inputs and development demand

A fundamental conceptual issue for SET&I in development is the inability of those with development demands, often the poorest of the poor, to articulate their demand in a way that links directly to a SET&I input. A great potential improvement would be in creating more effective linking systems between development demand and possible SET&I contributions. There is an intermediate skill in interpreting opportunities for SET&I input, often combined from several diverse sources into some viable solution. It will be important for DFID to integrate people with technical or integrative skills that would encourage SET&I inputs.

We stress the need for joined up thinking across DFID on the use of SET&I, particularly important is the integration between DFID research programmes and the country programmes. The DFID country programmes have access to much knowledge on demand issues and improved ability of country desks to interact and inform UK research institutions would provide a better linkage between demand and SET&I input. However, the country desks should be working together with communities, developing country scientists and country sectors to identify issues of demand. They should be more involved in taking up the results of research with the aforementioned groups as it is they who are most likely to get findings implemented. Country desks will need a more integrated and directed approach to relating SET&I and development which we hope the CSA will oversee.

Research Management

The increase in DFID's research budget by 58% over the next three years to £136 million is highly encouraging, but we hope that there will be explicit details of how these funds will be spent. The Research Funding Framework (RFF) had a number of positive and worthwhile policies and goals, but we look forward to more detail about methods of implementing ideas, by whom, and how research areas not covered by the RFF will be addressed; areas which we trust will be explained in further detail by the science and innovation strategy.

The Royal Society encourages the CSA to take control of the DFID research budget and outline how the £136 million will be spent. This would help to address how the Science and Innovation Strategy is linked to other research strategies currently being developed. For example, a clear indication of how the Science and Innovation Strategy will be linked to the Strategy for Research on Sustainable Agriculture (SRSA) should be stated. We are concerned that the development of the SRSA appears to have been done quite separately from the Science and Innovation Strategy. There will be important issues relevant to each strategy which will

need a coordinated approach. We would like to see that there is integration and coherence on the overall vision for different research areas under the Central Research Department and ensure there are proper linkages to the Science and Innovation Strategy. At present we do not see clear evidence that this happening.

There is also a need for a long-term strategic plan for research in terms of reorganisation of funds in a strategic way which was not proposed in the Research Funding Framework. We hope this will be outlined in the new science and innovation strategy. We strongly encourage DFID to undertake horizon scanning exercises to ensure a long-term perspective in its work which should look 20-30 years ahead. DFID could consider working in coordination with the OST Foresight Team to develop horizon-scanning projects on various themes associated with development and poverty alleviation. The Foresight team has good access to the UK and international scientific community and a partnership between Foresight and DFID could ensure a truly multidisciplinary approach to horizon scanning on development areas. The Foresight report 'Infectious diseases in Africa: using science to fight the evolving threat' is an example of how DFID and Foresight could have joined forces to broaden the impact of reports like this. It will be important to work jointly with stakeholders in developing countries to ensure that their needs are well-represented. Intense engagement with developing countries in horizon scanning is one way to help them develop the skills and expertise necessary to partake in these exercises.

UK scientific expertise

DFID must have a mechanism by which it can both recognise but also source elite international standard science from the UK which is also relevant to its objectives. We recommend a review to identify the areas where the UK holds comparative advantage and outline mechanisms to link these with the work of DFID. It should also review its current source of external consultation, ensure that it receives expertise from a number of high quality institutions and ensure that DFID tenders are allocated on a competitive basis. DFID could also optimise on top UK expertise through joint funding of research programmes on SET&I topics relevant to development with the UK Research Councils in collaboration with the developing country science communities. This will help DFID to foster strong links with the UK science community and ensure that it is kept abreast of research conducted by scientists in the UK which could have direct impacts on DFID's work.

Annex 1: List of Respondents

Professor Howard Atkinson	Centre for Plant Sciences, University of Leeds
Professor John Beddington FRS	Department of Environmental Science and Technology, Imperial College
Professor Christopher Chetsanga	Zimbabwe Academy of Sciences
Professor Robin Crewe	Academy of Science of South Africa
Ms Bitrina Diyamett	Tanzania Commission for Science and Technology
Professor Christine Foyer	Crop Performance and Improvement Division, Rothamsted Institution
Dr David Grimes	Department of Meteorology, University of Reading
Mr Mike Hughes	Ministry of Education, Science, Technology and Scientific Research, Rwanda
Mr Robert Kriger	National Research Foundation, South Africa
Professor Karl Kunert	Botany Department, University of Pretoria
Professor Silas Lwakabamba	Kigali Institute of Science, Technology and Management, Rwanda
Mr Moses Mengu	Botswana Technology Centre
Professor Samuel Mensah	Department of Physics, University of Cape Coast, Ghana
Professor John Mumford	Centre for Environmental Policy, Imperial College
Professor Victor Anomah Ngu	Cameroon Academy of Sciences
Professor Paul O'Brien	Department of Chemistry, University of Manchester
Professor Gideon Okelo	African Academy of Science
Dr John Palmer	DFID Forestry Research Programme, Natural Resources International Ltd
Professor Jack Pearce	Institute of Food Science and Technology, UK
Professor John Pickett FRS	Biological Chemistry Division, Rothamsted Research
Professor Steve Sparks FRS	Department of Earth Sciences, University of Bristol