Science and Technology Committee

The Science and Technology Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Government Office for Science and associated public bodies.

Current membership

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Graham Stringer (*Labour, Blackley and Broughton*)
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The following members were also members of the committee during the parliament:
Gavin Barwell (*Conservative, Croydon Central*)
Gregg McClymont (*Labour, Cumbernauld, Kilsyth and Kirkintilloch East*)
Stephen McPartland (*Conservative, Stevenage*)
David Morris (*Conservative, Morecambe and Lunesdale*)
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Powers

The Committee is one of the departmental Select Committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No.152. These are available on the Internet via www.parliament.uk

Publications

The Reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the Internet at http://www.parliament.uk/science. A list of reports from the Committee in this Parliament is included at the back of this volume.

The Reports of the Committee, the formal minutes relating to that report, oral evidence taken and some or all written evidence are available in printed volume(s). Additional written evidence may be published on the internet only.

Committee staff

The current staff of the Committee are: Dr Stephen McGinness (Clerk); Jessica Montgomery (Second Clerk); Xameerah Malik (Senior Committee Specialist); Jennifer Crees, (Committee Intern); Darren Hackett (Senior Committee Assistant); Julie Storey (Committee Assistant); Henry Ayi-Hyde (Committee Office Assistant); and Nick Davies (Media Officer).

Contacts

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List of additional written evidence

Written evidence

Written evidence submitted by Dr Thomas R Shelley

INTERNATIONAL DEVELOPMENT

Possible improvements to the way DfID works

Ever since I was at Cambridge in the late 1960s and early 1970s, I have been involved with the problem of improving education and development in developing countries and have to say that while many worthy educated British people have done much to help, activities by British Government agencies have always been something of an irrelevance. In my various experiences, I never heard of anything the British Government had achieved, and whenever I have tried to involve DFID or its various predecessors, it has always been, for some reason, outside their remit.

1. *Recycling text books and scientific equipment*

At Cambridge, I used to run the University of Cambridge branch of an organisation called World University Service. In my third year as an undergraduate in 1967 I hit on the idea of getting students going down, who could not be bothered to either sell or take their text books with them, to donate them to us. I then sorted through them and selected those that were worth sending to universities abroad, selling those that were not to be sent and using the money raised towards paying the shipping cost of the rest. I also started collecting unwanted laboratory equipment, and with the help of the London office of WUS, started collecting and shipping that too. As far as I know, nobody did this work after me, yet when I later went to work in Iran as a professor, I found that shortage of text books was a major problem for my students, which led to the university I was working in buying a printing press to produce pirated copies of some of the books.

Nothing has improved since. My wife is presently in her last year as a science teacher at a local school in Kent and told me that they throw lots of science text books away every time they change syllabus. I asked DfID if they had some means of sending donated text books and equipment to schools and they responded that it was not part of their remit. I have since made an arrangement through a retired BBC film director to have such text books and what equipment I can find shipped to Tafo in Ghana, where their schools and colleges have no books and no equipment except that which the film director has managed to find for them. But when my wife retires at the end of this school year, once again, all such surplus text books will go into skips for landfill.

I really think that DfID could help by using the power of being a government agency to collect up and ship unwanted science text books and equipment to institutions in Third World countries which presently have nothing. This has to be a better use of these materials than sending them to landfill, which is the fate of most of them at present

2. *Volunteer engineers aiding research and development*

My wife and I have made various visits to Pakistan at our own expense. On one particular occasion in August 2008, we were guests of Mr Rastgar, head of the Engineering Development Board, and he arranged that I give a series of lectures on how Pakistan could develop green solutions to their energy needs. These were very well received and he and we came up with a scheme to organise this research in Pakistan, and encourage retired engineers from the UK to come and give their time to assist it. We found that German and Russian semi retired engineers and professors were being brought in—we met some of each—but could not interest anyone in the UK in this idea. Again, if DfID cared to organise such schemes, where semi retired experts were shipped out to countries which needed them, this could be of great benefit, and help the UK sell not a few exports. The German we talked to was there with his expenses met by local companies, but not paid a salary, and regarded the visit as a holiday. He was staying as a guest in Mr Rastgar's residence while the Russian professor we met at a university in North West Frontier Province was being paid, but not much, and said he was there because he was enjoying the warm climate. I regret that we shall not be making any more visits to Pakistan in the near future after an attempt in July 2011 was made to rob us at gunpoint, and then murder us the following day, possibly connected with a terrorist organisation headquartered in London and under police protection here.

While we are reluctant to go again to Pakistan until the security situation improves, we feel that we could do a very useful job in some other country in the same sort of way, and know there are many others like us, who would also be willing to give some other country the benefit of skills acquired during a lifetime, which are no longer required in the UK. I am a chartered engineer, and my wife Rizwana is a chartered physicist.

12 November 2011

Written evidence submitted by the Met Office

Weather and climate science and international development

1. The importance of sustainable weather and climate services in developing countries is increasingly recognised by both DFID and the wider international development community such as the World Bank, Asian Development Bank and the UN Development Programme. Ultimately, weather and climate security underpins food and water security. Weather and climate information provides a crucial contribution to the achievement of national and international development goals: helping vulnerable communities prepare and respond to both natural and man-made disasters and increasing the ability of communities to adapt to future climate change. This contributes to the achievement of the Millennium Development Goals and is in particular aligned with the poverty reduction and environmental sustainability agendas. Developing national capacity in the science of climate change prediction is also an important mechanism to assist nations to participate fully in UNFCCC negotiations and contribute to bodies such as the IPCC.

2. The Met Office works in partnership with DFID, as well as national governments and other donor organisations, on a number of capacity development initiatives to strengthen the application of weather and climate science around the world. As part of the Public Weather Service the Met Office also supports National Meteorological Services (NMSs) in developing countries through the World Meteorological Organisation's Voluntary Cooperation Programme (WMO VCP). This enables those NMSs from areas of the world where observations are sparse, such as Africa and the Pacific, to produce weather and climate information and disseminate it to other meteorological centres around the world. This information assists in the monitoring of global climate change and is used in weather and climate prediction models to improve forecast accuracy. This is a mutually beneficial arrangement that ensures that the Met Office and the global meteorological community have access to the best possible data for weather forecasting and climate prediction. In turn, the VCP assists developing country NMSs to exploit forecasts from major centres, such as the Met Office, and to translate them into a national context.

3. Through this experience the Met Office recognises that the challenge of translating science, within a developing country context, to achieve real development outcomes is often as great as the completion of the science itself. For example, a weather forecast model might accurately predict the trajectory and intensity of a tropical cyclone, but if this information is not communicated to the impacted population and emergency responders in a meaningful manner and they are empowered to act upon it, the forecast is of limited value. In this respect the Met Office is able to draw upon its operational experience of working with central government, disaster responders, local authorities, media, private sector, public, civil society and other stakeholders in the UK, to support its partners in developing countries. Based upon Met Office experience in the UK, partner NMSs are able to identify the relationships and processes necessary to deliver sustainable and effective weather and climate services tailored to the needs of their own nations.

How does the UK Government support scientific capacity building in developing countries and how should it improve?

4. The DFID-Met Office Climate Science Research Partnership (CSRP) is a current initiative to improve both the science and application of monthly to inter-annual prediction over Africa. The programme draws substantially on in-depth intelligence gathering with African NMSs, NGOs and other bodies to understand specific vulnerabilities and needs. A major component of this programme is a fellowship scheme allowing scientists from partner institutions in Africa to conduct research on key climate science questions for the region and to collaborate with Met Office scientists working on similar themes. The scheme is centred around a secondment to the Met Office which has helped to build much greater understanding and cooperation between the UK and African climate science communities.

5. DFID has supported the development of PRECIS (Providing REgional Climates for Impacts Studies) on an ad-hoc basis over a number of years. This is a state-of-the-art regional version of the Met Office Hadley Centre climate prediction model that can be run on a PC. PRECIS allows scientists to take global climate change information and "downscale" the data for their region. This strengthens understanding of the likely impacts of climate change on a country, or regional, scale. Crucially, PRECIS is a tool that allows scientists from developing countries to get involved with climate science, investigate the strengths and limitations of climate predictions, and develop knowledge on how these predictions can be applied to inform decision making. Scientists from over 100 countries have been trained and are supported in the use of PRECIS.

6. The Climate Modelling in Bangladesh project is a collaboration between the Met Office Hadley Centre and the Bangladesh University of Engineering and Technology (BUET) which is supported by DFID Bangladesh. This project is enabling the Bangladeshi climate research community to produce their own regional climate projections, using PRECIS. A similar DFID funded initiative in China involves climate model downscaling for climate impacts and adaptation research in partnership with Chinese institutions. The work completed in Bangladesh and China serves as a model for how climate scientists can be engaged in a partnership at a national level, an approach which could be applied in other countries and regions.

7. The Met Office is also engaged in a wide range of capacity development initiatives which are not funded by DFID. Through the WMO VCP, the Met Office is supporting developing country NMSs to provide sustainable weather and climate services for their government and citizens. Examples include:

- Training and forecast products to support severe weather forecasting. This includes running weather forecast models specifically for Africa. Most recently the Met Office has supported a WMO coordinated project to disseminate weather warnings to fishermen on Lake Victoria. Part of this support has been to set up a 4km weather forecast model which is able to resolve small scale thunderstorms as they develop and move across the lake.
- Equipment and training to assist NMSs to provide weather presentations for their national television and radio networks. This improves visibility of the NMSs with their national government and wider stakeholders.
- Equipment, software and training to analyse and manage climate data, particularly for agricultural applications. This is beneficial to farmers in choosing crops and deciding on the best possible planting dates to optimise yield.

8. Under some donor funded initiatives, NMSs in developing countries are recipients of sophisticated technology without appropriate resources and training for ongoing maintenance, calibration and continued service delivery. Through the WMO framework, the Met Office and wider meteorological community are able to provide ongoing commitment and support, as well as address wider process and management issues, which are vital in ensuring long-term sustainability of services.

9. Working on these principles the Met Office also conducts capacity development initiatives for multilateral donor agencies and individual national governments. Examples include:

- Establishing a small network of Automatic Weather Stations in Sierra Leone in partnership with the Sierra Leone Meteorological Department, UN Development Programme (UNDP) and UN Environment Programme (UNEP).
- Secondment of an expert to Rwanda Weather Services funded by the Government of Rwanda to work with staff to enhance services, develop a sustainable growth strategy and implement training.
- A collaborative study of the likely impact of climate change on water resources in the Nile Basin in partnership with UNDP and Egyptian Ministry of Water Resources.

10. Closer alignment and coordination of the wider activities undertaken by the Met Office and international meteorological community with the regional and national programmes of DFID could be an efficient way to make the best use of scientific capability to achieve development outcomes. This could be achieved through more regular engagement and communications activities.

11. The Met Office has good and regular contact with the DFID Research and Evidence Division and also engages with individual country DFID offices, such as DFID Bangladesh, on an ad-hoc basis. More systematic sharing across DFID could ensure that lessons learned by one department, or country office, can be utilised by other areas of the DFID network. For example the CSRP is a project that has been coordinated by the Research and Evidence Division, but effective application of the science and capacity development across Africa, to ensure that DFID's investment in the CSRP realises its full potential, will require much closer engagement and integration with DFID's regional and country offices.

What are the most effective models and mechanisms for supporting research capacity in developing countries?

12. The CSRP fellowship scheme is engaging African climate scientists in research on key climate questions and, in the process, advancing their professional development. The Met Office would advocate the inclusion of similar fellowship schemes as part of any future capacity development programmes. The CSRP has also supported training workshops at ICPAC (Inter-Governmental Authority on Development Climate Prediction and Applications Centre) based in Kenya, at ACMAD (African Centre for Meteorological Applications and Development) in West Africa, and SADC-DMC (Southern Africa Development Community Drought Monitoring Centre) in southern Africa. In these ways the CSRP is proving very effective in both strengthening the existing scientific institutions and working in partnership with African climate science community to deliver enhanced and relevant services tailored to the needs and vulnerabilities of their populations.

13. This partnership approach is also at the heart of the projects that have been implemented in Bangladesh. In this case the direction of the science is coordinated jointly by colleagues from Bangladesh and the UK ensuring that it is tailored and owned on a national basis. Closer partnerships of this nature could be an effective means of translating the science into real development outcomes in other countries and regions.

14. UK support for research capacity in developing countries is dependent on identifying those areas where the UK has demonstrable leading expertise, enabling in-country scientists and end-users to leverage the best science capability possible. With other parts of government, the Met Office engages in UK science partnerships with other leading academic institutions to coordinate multidisciplinary teams across a broad science base. This ensures that the best possible science underpins these key projects. A similar approach could also be applied in the capacity development field. Future initiatives like the CSRP could benefit from the inclusion of a range of academic institutions in a longer-term science programme.

How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?

15. Progress on initiatives such as the CSRP is reviewed regularly both by DFID and by an independent Steering Committee. The Steering Committee consists of international experts who meet regularly to review the reports and future plans of project. DFID also monitor a broad set of metrics that indicate the ongoing success of the partnership. This is consistent with oversight of similar capacity development projects that are being completed for other donor organisations.

What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?

16. The DFID Chief Scientific Adviser (CSA) and Deputy Chief Scientific Adviser (DCSA) both have an authoritative standing within the international research community in development. The DCSA holds a part-time position at the University of Reading where he is an active researcher in the field of agriculture and climate change. The DFID CSA is a member of the cross-government CSAC group of CSAs, ensuring regular dialogue with the Met Office Chief Scientist. This could provide a useful forum for the Met Office to more closely align its capacity development activities with DFID's to ensure greater effectiveness and more efficient delivery.

13 December 2011

Written evidence submitted by the National Physical Laboratory (NPL)

1. *Summary of key points*

The UK is in a good position to exploit the strength of its Standards, Quality, Accreditation and Metrology sector not only to the benefit of Developing Countries but also to promote future growth in the UK economy.

2. *About NPL*

1.1 The National Physical Laboratory (NPL) is a leading UK research establishment with an annual turnover of £70 million and a staff of 600. It is the largest science asset directly owned by BIS and occupies a unique position as the UK's *national measurement institute* (NMI) sitting at the intersection between scientific discovery and real world application. Although sponsored by BIS, NPL also undertakes work for other government departments, notably Defra, DECC, MoD and DH. Its expertise and original research underpin quality of life, innovation and competitiveness for UK citizens and business:

- NPL provides companies with access to world-leading technical expertise and scientific facilities, assuring the confidence required to realise competitive advantage from the use of new materials, techniques and technologies;
- NPL expertise and services are crucial in a wide range of social applications—helping to save lives, protect the environment and enable citizens to feel safe and secure. Support in areas such as the development of advanced medical treatments and environmental monitoring helps secure a better quality of life for all;
- NPL develops and maintains the nation's top-level measurement standards, supporting an infrastructure of traceable measurement throughout the UK and the world, to ensure accuracy and consistency.

3. *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

3.1 Introduction

The World Trade Organisation recognises that one of the first technical capacities required by a Developing Country is the capacity for international trade. This requires a capability for Standards, Quality, Accreditation and Metrology (SQAM).

- Standards provide for the specification of products for trade
- Quality assures that products are fit for purpose
- Accreditation assures conformity to standards
- Metrology generally underpins the measurements necessary to show compliance with standards, legal aspects and specifications.

And all these generally depend upon the underpinning scientific capacity of the Developing Country.

A few years ago NPL took part in a workshop on Capacity Building in the SQAM Sector. A keynote address was given by Dr Laith Goonatilake, Senior Industrial Development Officer, Quality, Technology and Investment Branch of UNIDO. (He is now Director of UNIDO's Trade Capacity Building Branch.) I include below an extract from his keynote address where the links to SQAM have been highlighted:

Developing countries have commodities but not products. The Technical Barriers to Trade agreement mentions assistance to Developing Countries, but in reality Developing Countries have not applied for assistance, nor have developed countries offered it. Developing Countries cannot take immediate advantage of opportunities. This gives rise to the following requirements:

- There is a need for *technical assistance* to market access through:
  - Institution building for trade policy where proof of *conformity* with market requirements is necessary, eg in Uganda—*fish pesticide measurement*, Sri Lanka—*pesticide residues* in fabrics.
  - Export promotion
  - Strengthening *Trade Facilitation capabilities*
  - Investment, Facilitation and Financial Flows (through UNCTAD)
  - *International Agreements and Rules for Trade* (through WTO)
  - *Training and Human Resource Development*
  - Creation of trade-related *regulation*/policy framework
  - All these factors would depend upon Supply and Development (Capacity and *Competitiveness), Standards and Conformity Assessment Infrastructure* (TBT, SPS), Customs Procedures, Transport and *Documentation.*
- For *technical assistance* there is a need to develop strategies for:
  - Competitive Manufacturing Capacity
  - Providing Conformity with Market Requirements
  - Connecting to the Market
  - Funding technical assistance
  - To link supply capacity and conformity.
  - At the same workshop DFID stated: Trade is of vital importance to developing countries—a one percentage increase in Africa's share of world exports is equivalent to around five times the amount provided to the region through aid and debt relief.
  - Evidence of the importance of SQAM to Developing Countries can be found at:
  - www.sadc.int/english/regional-integration/tifi/sqam/; which sets out the priority given to SQAM by the South African Developing Community (SADC).

3.2 Current Government Support

The UK has a particularly strong SQAM sector and this provides a valuable resource for development assistance. The UK SQAM sector is embedded in various national institutions, and in some cases parts of government, including: National Measurement Office, National Physical Laboratory, British Standards Institute, United Kingdom Accreditation Service, Trading Standards Institute.

These organisations are often approached by Developing Countries and by agencies funding their development, and some training is provided where budgets allow. However, DFID have not to-date to our knowledge directly supported any overseas development work by the UK SQAM sector.

3.3 Opportunities for Improvement

The SQAM sectors of some other countries in Europe, for example France and Germany are funded by their governments to support the development of SQAM sectors in Developing Countries. For example PTB, the German equivalent to the UK NMO and NPL, has jointly undertaken projects with UNIDO and the International Organisation of Legal Metrology in West Africa providing training and planning workshops, and the German Government also provides funding for PTB experts to go to the region.

We give below a summary of the PTB International Technical Cooperation Programme as described by SADC.

Delegates were informed about the PTB's organisational structure, funding, its role as the National Metrology Institute and in the worldwide securing of correct measures and measurements and PTB's role in international technical cooperation. Over a period of four decades, more than 70 countries have been assisted with more than 130 million Euros in setting up metrology standardization, testing and quality (MSTQ) infrastructures.

To achieve this, PTB has cooperated with many specialist institutions and organizations in and outside Germany. The main German partners have been the Federal Institute for Material Research and Testing

(BAM), German Institute for standardization (DIN), German Calibration Service (DKD), Society for Electrical Engineering, Electronics and Information Technology (VDE) to name a few.

Outside Germany, PTB has cooperated with international organizations such as BIPM, ILAC, ISO, OIML, UNIDO and WTO and with national institutions such as INMETRO (Brazil), KEBS (Kenya), NIST (United States of America) and SABS (South Africa). Although PTB projects initially focused on the establishment of metrology institutions, the focus being demand driven has shifted over the years towards the establishment of regional metrology, standardization, testing and quality (MSTQ) structures in order to enable developing countries to effectively implement regional trade agreements and to create regional markets.

Projects are currently being implemented in Africa, Central/South America, Asia and the ex-Soviet Union countries. Adequate technical infrastructures in developing countries are key for competitive production, conformity assessment procedures and in implementing trade agreements hence PTB's focus and preparedness to continue its technical cooperation in this regard.

As well as providing important benefits for the Developing Countries, enabling them to export more goods, it also brings benefits to the donor countries. NPL staff often visit the emerging SQAM organisations in Developing Countries and are struck by the large amount of for example German manufactured equipment in their national laboratories. These national laboratories are providing leadership for their countries, and it is reasonable to expect that emerging technical businesses in these countries are likely to follow the purchasing choices of their national laboratories.

As important will be the relationships that are developed through the training given; such relationships are key to the future development of a strong trading partnership with Developing Countries.

The UK is in a good position to exploit the strength of its SQAM sector not only to the benefit of Developing Countries but also to promote future growth in the UK economy.

13 December 2011

Written evidence submitted by the Glasgow Centre for International Development (GCID), University of Glasgow

How does the UK Government support scientific capacity building in developing countries and how should it improve?

1. The UK Government supports scientific capacity building in developing countries in a variety of ways either directly through DFID, albeit on a limited scale, or through various agencies such as the Medical Research Council, the Royal Society, the British Council and the Commonwealth Scholarship Scheme. It should also be noted that some funders of scientific capacity building are not tied to government and do extremely valuable work. The Wellcome Trust is one such example.

2. However, scholarships and support that come from such sources can be very difficult for young scientists from developing countries to access successfully, mainly because there are relatively very few such schemes and the students face fierce competition from top students from very well-funded western countries like the USA, Canada, Australia, Japan, where their training has provided them with a stronger background and skill set to compete for these scholarships. With the emphasis on research excellence in UK universities, and this is of course has to be supported, there is however not always an incentive to recruit young scientists from developing countries onto these schemes. It is our view that if we really are to make difference to raising sustainable research capacity in developing countries, there has to be established a specific funding scheme, generously funded and specifically targeted at the poorest countries of sub-Saharan Africa and Asia.

3. It is the case that there has been a lack of interest by the UK Government in supporting the tertiary sector in developing countries and this has thus contributed, perhaps unwittingly, to the erosion of research capacity in these countries. Up until the 1990s, there had been considerable support for tertiary education in developing countries, and, as a result, many countries had strong universities, a vibrant research culture, an adequate scientific capacity and excellent academic links with UK institutions. However, a refocusing of British support in favour of primary, and to some extent secondary, education has had a hugely damaging effect on university education in many developing countries, and hence on those countries' domestic research capacities. This was sometimes matched by reductions in support by governments in developing countries themselves because of national level budgetary pressures. The result has been an impoverished university sector in many countries, in which there is ironically a growing demand for tertiary education, but a limited capacity to provide it at an acceptable level of quality. In many countries this has led to the growth of a private university sector in which standards are frequently very poor, with little meaningful contribution to building research and scientific capacity.

4. The problem of hugely reduced research and scientific capacity in developing countries has at least now been recognised by some donors and some governments. This has very much come to the fore with the dominance of the MDGs, and the realisation that one of the key reasons that most sub-Saharan African countries are going to miss most of the targets is that there is a significant lack of domestic scientific capacity to deliver them. President Kagame has observed that primary school leavers will make little or no impact on poverty

reduction related to the MDGs, and the pressing need is for more well-trained researchers and scientists coming out of well-resourced African universities if the MDGs and other poverty reduction measures are to be achieved. In Tanzania, there is a commitment by government to building national science capacity in support of national development ambitions. Consequently, many donors are now giving greater priority to capacity building; recently, for example, SIDA announced the full funding of 43 PhD training scholarships for Rwanda explicitly to build sustainable research capacity within that country, and there are various EU programmes, such as the ACP Science and Technology Programme, which are also explicitly aimed at building scientific capacity.

5. There is still a marked deficit of opportunities for PhD level training for developing country scientists. To become an independent researcher capable of accessing his/her own competitive funding (a clear measure of scientific sustainability), the absolute minimum requirement of any credible applicants is a PhD. There is a huge wealth of scientific talent in developing countries, and often many BSc and/or MSc level researchers with great skills but few opportunities to advance their career through PhD training because few opportunities exist in their home countries for such training, the costs of doing so in a western country like the UK are prohibitive (here we charge circa £14k per year; by contrast, many EU countries like France and Italy, for example charge either no fees, or as little as 1000 Euros per year, for African students), and there are very few scholarship opportunities for these students anyway.

What are the most effective models and mechanisms for supporting research capacity in developing countries?

6. At the outset, there needs to be a very clear commitment by donors and recipient governments to supporting scientific capacity building as a key development priority. This commitment is not only to be enshrined in policy statements, but also has to be followed up significant financial input.

7. A very successful model, which was previously supported by the UK Government through schemes such as the Academic Links Programme, needs to be revitalised but significantly upscaled. Long-term partnerships between universities and institutes in developed countries and those in developing countries need to be promoted, built on trust and mutual support. Capacity building should be at the heart of such arrangements, with mutually agreed outcomes and targets, but with a clear recognition by donors that this is NOT a short-term fix, and that patience must be shown. Because the scientific capacity of developing countries has been allowed to wither so dramatically over the last two decades, the Committee should be under no illusion about the scale of the rebuilding task to be undertaken.

8. As well as training programmes for early career researchers to build capacity, there is an equally important need for mid-career researchers and scientists to have exposure to international research through two-way exchange programmes of students, supervisors, experts etc. This could also be most effectively achieved through partnerships' development between UK and developing world universities, research institutes etc, supported by DFID funding.

9. There is a need for investment in people at developing world universities and institutes to encourage them to stay and develop their career in their home countries, and to develop internationally competitive teams. This can be achieved through the increased availability of significant local grant funding, as the lack of such funding has been a major factor in encouraging many young scientists to leave developing countries to work and settle in Europe and the USA. In addition, the provision of some source of salary buy-out to allow local researchers and scientists the time and space to do research, instead of being burdened by large administration and/or teaching loads. All too often, shortly after graduating with a PhD, researchers and scientists quickly are promoted to more senior managerial positions in their institutions, taking them out of research. If research and scientific salaries, or other support mechanisms, can be funded, this will reduce this loss of expertise to the domestic scientific community. Equally, investments in the provision of technical support, the creation AND maintenance of good research facilities, and collaboration opportunities with UK mentors, where appropriate, will all help to create a supportive research environment in which local scientists will want to stay.

10. A potential model of how this might look is the Wellcome Trust Fellowship scheme for students from developing countries. This supports the best and brightest scientists from low income countries to develop their career in their home country, well financed, with the opportunity to concentrate on cutting-edge research and to develop deep collaborations. The Wellcome-sponsored "Afrique One" consortium is an example of a scheme that is specifically designed to help build capacity through investing in promising early-career African researchers to establish themselves, along with their associated research group within their own country, supported by mentoring and in-country training by relevant UK experts.

How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?

11. We are frankly unclear how the Government monitors and evaluates the effectiveness of scientific capacity building, but suggestions for monitoring and evaluating include metrics such as evidence of the retention rates of young scientists in developing countries; evidence of changes in levels of funding for science in developing countries; monitoring of expenditure on science as a percentage of GDP in developing countries to assess government commitment; the development of an index of scientific outputs (papers), successful

research grant applications by researchers specifically and explicitly as PIs; and measures of impact as seen through sustainable development interventions.

12. There is also the possibility of research assessment exercises (similar to the RAE/REF) across developing regions to assess the relative scientific strengths of institutions. This form of competition can drive up quality as happened in the UK following the introduction of the RAE over 20 years ago. However, given the costs associated with developing and managing such an undertaking, we would signal some caution, given that such funds might be more usefully deployed to the central challenge of building scientific capacity in support of poverty reduction.

What role does DFID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?

13. It is not wholly clear to us what role DFID's Chief Scientific Adviser plays in determining priorities and in the development and assessment of capacity building policies. We do strongly feel, however, that there is considerable scope within the research budget of the Research and Evidence Division of DFID to embody research and scientific capacity building as a central element of any research grant proposals which it receives. This is essential for the creation of a sustainable research base in developing countries.

14. However, there needs to be a clear understanding developed of what the ultimate goal of capacity building should be, and this should be defined by appropriate stakeholders from developing countries, in collaboration with stakeholders from the UK, to give ownership and a clear sense of purpose and direction.

How are government activities co-ordinated with the private and voluntary sectors?

15. There has been a marked improvement in the way that government activities are co-ordinated with the private and voluntary sectors and there is clearly an opportunity to improve these still further. The success of the bioscience base in the UK is world-leading because of the support of the government (especially the Research Councils), the private sector (large pharmaceutical companies) and major charities (eg the Wellcome Trust and Cancer Research UK). A similar model could potentially be very effective in developing countries.

Declaration of interests

The Glasgow Centre for International Development (GCID) is an interdisciplinary research centre at the University of Glasgow with the remit to co-ordinate research and capacity-building activities in international development across all four Colleges of the University (Medical, Veterinary and Life Sciences; Science and Engineering, Social Sciences; and Arts), and mainly in collaboration with our partner universities and research institutes in developing countries. Most of these are located in sub-Saharan Africa. Given our remit, we have a keen interest in the outcomes and findings of the Inquiry.

14 December 2011

Written evidence submitted by David Strangway PhD, FRSC, OC

"We in Africa must either begin to build up our science and technology training capacity or remain an impoverished appendage to the global economy." President Kagame Rwanda

1. I submit this response to the committee as a Canadian deeply interested in the development of capacity in Science, Technology and Innovation in African universities. I grew up in Africa, although I am Canadian. My parents were medical missionaries in Angola from 1927 to 1967. Theirs was a life in tropical medicine where they created and ran a major hospital that served Africans for many decades. In reality they were part of the capacity of that country at that time.

2. I have been on the faculty at MIT and subsequently was the chief of earth and planetary sciences for NASA during the Apollo missions to the moon. This was followed by the presidency of the University of Toronto and then of the University of British Columbia.

3. In 1998 I was the founding president of the Canada Foundation for Innovation. This was an organization funded by Canada's federal government. This funded research facilities at Canadian universities in order to provide first rate research equipment. The universities had to find matching funds. To date the federal government has invested over $5 billion in this foundation. The purpose was to help Canada reverse its serious brain drain problem as we were losing many of our best academic researchers to the United States. Canada like other countries was pushing hard to be part of the emerging knowledge economy.

4. In 2000 the federal government took a further step to help close the brain drain gap. I was involved with the establishment and operation of a program of 2000 Canada Research Chairs to be placed at Canadian universities. These positions have also had a major impact on ensuring that Canada could retain and attract the best academic researchers. This continuing program is funded at $300 million per year.

5. In 2004 I founded a small not for profit private university focused on undergraduate students on Canada's west coast. This liberal arts and science university opened its doors in 2007 and has now graduated its first

class. Indeed it has already received the highest ranking of 700 universities in North America after interviewing 280,000 students in the US and Canada.

"We, the members of NASAC are convinced that a sustainable economic future lies in strengthening the continent's S and T capacity". Network of African Science Academies

"…development is a knowledge intensive activity that cannot be imposed from the outside". Calestous Juma Harvard Kennedy School of Government, originally from Kenya.in Science and Innovation for Development by Conway and Waage

6. Because of my early years and deep commitment to Africa, I have been developing a concept that is designed to use the Canadian experience and to help African universities build their research capacity. The idea is to find the funding to help African universities build their capacity to identify and take steps to solve the problems they have identified. as needing priority attention. The concept is to fund African Research Chairs to be held at African universities This would help them to make a start on dealing with the brain drain problem. The brain drain problem in African universities is truly profound. There are more Malawian doctors in Manchester than there are in Malawi.

7. I have met with many organizations around the world but particularly in Africa. These include the United Nations, the African Union, the African Development Bank, the Association of African Universities, Agence Universitaire de la Francophonie, Association of Commonwealth Universities, La Francophonie, the Commonwealth Secretariat, the EU, OECD, and UNESCO. I have met with senior officials in several countries including France, the United States, Germany, Canada, Japan and several others. And of course I have met with representatives of several African countries and consulted with many African university vice chancellors. There is very wide support for the idea of building capacity in African universities to tackle the issues represented by the Millennium Development Goals.

8. What I hear over and over again is very strong support for the idea of building Africa's research capacity and building an African base to deal with African problems. They are seeking investment in capacity for the longer term, rather than aid for short term projects. From this base of amplified capacity, they can then approach potential partners in the developed world. The new approach that they seek is investment, so that they can be in a position to follow their own agenda and seek the partnerships on an equal footing. In other words, they are fully aware of the issues that need to be addressed and would like to be asked where they see the priorities, rather than be by told by the various aid agencies what their priorities should be. There is a universal demand to build capacity, so they can enter the competitive world of Science, Technology and Innovation (STI) for development.

9. The most frequent concern I hear over and over again, is about the UK positions and the role of DFID. DFID they report shows very little interest in higher education and research and in particular shows essentially no interest in helping developing countries build capacity. It seems from my many sources, that DFID and the UK have not yet crossed the line from aid to investment and remain patronizing in their approach to the developing world.

10. I have just been in South Africa which is one of the fast emerging economies. They have already taken steps to create a program of South African research chairs modeled on the Canadian experience. South Africa has created a program of 200 chairs as a major step to ensure they can keep their best researchers and/or attract good people from the diaspora or indeed from other jurisdictions.

11. I applaud the Committee's thinking to look afresh at the UK approach to the investment needed by developing countries. Helping to build the long term capacity of the developing world, will give a lot more benefit to helping them participate in the 21st century, with its focus on the knowledge economy.

"The suggested concept is a timely and very worthwhile initiative and I would be pleased to lend my support towards strengthening African faculties and reversing the continent's brain drain". Kofi Annan, former secretary-general, United Nations.

15 December 2011

Written evidence submitted by the Natural Environment Research Council (NERC) Centre for Ecology and Hydrology

I would like you to consider the evidence below in relation to the above mentioned inquiry. The evidence is submitted on behalf of the Natural Environment Research Council (NERC) Centre for Ecology and Hydrology.

The Centre for Ecology and Hydrology (CEH) is a research centre of the UK Natural Environment Research Council (NERC) reporting to government through BIS. CEH undertakes fundamental, strategic and applied research through the UK Science Budget, under commissions from UK government departments and agencies, the EU, international organizations (UN agencies), foreign governments, development banks and the private sector. CEH employs approximately 450 research and support staff, and have worked in over 80 overseas countries, many of these being developing countries with acute water stress and environmental problems. As

part of these activities, CEH has been involved in programmes that have delivered sustainable research capacity building in developing countries. CEH is now leading on behalf of NERC, the UK's input to the Joint Programming Initiative on "Water Challenges for a Changing World". This Water JPI will support improved coordination of Member State actions to build research capacity for international development.

Our views are submitted under the *specific questions* requested in the call for evidence.

How does the UK Government support scientific capacity building in developing countries and how should it improve?

1. UK research institutions have a long and successful track record working with research organisations in developing countries. UK research is of high quality and UK researchers have much to offer in terms of capacity building. However, DfIDs recent research strategy has meant there are fewer opportunities for research partnerships between UK research organisations and those in developing countries, reducing the opportunity to share expertise and build capacity.

What are the most effective models and mechanisms for supporting research capacity in developing countries?

2. Long term partnering between UK research establishments and those in developing countries is, in our experience, the most effective mechanism for capacity building. Many researchers and research organisations wish to be part of world leading, basic research. This is the key driver for many researchers who undertake research in developing countries, as well as knowing that the knowledge derived can help shape policy and solve problems for wider society.

3. CEH has experience of supporting research capacity within developing countries that has allowed lessons to be learnt and provides models for best practice. CEH worked with DfID from 2000 to establish the capacity for water resources research and management in Southern Africa. The challenge for sustained economic growth and poverty alleviation to meet the Millennium Development Goals in the Southern African region is closely associated with sustainable use of natural resources and better management of the environment. Developing a research capacity within the region is central to ensuring efficient water use under future environmental change. The experience from the effort to establish a data network and research capacity as part of the Southern Africa FRIEND Programme (Flow Regimes In Experimental and Network Data) serves as a case study of the issues involved.

4. The SA FRIEND Programme was driven by funding from DfID and was successful in achieving its objectives until the funding stopped. Considerable effort was made in research capacity building but perhaps this relied too heavily on key individuals trained in regional workshops who did not necessarily pass on their knowledge to their colleagues, with the result that when some of these staff left, the capacity was lost. The lesson learned is that capacity building must place greater emphasis on training and mentoring to ensure maximum potential impact in terms of numbers of regional scientists reached. It is also a challenge to get local researchers and institutional managers to see initiatives not as projects with fixed start and end dates, but rather as "seed funding" for a bigger and longer-term initiatives. Perhaps projects would benefit from "tail-off" funding for c. two to five years after the end of the initial project period with the aim of helping to maintain training, continuing development of systems that have been established as part of the project, and for seeking other future funding. This would help to establish the research capacity building as a "way of life" rather than time-limited by resources over a given project period.

5. As an example of this approach, between 1990 and 2000, CEH supported the building of world class research capacities in Brazil under a 10-year long series of NERC, DfID and then EU funding contracts. The Brazilians involved in that research now hold ministerial level positions within the Brazilian government, and are lead authors on inter-governmental scientific reports released under the IPCC and UNFCCC. The institutions that have been established in Brazil are now regarded world class. Because of CEH's role in supporting that capacity building, these Brazilians now consider the UK as a preferred research partner. The long-term nature of the research partnership was undoubtedly responsible for the maintenance and sharing of capacity amongst Brazilian researchers, and provided a platform for future collaborative work.

How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?

6. DfID rely heavily on outsourcing of monitoring and evaluation to external consultants who may have expertise in development delivery, rather than research. Research Councils UK (RCUK) have a number of research programmes co-funded by DfID and they should be well-placed to ensure good on-going monitoring and evaluation of these programmes using DfID's log frame approach. External evaluation of these programmes should be carried out by independent peer organisations with research and capacity building experience. Evaluation could also be done a period of time after a project has been completed to assess the longer term benefits of the research in terms of capacity building and the career paths of the developing country partners.

What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?

7. No comment.

How are government activities co-ordinated with the private and voluntary sectors?

8. No comment.

15 December 2011

Written evidence submitted by the London School of Hygiene & Tropical Medicine

Many thanks for the opportunity to submit evidence to the Science and Technology Committee. Our comments below focus on health.

How does the UK Government support scientific capacity building in developing countries and how should it improve?

1. In the health field, UK Government support for scientific capacity building through research is delivered mainly through MRC and DFID, with DFID providing much of the funds for MRC's developing country activities, as well as through smaller funding arrangements with other research councils. MRC supports two large and active research centres in Africa and research in other geographical areas through programme and project grants. The provision of core support to its overseas units is a major boon to these centres, and one which is much envied by other developing country research centres which have to struggle to cover their core costs through grant overheads. Core support provides a measure of scientific independence and means that a coherent research programme can be developed which is not always dependent on achieving the next grant, however uninteresting this is, to keep the centre afloat. This support needs to be sustained but the new model that increases the pressure on MRC centres to achieve additional support for specific research activities is a good one.

2. On the whole, MRC manages its developing country research portfolio reasonably well. MRC awards are generally made fairly using peer review and units and grants are monitored. MRC also has a good record in training. Training for many categories of staff is provided at the MRC's overseas units. This includes local training courses for more junior members of staff, including support staff, and also support for scientific staff to take higher degrees. The UK government also provides funds for support of excellent researchers and research leaders in East Africa. A good example of this is the MRC-DFID and EDCTP African research leadership schemes.

3. Some research is funded directly by DFID and it is less apparent that this is always done effectively. DFID has decreased capacity in technically qualified manpower in the health sciences and thus would now have difficulty in operating an open, peer-reviewed system with effective project monitoring as it did in the past. As a consequence it is likely that some projects of doubtful utility are being supported and that others are allowed to continue after the period when they should have stopped for lack of effective monitoring. However, DFID does bring a very important policy angle to the research table, which is different from the interests represented by the research councils, so it is critical that DFID's funding is maintained for research and related capacity strengthening. Increasing DFID's staffing in order to manage a research programme more directly and effectively would not be a popular idea at the present juncture but some of this work could effectively be outsourced to other agencies which have these skills such as MRC and the Royal Society among others, as long as the arrangements ensure that the policy-related aims of DFID research funding are maintained and safeguarded.

4. Apart from the critical support for capacity building via research, the UK government provides valuable scholarships to students via funding to the Commonwealth Scholarships Commission. These are mainly used for study in the UK, and to pursue distance learning Masters degrees, and are important as many of the degrees that the students take are either not available in their own country, or are not of sufficient quality. To improve this, the UK government could sponsor students to take in-country courses, and to support the provision of external quality assurance for those courses. The best way to do this would be to link Universities in developing countries with Institutions in the UK and provide funds for some transfer of skills, technology, and support, to enable such universities to broaden their range of courses (see also under next section). This could include support for both students, and for lecturers/tutors within those institutions. Another way it could help would be to support student loan schemes for students to study in their own, or other countries. Many more people would be able to develop their scientific skills if the money was available (as loans) for them to access.

5. Strengthening capacity in scientific research should go along with building national decision-making capacity around the introduction of innovations such as new vaccines. This means support for countries in developing national capacity in gathering/assembling and evaluating data, as well as in using data in appropriate ways for decision-making. Ministry involvement and ownership is crucial for capacity building and ensuring that the evidence feeds into national policy deliberations. As an example of what can be done, a PAHO initiative is supporting universities (Centres of Excellence) in the PAHO region to do the gathering/

assembling of evidence and evaluation of new vaccines, and has provided policy makers in the region with tools and workshops to do the analysis and decision-making.

What are the most effective models and mechanisms for supporting research capacity in developing countries?

6. There is no single model for supporting research capacity development in developing countries that can be guaranteed to work. Successes and failures have been achieved with many different models including institution to institution partnerships, large consortia, small collaborative research groups and links between individual scientists in the north and the south. Some of the advantages and disadvantages of different models of north/south and south/south partnerships were discussed at a recent meeting co-hosted by the RCP and Academy of Medical Sciences. The report of this meeting, which is reaching the final stages of preparation, would be a helpful contribution to this debate. Some common features of successful partnerships were identified as—

- — the need to clearly identify the purpose of the collaboration at its outset,
- — a need to ensure that all partners had something to gain from the collaboration,
- — avoiding dominance by one partner, especially the northern one,
- — identifying in advance mechanism for the exit of one or more partners if things are not working out.

7. Schemes which support long-term interaction and exchange between developing country and UK universities and research institutes are critical. Including South South as well as North South interactions within such schemes is often valuable. Developing research capacity takes time—eg at least 10 years to educate a scientist to a level where they may competently manage, innovate and begin to lead their field locally. Thus there is a need for long-term programmes that are dedicated to both investing in individuals and strengthening the organisations they work within, including their administration, governance, and support systems including IT. Some of the key needs are:

- — ensuring training in research methods, proposal development, research project management and paper writing
- — access to excellent training in the UK for high flyers (with competitive entry)
- — free online teaching materials and interactive documents to facilitate learning of key analytical methods
- — sponsoring research internships/degrees at institutions within the region of appropriate standing
- — access to reading materials (text books) and up to date research; free online journal access (eg extending HINARI to broaden the number of journals covered)
- — support for software license fees for key analytical software and manuals
- — support for scientific exchange
- — support for equipment maintenance
- — for translational science/medicine: encouragement of interaction with the private sector
- — support for building clinical capacity/platforms (GCP and quality training, local sustainability and leadership, use of sites once training in place) as exemplified by trial capacity for leishmaniasis and trypanosomiasis built in East Africa and Central Africa, and now being locally driven.

8. Some long term programmes have successfully used a model of simultaneously bolstering teaching capacity by situating experienced researchers in the target country for the medium to long term while at the same time sending students overseas to undertake their doctoral training—post graduate study in a world class environment can be truly empowering and help to create internationally competitive research leaders. It is vital that both these activities are undertaken simultaneously because it establishes a "research culture" in the target country while also turning out fully trained scientists. Retention of graduates in the target country has been achieved by ensuring that large components of their thesis work (if not all) are undertaken in the home country and by providing add-on postdoctoral components to the programme. Both of these initiatives foster the idea (for the student) that there is a future in research in their home country. The existence of a stimulating research institute in which to carry out doctoral and postdoctoral studies is also vital to the encouragement and retention of programme participants and graduates.

9. Good examples of long term partnership programmes include:

- — the development of the Kintampo Health Research Centre in Ghana. This was enabled by a long-term large scale collaborative research programme funded by DFID that was sufficiently long to enable the establishment of a credible infrastructure that then attracted more funding. DFID allowed training costs (PhDs, MScs etc) to be included which were used not just for research staff but to build research capacity more generally—thus it enabled two of the computer centre staff to come to the UK for computer science masters. In recent years two staff also received Commonwealth PhD scholarships with the Centre being allowed to apply for these as part of a DFID consortium.

— a large EDCTP trials network focussed on malaria combination therapy in West Africa. The funding model has generated an excellent project, and the capacity development aspects are very promising—the European partners (3 plus Medicines for Malaria Venture) mainly provide technical assistance with laboratory investigations and training of PhD and Masters students from the African sites; the more advanced African partners (3) are directly providing capacity development activity in Guinea-Conakry, which has a very poor infrastructure in terms of clinical trials capacity. The focus of all decision-making and protocol development has been the lead African partner (University of Bamako, Mali).

10. As indicated above, a key part of strengthening research capacity is post-graduate training of developing country scientists. Provision of residential and distance learning (DL) high quality post graduate training for scientists from developing countries is still of major value and likely to continue to be so for a long time to come. Distance learning has especial value as a means of extending access to education—eg LSHTM has around five times as many students enrolled on DL than London-based courses, and it has proven enormously attractive to students who otherwise cannot or do not want to come to London to study. The cost for a DL Masters is approx one third that of a London-based MSc and students can study whilst working and apply learning immediately in their professional context. Mixed mode study—doing some study in London and some by DL—is also of interest although not feasible for all.

11. There has been effort devoted to evaluation of training—eg evaluation of the impact of scholarships (eg Commonwealth Scholarships Commission—http://cscuk.dfid.gov.uk/evaluation/), and evaluation of postgraduate education involving tracing and career mapping of alumni (eg http://www.lshtm.ac.uk/alumni/survey/). Such evaluations generally identify the critical value of support to post graduate education in furthering scientific careers.

12. Experience is increasing of supporting post-graduate training in institutions in developing countries through programmes such as the Malaria Capacity Development Consortium http://www.mcdconsortium.org/ which has built on the successful Gates Malaria Partnership which trained many PhD students from Africa, and the Wellcome Trust's African Institutions Initiative http://www.wellcome.ac.uk/Funding/International/WTX055734.htm and the PHFI-UK consortium http://phfi-uk.org/index.php. This type of support is likely to become an increasingly important component of the UK government's support for research capacity development in developing countries in the future. Careful evaluation of how effective is this kind of capacity development will be needed.

How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?

13. Monitoring of the effectiveness of scientific capacity building programmes is a weakness, as the time scale for impact is much longer than the implementation. For example building a new course, or School of Public Health can take at least three to five years. But the results of that course will take many years, or decades, to bear fruit as the students enter research and make their name by doing good science, and excellent research. The quality of the ground work will only be apparent when the graduates become research leaders in their own right.

14. However the UK Government could play a role in developing interim process benchmarks of excellence. This could include markers of sound implementation, realistic and important milestones of success, and measures of sustainability of the programmes. An important aspect is to ensure that barriers of discrimination within the country are broken down, and that access to higher education and professional development is based on merit and not on patronage.

What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?

15. The CSA clearly has an important role, but care should be taken not to over-generalise policy. Different solutions will be required for different countries/regions, and an awareness of what strategies would best suit the locale should be demonstrated in any project proposals. The multiplicity of funding streams for any given country can greatly hamper capacity strengthening—it can be capacity destroying, so local leadership (and supporting the creation of such leadership) to set priorities is critical.

16. That said, a "best practice" model could be synthesised via a "lessons learnt" evaluation of the capacity building policies to date, and should inform policy (ie policy should be evidence based).

How are government activities co-ordinated with the private and voluntary sectors?

17. DFID works reasonably well and effectively with the voluntary sector. MRC is more successful with collaboration with the private sector, for example by supporting trials in developing countries of tools developed by pharma. An area that seems to have been little explored is collaboration with the private sector in developing countries and this should be possible in a number of countries such as India and China which have thriving private companies in the health sector. A recent example of a successful project of this kind has been the development of a new meningitis vaccine for Africa through a collaboration between PATH and the Serum

Institute of India, a private company. DFID appears now to be providing some support to the Serum Institute to develop a further meningitis vaccine and this kind of collaboration should be encouraged and may be possible in other areas.

18. Agencies such as VSO can play a valuable role in local capacity development. Relevant skills go beyond those of doctors and nurses; for example biomedical scientists are critical for helping develop high quality laboratory services.

15 December 2011

Written evidence submitted by the Natural History Museum

BACKGROUND AND INTERESTS

1. The Natural History Museum (NHM) has a mission to maintain and develop its natural history collections to be used to promote the discovery, understanding, responsible use and enjoyment of the natural world.

2. The NHM's statutory obligation under the British Museum Act 1963 is to care for and give access to the nation's natural history collections. The collections comprise over 70 million specimens, ranging from international collections of biodiversity and minerals to DNA samples from mosquitoes collected and stored using the latest technology. The Museum, through its collections, research and knowledge exchange, is part of the UK's science base and a major intellectual infrastructure that is used by its own 350 scientists and over 8,000 annually from across the UK and the globe to enhance knowledge on the diversity of the natural world and addresses some of the major challenges society faces, from biodiversity loss due to climate change to the spread of parasitic disease and to the sustainable use of natural resources. The NHM is the pre-eminent institution in a wide international network of collaboration and common purpose with respect to the diversity of the natural world and its uses by humans. The NHM also makes significant expertise and information resources available for different needs, together with training, education and public engagement programmes. It cares for and develops these collections for future generations to use in ways not currently possible to help answer future scientific questions of importance.

3. The NHM is a recipient of Darwin Initiative funding from the Department for Environment, Food and Rural Affairs (Defra) for a range of projects that assist countries that are rich in biodiversity but poor in financial resources to meet their objectives the three major biodiversity Conventions: the NHM is particularly active in working with international partners under the Convention on Biological Diversity (CBD).

SUBMISSION

Question 1: *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

4. The Museum as a scientific research institution is active in over 70 countries, collaborating on scientific research, collections development and capacity building, and providing commercial scientific consultancy services. The NHM collection is a major part of a network of collections in both developed and developing countries that is essential for scientific research and its effective application in managing the environment, public health management and sustainable use of biodiversity. The capacity building we undertake is primarily around research in the form of joint research projects, field projects, community partnerships and postgraduate education; and collections and information development and management in the form of training courses and network development, standards and access development, mobility of collections and information repatriation. This assists scientific development in-country and provides long-term access and collaboration for the Museum—the research, collections and skills of all the partner institutions develop as a result of this activity, resulting in shared benefits.

5. The Museum has also been active in discussion and development of initiatives under the CBD in partnership with developing countries: staff have provided advice and expertise to Defra, the CBD secretariat and other agencies and have undertaken needs assessments for taxonomy in developing countries.

6. The Museum also has a commercial exhibition design consultancy service which supports the development of exhibitions and museums in a number of countries: it has, for example provided expertise for the master-planning of a new natural history museum in Malaysia.

7. The Museum's principal funding comes from the Department for Culture, Media and Sport. However, our scientific and public engagement activities contribute to a number of other Government Department's agendas, including those of the Department for Education, the Department for Business, Innovation and Skills, the Department for Environment, Food and Rural Affairs, the Foreign and Commonwealth Office and the Department for International Development.

8. The Museum's scientific research in taxonomy, classification and evolution underpins all the life sciences. Without this understanding, it would not be possible address a number of major challenges, including biodiversity loss due to climate change of the control of parasitic diseases. The Museum's history, and that of the UK, means that it holds an international collection and expertise of major value to many developing

countries. Addressing the most productive and interesting research questions means working internationally and capacity building in research and collections is an essential element of this work to strengthen current and future collaboration and value to the UK. Partnership with governments, universities, NGOs and others in developing countries is now a standard practice.

9. The Museum is currently reviewing the strategic alignment of its research with Government and other priorities. This will include consideration of collaboration and funding generation and application with other UK and foreign organisations, aiming at improving effectiveness of scientific programmes, which include capacity building. 10. The Museum welcomes discussion with Government on an ongoing basis on the Museum's contribution to the UK response to international imperatives for development of scientific capacity, such as under the CBD or the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).

Question 2: *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

11. Research capacity in developing countries differs widely as a result of historical investment and development and access to current resources. For some countries with established university systems that conduct research; with collections institutions such as natural history museums and botanic gardens; and with a capacity for application of research findings, the Museum has often many years of collaboration, respect and exchange of mutual benefit that actively supports research capacity through partnership. The limiting factor in such cases is often resources both in the UK and in the developing country that constrain the scale, frequency and output of collaboration.

12. For other countries, there may be very limited research capacity, few resources for collections institutions or infrastructure where these exist and limited engagement with policy. In some cases, the Museum may hold definitive collections from the past that would be needed for effective research. In such cases, the Museum can work with local partners to deliver some benefit but active external funding from sources such as the Darwin Initiative is essential to have significant impact. Even if funding for a number of years is available, policy and funding support from within the country are essential for a sustainable research capacity even in narrow areas of science. There is potential for exploring regional networks for the development of research capacity and infrastructure across a number of countries: this has been relatively rare to date, with a focus on certain information products such as digital collections, rather than research capacity as such.

13. Continued support for actors such as the Museum is essential and the current model is the most effective, if limited by resources. However, there is potential for better co-ordination to allow for the better sharing of intelligence and a more accurate measurement of value to Government. Specialist institutions like the Museum have a critical role to play in building scientific capacity, literacy and civil society, which can be perhaps more effective in specific areas then through direct Government involvement. However, recognition is required of this work across Government.

Question 3: *How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?*

14. If the Government wants a complete assessment of this type of work that it funds then it will need to broaden its oversight to include organisations like the Museum. The Museum would welcome discussions on research capacity and infrastructure development.

15. Specific Government funding programmes such as the Darwin Initiative include effective monitoring and assessment.

Question 4: *What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?*

16. The Museum is unable to answer this question, however, we would welcome the opportunity to discuss our contribution to this area with the Department and its Chief Scientific Adviser.

Question 5: *How are government activities co-ordinated with the private and voluntary sectors?*

17. The Museum is not able to answer this, but it does work with organisations in each of these sectors, particularly the latter, in developing research capacity in developing countries.

15 December 2011

Written evidence submitted by the Commonwealth Scholarship Commission

Background and Declaration of Interests

The *Commonwealth Scholarship Commission* in the United Kingdom is a Non-Departmental Public Body, established by Act of Parliament in 1959. The Commission manages the United Kingdom contribution to the international *Commonwealth Scholarship and Fellowship Plan*, through which individual Commonwealth countries offer training and educational opportunities to citizens of other member states. As noted below, DFID is the dominant funder of the Commission, which also receives support from the Department of Business, Innovation and Skills, the Scottish Government and individual UK universities. The Commission also has strong relationships with the Association of Commonwealth Universities, which provides its Secretariat, and the British Council, which also provides defined administrative services.

The work of the Commission received favourable comment in the 2004 Report of the Select Committee. Paragraphs 112–116, in particular, commented favourably on the introduction of "innovative approaches" such as the introduction of split-site and distance learning scholarships, and on the continuing policy of the Commission to support doctorates, despite the fact that these were significantly more expensive than taught Masters courses. The Committee also commended the Commission for following a "demand led" approach, noting that this had led to a higher proportion of awards in science and technology than other scholarship schemes, and for the strong representation of science and technology in the review process for applications.

In their response, the Government welcomed the "encouraging comments", and undertook to ensure that "the Plan remains at the cutting edge of providing opportunities for study in science and technology." This note reviews the extent to which DFID, as the lead department responsible for the Commission, has maintained this commitment, and emerging evidence about the impact of the scheme on development. It also makes observations on the first three Questions in the Committee's Terms of Reference.

Nature of our Provision

Governments of both parties have affirmed their support for the Commission since 2004, a confidence re-affirmed by a favourable external review in 2007, and a further positive DFID review in 2010. DFID funding for the period 2011–15 has recently been confirmed at £87 million, a significant increase on the three year funding allocation of £51 million for the period from 2008–11. UK universities have also demonstrated their support for the programme, and now routinely contribute to the programme by contributing at least 20% of the cost of tuition fees, and in many cases more. The Department of Business Innovation and Skills contributes £400,000 per year, to ensure that awards are still available for high quality candidates from developed Commonwealth countries, and the Scottish Government currently contributes £50,000 per year.

The Commission currently provides seven different types of award, each tailored to a specific need: PhDs (full-time and split site); Master's awards (standard, shared with universities, and distance based), academic fellowships and professional fellowships, both aimed at staff in mid-career.

Representation of Science in the Programme

Science has continued to be well represented in the programme, reflecting our view of its importance to development. Of 2860 new awards made in the four years from 2007–10, 36% are classified as being in science and technology. A further 9% took up awards classified as Agriculture, Forestry, Veterinary Science and Environment, and a further 15% in Medicine, Dentistry and Public Health, although the latter category also includes some social science awards.

The Commission has no fixed quota for scientists, continuing to place the emphasis on the quality and relevance of individual applications. These are judged by three criteria—academic merit, likely contribution to international development and the quality of the application itself, with marks being awarded in a ratio of 5:5:2 It believes, however, that continued presence of doctorates in its programme represents a key reason for the high proportion of science amongst award holders. The Commission's continued desire to support high quality doctoral research is continued in its Strategic Plan for 2011–15, which anticipates that doctorates will continue to account for 36–39% of expenditure over the period.

Development of New Approaches

The innovative approaches commented on by the Committee in 2004 have also continued to expand. 27% of awards over the 2007–10 period were through distance learning—with recipients studying for UK qualifications but spending either no or very short periods in the United Kingdom. Short professional awards, allowing individuals in key development occupations to spend up to three months with host organisations in the UK, have also increased—representing 10% of awards during the same period. Split-site awards, the other new initiative commended in the 2004 Report, have developed more cautiously. There have been 97 of awards over the period, representing 4% of the total. Our caution in this area reflects the need for a stronger recruitment route for strong candidates, with the facilities in their home country to complete that work not undertaken in the United Kingdom.

The one type of award over which the Committee expressed some reservations in its previous report—Institutional Capacity Grants—has been discontinued. The aim of these awards—which were in a pilot phase at the time of the last Select Committee report—was to concentrate scholarships and fellowships on particular departments or institutions. In practice, tensions emerged between the desire to achieve this and our overriding aim of supporting the best individual candidates according to our selection criteria set out above. It was considered that this emphasis on the qualities of individual candidates represented the best prospect of impact in the long-term.

Evidence of Impact

Since 2007, the Commission has embarked on a substantial programme of alumni tracing and evaluation. It is now in contact with over 7,000 former award holders. An alumni survey, which generated a response rate of almost 40%, found that between 88 and 92% of alumni reported working in their own, or another developing country. In the same survey, of the 90% reporting impact in one or more key priority areas for development, 63% did so in Scientific and Research Applications.

Not surprisingly, given the emphasis on doctorates, and the fact that developing country universities are a leading nominating route, higher education was the largest single destination for alumni respondents to this survey, with just over half working in this area. 93% accessed equipment and expertise not available in their home country and 93% reported that their award had to some extent increased their ability to have influence and make changes at work. The surveys also revealed many individual examples of impact, some of which can be seen from the Appendix below.

It is likely the impact of the programme extends beyond development to wider public diplomacy; since 71% with reported continuing links with their host universities, 55% work contacts and 51% contact with a professional association in the UK. 25% reported holding some form of elected office. The increasing willingness of universities to actively contribute to our awards also demonstrates the very high quality of candidate which Commonwealth Scholarships attract, which in turn contributes to Britain's international standing.

These findings, and the level of contact with alumni that underpins them, are already significantly further advanced than for most international scholarship schemes, but we recognise the need for much deeper analysis to determine detailed impact. Our Strategic Plan for the next four years includes increased provision for this area, both through expanded and more systematic alumni studies, and more in-depth work to drill down into specific sectors.

Observations to the Committee

In view of our role as a Non-Departmental Public Body, much of the above information is factual in nature. We would, however, like to make the following observations on the key questions posed in the Terms of Reference for the Committee:

Question 1—*How does the UK support capacity building, and how could this improve?*

The activities described above are intended to major a major contribution to the overall UK effort in this area. We consider it important that the UK adopts both a balanced approach, and recognises the need for a long-term perspective. Hence our programmes are open both to students and those involved in a range of occupations, across a range of professions.

It is important, too, that such capacity building is judged on the likely catalytic impact, rather than the impact on the recipient only. Whilst this observation applies to all of our awards, it is perhaps most relevant to those at doctoral level. Although the cost of such awards is substantial, we believe, that the "payback" from such candidates, in terms of the numbers that they will teach, or that their research will influence, can justify such levels of investment. This is particularly the case in the areas of science and technology.

Whilst our evaluation results confirm that the proportion of students completing their awards and returning to their home countries are consistently high, we recognise that more consideration needs to be given to supporting such individuals in the period immediately after their return, to ensure that their skills is utilised to best effect.

In this context, we note recent evidence from the British Academy and other studies that point to the lack of early career development structures within African universities. This finding is supported by anecdotal evidence from our own alumni. As higher proportions of highly qualified staff return, or indeed study for qualifications within Africa, we believe it important to support their work at an early stage of their career. In the long term, a parallel programme to the CSC which supports the long term development of African universities as institutions would be one way of achieving this. In the shorter-term, much could be achieved by identifying ways in which returning academics could retain links with the UK institutions. Such investment would not be expensive, benefit both the UK science base and help ensure retention of academic staff within the developing country concerned.

The introduction of such support might be considered outside the current scope of the Commission, which is confined to the provision of scholarships and fellowships. It would, however, play an important role in maximising the impact of our investment. We would be happy to discuss extending the role of the Commission into this area, or alternatively working alongside any further scheme that might be established:

Question 2—*What are the most effective models to support research capacity in developing countries?*

Effective research capacity requires investment at both individual and institutional level, and a coordinated approach between initiatives. Some progress has been made in both of these areas in recent years, but we believe that more could be done.

The work of the Commission has primarily been focussed at the individual level. We are proud of the fact that, during a decade in which universities were largely disregarded as a recipient of development aid (both in the UK and internationally), the Commission continued to recognise the needs of the sector. The benefits of this investment can be seen by the large numbers of academics and researchers in the critical "middle age" period where African universities, in particular, report significant shortages. Whilst our awards support capacity across a wide range of areas, academic and research careers still provide the largest single destination for our award holders.

Now that the benefits of higher education and research are more widely recognised, it is important that UK government initiatives in the field adopt a coordinated approach. As the major HMG provider of scholarships whose prime aim is focussed on international development, the Commission can provide a valuable resource to other areas of DFID and the development sector. We have already made a start on this. DFID funded research consortia, and programmes funded under the DFID Development Partnerships in Higher Education programme, are invited to nominate candidates (in open competition with other sources) for our awards. In a recent development, our alumni programme has just provided four in-country consultants to assist in the evaluation of the DFID funded Development Partnerships in Higher Education (DELPHE) programme. We believe that much further potential exists to explore synergies between scholarships and other areas of DFID capacity building, particularly in the area of research.

Question 3—*How does Government evaluate the effectiveness of science capacity building?*

Our own experience in developing an evaluation programme for the CSC over the past five years suggests that evaluation of scholarship provision is an area in which the UK could be at the cutting edge of international practice. We regard our evaluation reports of recent years as a starting point in regard. Relatively few international donors have developed such robust alumni surveys. We do, however, need to know much more about the detailed impact that our awards have. The Commission is keen to lead international developments in this area, and has convened an international seminar to share good practice in March 2012.

One preliminary comment we would make, however, is the need for such evaluation to take a longer-term perspective. In evaluating scholarships, the "pay back" time of an investment can be spread over thirty years or more. Often the nature of provision will have changed in the interim. For example, the evaluation of our programmes reflects the selection methods and criteria of the time in which the awards were made. Such issues are not easily addressed within the current reporting mechanisms of DFID, which sometimes tend to focus on arbitrary project and funding periods, although the two independent reviews of the Commission's work that have taken place in recent years have sought to recognise them.

Conclusion

The Commission was grateful for the recognition given by the Committee to its work in the 2004, and believes that this is increasingly recognised within DFID. We are particularly grateful for the enhanced support of our work by both the current and previous governments, whilst recognising that support for international scholarships generally in the UK continues to lag behind those of other developed countries.

We believe scholarships will continue to play an important role in scientific capacity building, and this is evidenced both by the proportion of awards made in science related fields, and the evidence of impact through our alumni studies to date, We recognise, however, that more could be done to coordinate such activities within DFID, and that there is a need internationally to develop evaluation tools that better reflect the long term nature of our investments.

By way of further illustration of our work, we attach some specific examples of Commonwealth Scholars for information.

APPENDIX ONE

COMMONWEALTH SCHOLARSHIPS AND SCIENTIFIC CAPACITY BUILDING IN DEVELOPING COUNTRIES—CASE STUDIES

Dr Judith Henry-Mowatt (1998 Commonwealth Scholar from Jamaica, PhD in Toxicology at the University of Manchester) spent her award researching in the field of genotoxicity, and she believes that her award has had a wide impact, not just on her career but in her professional field. Judith's appointment as Director of the Forensic Science Laboratory at the Ministry of National Security in 2007 has enabled her to modernise the institution. "As a civil servant, I would not have been able to afford my PhD. The Commonwealth Scholarship award made this dream a reality and has given me the training to make a tangible difference to my place of work and to Jamaica as a whole."

Judith has participated in drafting the terms and conditions for the operation of Jamaica's first sexual offenders' register, and has written the proposal documents for the establishment of a national DNA database. She has also been instrumental in the reorganisation and restructuring of the island's Rape Units. Internationally, Judith is Jamaica's forensic representative to Interpol and on the forensic subcommittee of the CARICOM Implementation Agency for Crime and Security, and is one of the country's representatives on the Caribbean DNA working group.

Judith is also actively involved in training scientists of the future. She has contributed to the development of a Master's course in Occupational and Environmental Health and Safety at the University of the West Indies, Mona, and has assisted in the establishing of a BSc programme in Forensics at the University of Technology. She is a part-time lecturer in Toxicology at the University of the West Indies, Mona, and has also taught at the University of Technology.

Professor Omkar Wakhlu was part of our first-ever cohort of Commonwealth Scholars, holding a Commonwealth Scholarship from 1960–1963. He obtained his DPhil in Fluid Mechanics from the University of Birmingham. Professor Wakhlu's work is in the field of promoting quality in engineering education and the development of research facilities in water resource engineering. He is currently working in the areas of water resources engineering, sustainable development, and leadership and quality in education. During his academic career, he has had the opportunity to influence and teach many at the beginning of their careers. As he himself estimates, "Approximately 2,000 engineers have graduated after training during my active academic term of 12 years. Many of them work as chief engineers in India and other countries". He has also conducted several management development programmes in both private and public sector organisations, and is actively engaged as a postgraduate research examiner.

Professor Md Jahiruddin was awarded a Commonwealth Scholarship in 1983, and obtained his PhD in Soil Science from the University of Aberdeen. He returned to Aberdeen as a Commonwealth Academic Fellow in 1996. Currently Professor of Soil Science at Bangladesh Agricultural University, he passes on his knowledge through teaching both undergraduate and postgraduate students, supervising Master's and doctoral students, and carrying out contract research projects.

> "I have been able to contribute to agricultural research and development in Bangladesh. My research interest lies in two important aspects: micronutrient deficiency in soils and crops, and heavy metal pollution. I have already achieved some significant results which have both national and international value."

Professor Jahiruddin has successfully determined zinc and boron rates for different crops and cropping patterns in Bangladesh, which have appeared in the *National Fertilizer Recommendation Guide*, for use by farmers. Recently, he has taken much interest in arsenic contamination, which is a severe problem in Bangladesh, and has investigated arsenic levels in groundwater and soils, and its absorption and accumulation in crops. He has presented his research results in international forums and seminars, and published them in internationally-respected journals. He has also established a modern soil chemistry laboratory at his home institution. In addition to teaching and research, he is involved in other professional and voluntary activities.

Dr Md Monzur Hossain held a Commonwealth Academic Fellowship in Applied Molecular Biology at the University of Nottingham in 2001. Now Professor of the Department of Botany at Rajshahi University, Bangladesh, he, along with his team members, has developed a module for the establishment of a cost-effective commercial tissue culture laboratory, using indigenously-manufactured equipment and apparatus, for the production of disease-indexed high-quality seed potato tubers and other crops. This and other activities have contributed to the establishment of more than 30 tissue culture-based seed potato farms in the private, public and NGO sectors, reducing the need for imports.

This technology has also been successfully transferred to grassroots level, with many farmers becoming involved in producing high-quality seed potato tubers using tissue culture-derived planting materials, and then selling their produce to other farmers. His team has also developed three new strawberry varieties that are suitable for commercial cultivation in Bangladesh.

> "These varieties are being used for commercial cultivation for the first time in Bangladesh. This achievement has been highly appreciated by farmers and intellectuals, and has received wide publicity in both print and electronic media."

Dr Jackson Mwakali is Professor of Structural Engineering at Makerere University, Uganda—the first professor in engineering to be produced by the university in its almost 90-year history. He was awarded two Commonwealth Scholarships in the mid-1980s, obtaining an MSc and a PhD in Structural Engineering from the University of Surrey. Alongside teaching at undergraduate, postgraduate and doctoral levels, he also undertakes research and, outside of the university, is Chairman of the Engineers Registration Board, Uganda National Bureau of Standards Technical Committee on Civil Engineering, and the Bujagali Hydropower Project Monitoring Committee. He is also a member of the National Environment Management Authority's Technical Committee on Environmental Impact Assessment and the Uganda Investment Authority's National Industrial Parks Planning Committee.

> "I have been consulted widely on the improvement of the construction industry in Uganda, on matters such as how to reduce workplace accidents, and how to best plan physical infrastructure. I have also been involved in numerous technical investigations involving building accidents and dispute resolutions. As a member of several technical committees, I make inputs that influence policies related to environmental management, engineering education, public safety, and so. As a professional engineer, I am involved in consultancies that help solve engineering problems for the benefit of Ugandan and wider society."

Dr Mwakali has also contributed to long-term impact in this sector through his academic career. Formerly Head of the Department of Civil Engineering at Makerere University, he presided over its growth from around 200 to more than 400 undergraduate and postgraduate students in under ten years, as well as the addition of a new Department of Construction Economics and Management.

Professor Steven Chown was awarded a Commonwealth Academic Fellowship in 1996, spending a year at the University of Sheffield working with Professor Kevin Gaston on Macroecology and Ecophysiology. Since returning to South Africa, he has developed and now directs one of the country's seven centres of excellence, the DST-NRF Centre of Excellence for Invasion Biology. The main aims of the centre are to reduce the rates and impacts of biological invasions by furthering scientific understanding and predictive capability, and by developing research capacity. It not only employs many staff, but also places graduates both in South Africa and abroad.

As well as undertaking research and supervising postgraduate students within the centre, alongside his other duties, Professor Chown has influenced national environmental policy through his involvement in the development of the research and training policy for the South African National Antarctic Programme, as well as helping draft the regulations for Chapter 5 (Invasive and Alien Species) of the Biodiversity Act.

Professor Anoja Wickramasinghe studied for a PhD in Forest Ecology at the University of Sheffield in the early 1980s, on a Commonwealth Academic Staff Scholarship. Now Emeritus Professor at the University of Peradeniya, Sri Lanka, the university which nominated her for her Commonwealth Scholarship back in 1980, she is currently engaged in a range of work related to forest ecology, including ethnoforestry, renewable energy development, gender mainstreaming, and rural and community development. Her work is wide-ranging, and involves teaching, administration, research, supervision, training, dissemination of knowledge, action projects and programmes, consultancy and advocacy, grassroots mobilisation, capacity building, and empowerment. She has contributed towards building local capacity and social capital in more than five administrative districts, through the establishment of women's organisations, revolving funds, and income generating activities. Significant changes in rural areas have also been achieved through the livelihood development of communities adjoining villages, alongside policy sensitisation work, and the integration of energy into rural development.

Dr Aweeda Newaj-Fyzul is a 2005 Split-site Scholar from Trinidad and Tobago, and spent 12 months at Heriot-Watt University as part of her University of the West Indies (UWI) PhD in Fish Disease and Pathology. She is now based at UWI's St Augustine campus, where she lectures in fish health and microbiology. Dr Newaj-Fyzul also supervises postgraduate and undergraduate students in fish-related projects, as well as conducting her own research and acting as a consultant and training provider for Trinidad and Tobago's Ministry of Science, Technology and Tertiary Education.

Two of Dr Newaj-Fyzul's main achievements include the design and construction of an aquaculture unit at UWI, and the development of an aquaculture course for the government of Trinidad and Tobago.

> "Aquaculture is now being introduced at the School of Veterinary Medicine, where there were no "fish labs" or aquaria previously. I have designed and built an aqua culture unit through funding received from the university. This project has led to four students undertaking Master's degree programmes in fish-related topics, where I am involved in supervision. I am in charge of the unit, which includes two technicians and three assistants."

> "With the closure of a major portion of the agriculture sector in Trinidad, over 10,000 people were out of work. I assisted the government in retraining and retooling some of these workers into the field of aquaculture. I assisted in developing a course and assessment package for the government, which has led to the training of over 300 people in aquaculture. Some have opened fish farms and others have even begun exporting fish. At present, I am still teaching this course for the Ministry of Science and Tertiary Education, and it has been extended to young people who have dropped out of school."

Grace Aneju is an assistant lecturer in the Department of Physics at Benue State University, Nigeria. In 2002, she was awarded a Commonwealth Academic Staff Scholarship to study for an MSc in Medical Physics

at the University of Aberdeen. She feels that her award has enabled her to both gain and apply key skills and experience in her work.

> "Since taking the Master's programme, I have been teaching in the university and would say that the experience of studying in the UK has enhanced my teaching skills. I have developed both theoretical and practical knowledge in the field of medical physics, which has helped me to be a better teacher through teaching from personal experience. I have been able to contribute immensely to the training of many graduates in physics, as well as to the development of scientific skills of young physics undergraduates. I have also been able to apply some of the research skills I gained during the course to similar."

15 December 2011

Written evidence submitted by the Royal Society of Chemistry

1. The RSC is the largest organisation in Europe for advancing the chemical sciences. Supported by a network of 47,000 members worldwide and an internationally acclaimed publishing business, its activities span education and training, conferences and science policy, and the promotion of the chemical sciences to the public.

2. RSC Publishing is one of the largest publishers of chemical science information in the world. The RSC as a whole employs approximately 400 staff across the globe. The majority of staff are located in located in Cambridge and London (UK), although the RSC also has offices in Philadelphia (USA), Tokyo (Japan), Beijing and Shanghai (China) and Bangalore (India). RSC Publishing is a not-for-profit publisher wholly owned by the Royal Society of Chemistry. Committed to advancing the chemical sciences, any surplus is reinvested in supporting the global scientific community.

3. This document represents the views of the RSC. The RSC has a duty under its Royal Charter "*to serve the public interest*" by acting in an independent advisory capacity, and it is in this spirit that this submission is made.

4. The RSC believes that

- Addressing educational provision in developing nations is a key part of building and sustaining scientific capacity, as it ensures the development of a skilled workforce for scientific research.
- Partners in the developed world can provide valuable opportunities for knowledge exchange and resources to support research capacity in the developing world. However, it should be scientists in the developing world who determine the focus for joint research activities.
- Coordination between government activities and work in other sectors could help to build research capacity more efficiently, addressing the needs of research according to discipline.

1. *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

5. The UK government supports capacity building in developing countries through funding joint research programmes that bring together researchers in developed and developing countries. These programmes, funded by the Department for International Development (DfID), focus upon research areas where there is a clear link to poverty reduction and/or economic growth in the developing nation. These research partnerships focus on solutions to problems in areas such as agriculture, health and governance.

6. These partnerships can produce direct benefit through the research outputs generated, but they also provide valuable opportunities for knowledge transfer between partners in different countries. It is important to ensure that scientists in the developing world, who are part of these partnerships, are enabled to take a strong role in determining what the most appropriate research solutions for the issues facing their country are. Their partners in developed nations may be best placed to provide resources to help reach these research goals but there needs to be a stronger emphasis in encouraging scientists in developing nations to take ownership of these projects.

2. *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

7. Models and mechanisms for development must address "research capacity" in the broadest sense. Joint research programmes to help build research capacity are important. However, programmes that target supporting aspects such as science education (ensuring a supply of adequately trained people), infrastructure (access to specialist equipment) and advocacy (increasing government engagement with scientists) are also areas that need to be addressed.

8. In 2007, the Royal Society of Chemistry (RSC) and Syngenta embarked on a £1 million, five-year project, the *Pan Africa Chemistry Network (PACN)*.[1] The remit of the PACN is wide-reaching and ambitious, given current national and global challenges. The RSC's *Chemistry for Tomorrow's World*[2] has identified 41 of

[1] http://www.rsc.org/pacn

[2] Chemistry for Tomorrow's World—A Roadmap for the Chemical Sciences, July 2009

these challenges and the contribution of the chemical sciences in providing solutions to these. Whilst all of these challenges are outlined in a global context, some challenges such as those relating to food security, energy demand and water supply, are more pertinent to developing nations. The main aim is to enable African scientists from across the continent to communicate more effectively and find sustainable solutions ultimately to tackle these urgent problems. PACN works in collaboration with national chemical societies from across Africa to achieve this.

9. To date, two centres of excellence in Chemical Sciences have been established, one in Ethiopia (Addis Ababa) and one in Kenya (Nairobi). These provide a focal point for the training of scientists from across the region and are furnished with specialist equipment to facilitate this. Workshops to train researchers in each country, and even neighbouring countries, in key chemical analysis techniques, such the use of gas chromatograph-mass spectrometry instruments (GC-MS) provide an active opportunity for researchers to develop their analytical skills.

10. The PACN has coordinated national and international meetings on relevant scientific issues across the continent, such as water quality, sustainable development and agricultural productivity. These meetings provide an opportunity for scientists from across Africa to network and exchange knowledge with others. In addition, output reports from these meetings have been produced which highlight the potential for chemical science research in developing nations. These reports have been disseminated to policy makers not just in Africa, but globally. The report *Africa's Water Quality: A Chemical Science Perspective*[3] was launched on World Water Day in March 2010 at the United Nations Environment Programme Headquarters in Nairobi. In 2010, PACN brought together experts to discuss the area of green chemistry, sustainable technologies and their development and adoption in Africa. The findings from the conference were published in the report *Wealth Not Waste: Green Science and Engineering for Sustainable Growth in Africa*,[4] which was launched at the United Nations Economic Commission for Africa (UNECA) Committee on Development Information, Science and Technology in May 2011. The 2011 Congress, which took place between 11–13 November, focussed on the topic of Agricultural Productivity; the proceedings of this congress will also be collated into a report.

11. Knowledge exchange is an important part of building research capacity *via* researchers themselves. The PACN has funded schemes that have allowed African researchers to undertake research fellowships of up to two months, within a university research department or in industry in other parts of the world. One of these fellowships has generated an active collaboration between a researcher in Cameroon and the department which hosted him in Brazil, meaning that such initiatives can lead to long-term research benefits.

12. Education is a cornerstone to building research capacity. Equipping countries to train their next generation of researchers is essential. Since its inception, the PACN has carried out a number of programmes to help build teaching capacity at different educational levels. These have included programmes supplying educational resources such as Access to Chemistry, a foundation textbook, which is available online in all schools and universities across Africa. The PACN has organised several activities to support education, including teacher training workshops in Uganda, Rwanda and Ethiopia. It is important that such initiatives address the specific issues that face the teaching communities' in these countries. A recent Experimental Chemistry Training Workshop, held at Addis Ababa University, helped teachers to develop key skills in practical chemistry and also showed how to use these to carry out experiments on a modest budget. To ensure that such capacity building is sustainable, the RSC has run training courses for teachers in Africa with an emphasis on "training the trainers". This allows our programme of activities to reach a wider audience and ensures that such knowledge is embedded within the community it needs to serve. With limited resources, the PACN must focus its efforts to specific activities. However, the success of the programme means that the RSC is embarking on further fundraising to extend the reach of successful activities.

13. The concerted approach of building research capacity through education, opportunities for knowledge exchange, infrastructure and advocacy (highlighting the role of chemistry to African policy makers) is essential to the success of the network. It has helped to raise the number of opportunities available to chemists across the continent, as well as the profile of the role chemistry has to play in developing solutions in Africa.

3. *How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?*

14. One consideration in the further assessment of Government scientific capacity building is to examine this in relation to similar capacity building work in other sectors (see paragraphs 17 and 18 in question 5) and establish where collaboration may be beneficial.

[3] Africa's Water Quality A Chemical Science Perspective, Pan Africa Chemistry Network, March 2010
[4] Wealth Not Waste, Green Science & Engineering for Sustainable Growth in Africa, Pan Africa Chemistry Network, April 2011

4. *What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?*

15. No comment.

5. *How are government activities co-ordinated with the private and voluntary sectors?*

16. Currently, the RSC does not formally co-ordinate with government activities in international development. We would, however welcome the opportunity to engage with government strategies *via* the Department for International Development (DfID) in our capacity building activities.

17. Better coordination between government *via* DfID and UK charities and private sector that work in building science, technology and innovation capacity could help deliver benefits more efficiently and effectively reach many more people. Organisations such as the RSC that have initiated links with scientists in developing countries can provide information on the issues surrounding capacity building in specific disciplines. Within chemistry, access to appropriate specialist equipment is critical; however programmes to train scientists in both the maintenance, as well as the use, of such equipment is essential. This has already been initiated *via* the PACN two Centres of Excellence in Chemical Sciences (see paragraph 8).

18. Better coordination with government activities would mean being able to build on successful programmes that help to further the RSC's aims and objectives and complement DfID's strategy. Chemistry as a discipline is a key contributor to a number of the research themes that are covered by the Research for Development Programme.[5] The programmes described above (paragraphs 8—11) that contribute to supporting chemistry education and developing the skills of scientists will ensure that researchers are equipped to contribute to Africa's research base.

19. The government's role in helping to develop the appropriate supporting climate to allow science and technology to drive economic growth in developing countries is essential. An analysis of how to rebalance capacity in governance in developing countries against capacity in science and technology could be useful to determine future priorities for the UK government in their science development activities overseas.

16 December 2011

Written evidence submitted by the Society of Biology

1. The Society of Biology welcomes the Committee's inquiry into this topic which is an important part of international collaboration in science.

2. The Society of Biology is a single unified voice for biology: advising Government and influencing policy; advancing education and professional development; supporting our members, and engaging and encouraging public interest in the life sciences.

3. We welcome and support the submission of the Institute of Physics to this inquiry which helpfully notes the contribution which learned societies can and do make in this arena.

4. Many of the varied schemes supported by learned societies, institutions and individual funders, focus on closely defined approaches and settings and necessarily operate on a small scale. The small number of scientists engaged with these programmes is a significant impediment to critical review and assessment for sponsoring organisations. Given the overarching remit of the Department for International Development (DfID) it could be helpful if it could act as a repository of knowledge about these schemes as a whole, and maintain oversight of success indicators so as to allow the spread of good practice.

5. In order to address and solve global challenges a network of well-functioning international collaborations is essential. Expanded capacity for UK scientists to link with and work alongside overseas local experts would be a significant advantage in this regard. As well as supportive involvement with capacity building, and targeted help for locally-needed facilities, options to form relationships with relevant UK institutions could be valuable.

16 December 2011

MEMBER ORGANISATIONS OF THE SOCIETY OF BIOLOGY

Anatomical Society
Association for the Study of Animal Behaviour
Association of Applied Biologists
Biochemical Society
Biosciences KTN
Breakspear Hospital
British Andrology Society
British Association for Lung Research
British Association for Psychopharmacology

[5] http://www.dfid.gov.uk/R4D/Search/BrowseByTheme.aspx

British Crop Production Council
British Ecological Society
British Lichen Society
British Microcirculation Society
British Mycological Society
British Neuroscience Association
British Pharmacological Society
British Phycological Society
British Society for Ecological Medicine
British Society for Immunology
British Society for Matrix Biology
British Society for Medical Mycology
British Society for Neuroendocrinology
British Society for Parasitology
British Society for Plant Pathology
British Society for Proteome Research
British Society for Research on Ageing
British Society for Soil Science
British Society of Animal Science
British Toxicology Society
Experimental Psychology Society
Fisheries Society of the British Isles
Genetics Society
Heads of University Biological Sciences
Heads of University Centres of Biomedical Science
Institute of Animal Technology
International Biometric Society
Laboratory Animal Science Association
Linnean Society of London
Marine Biological Association
Nutrition Society
Royal Entomological Society
Royal Microscopical Society
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Scottish Association for Marine Science
Society for Applied Microbiology
Society for Endocrinology
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The Physiological Society
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The British Library

Unilever UK Ltd
Wellcome Trust
Wiley Blackwell

Written evidence submitted by the Wellcome Trust

KEY POINTS

— The Wellcome Trust is very supportive of the Department for International Development (DFID)'s activities in the area of science and international development. We consider that significant progress has been made in the areas identified in the Committee's 2004 report on this topic.

— Capacity building is a difficult and complex activity. The most effective approaches are those that aim to strengthen the national and institutional research environment in addition to providing training and career support to individual researchers.

— Research funders, including foundations and charities, can work in partnership with government development agencies in areas where they have complementary skills and experience. The Health Research Capacity Strengthening initiative in Kenya and Malawi is a major (£20 million) partnership between DFID and the Wellcome Trust that aims to improve capacity to generate and use research evidence in Kenya and Malawi. This initiative demonstrates the complexity of capacity building and the significant challenges, as well as opportunities, it presents.

INTRODUCTION

1. The Wellcome Trust is the largest charity in the UK, spending over £600 million each year to support the brightest minds in biomedical research and the medical humanities. Over the past six years the Wellcome Trust has significantly increased its international activity and funding, spending £527 million between 2004–05 and 2009–10. The Trust's global health strategy can be summarised as:

— Supporting areas of science that have the potential to lead to health benefits for people and livestock.

— Supporting international networks and partnerships focused on problems of resource-poor countries.

— Broadening the research base for scientific endeavour in under-resourced environments.

The Wellcome Trust and DFID are working together on partnership activities totalling £44 million.

2. This inquiry focuses on DFID's activities to build scientific capacity in developing countries. Research capacity strengthening is an important mechanism to improve the generation and use of health research evidence at the individual, institutional and/or national level. Developing a cadre and critical mass of research professionals in low and middle-income countries allows local health research priorities to be addressed. It also improves both the quality of medical and research training and the quality of the evidence used by policy-makers in these country settings. In view of the importance of these outcomes, we hope that the planned increase in DFID's budget over the spending review period will include an increase in the resources that are invested to strengthen research capacity in low income countries.

3. The Terms of Reference for the inquiry refer to the Committee's 2004 report on "The Use of Science in UK international development policy", which identified DFID's research capacity building activities as an area of weakness. DFID has made significant progress since the 2004 report was published, improving its ability to generate and use research evidence; more effectively integrating research and policy within its departmental structure; and strengthening links with charities and other partners. DFID is currently reviewing the Research Programme Consortia model (RPC), which has been the main mechanism used to strengthen research capacity over the past few years. The appointment of a highly capable Chief Scientific Adviser (as recommended in the 2004 report) who is also head of the DFID Research and Evidence Division (RED) has been a major driver behind these improvements.

4. The Wellcome Trust has a major partnership with DFID, the Health Research Capacity Strengthening Initiative, which is specifically focused on strengthening capacity for health research in Kenya and Malawi. We value DFID's contribution to this partnership.

RESPONSES TO SPECIFIC COMMITTEE QUESTIONS

Q1. *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

5. Traditionally, the focus of capacity-strengthening programmes has been on individuals working in a low or middle-income country environment, via fellowships or other forms of personal support. More recently there has been a recognition and understanding of the need to provide institutional and in some cases, national, health research capacity strengthening support.

6. In the health research area, DFID's main approach has been to support capacity strengthening through its Research Programme Consortia (RPCs), which aim to generate new policy-relevant knowledge that will help developing countries, the wider development community, and DFID to eradicate world poverty. DFID has been

effective at commissioning research in priority areas, complementing the role of other funders who adopt a more investigator-driven approach. For example, DFID has supported research through a concordat with the Medical Research Council and a similar initiative with the Economic and Social Research Council.

7. The Wellcome Trust is involved in several partnerships with DFID, including the Global Health Trials Scheme, and the Health Research Capacity Strengthening Initiative (HRCS) in Kenya and Malawi. The latter is specifically focused on increasing the capacity for generating new health research knowledge within Kenya and Malawi, and to improve its use in evidence-based decision making, policy formulation and implementation. The Wellcome Trust and DFID committed £10 million each towards the initiative.

8. The focus of the HRCS initiative is on strengthening key academic research and health policy-making institutions, and facilitating the collaborative engagement of national representatives. An inception phase supported national task forces in the two countries, which over six months developed comprehensive five-year work plans that document activities to support the initiative's aims. In each country a new institutional entity has been established that has implemented systems for receiving, evaluating and monitoring grant applications. In Kenya the programme is implemented by a new NGO, the Consortium for National Health Research (CNHR). In Malawi, HRCS activities are housed within the Government of Malawi National Commission for Science and Technology (NCST). CNHR and NCST have each set up transparent, merit-based, peer-reviewed competitive processes for the evaluation and awarding of grants.

9. Key outputs from HRCS include:

— In Malawi, the first national health research agenda for Malawi has been produced (2012–16). The goal is to guide researchers, policy makers, programme implementers, academic institutions and other stakeholders on health research priorities for Malawi in nine key areas, including: nutrition; health systems; mental health; infectious diseases; and non-communicable diseases such as diabetes and cancer. This process has been led by the HRCS initiative in close partnership with the Malawian Ministry of Health. In addition, Masters students and key research grants have been supported in areas of identified need. Institutional support for student grants has been established to permit undergraduate research projects as part of medical and scientific training.

— In Kenya, four Centres or Research Excellence have been selected and supported: two in health systems research; one in pharmacology; and one in vector control. All have a major focus on training and core support. In many cases this is the first time that major Kenyan health research institutions have collaborated together. In Kenya HRCS also supports a successful graduate internship programme as well as research leader grants, with associated training fellowships. Closer links with the Government of Kenya are illustrated by the co-hosting, in June 2011, of the "First National Research-to-Policy workshop on Using Research Results".

10. A number of challenges have been faced in setting up the HRCS initiative, particularly in Malawi, where changes in the government "host institution" delayed the establishment of appropriate systems. A lack of capacity and experience to provide relevant leadership and expertise to manage the programme has also been an issue. A major review of the Malawi initiative (jointly with DFID) is planned for March 2012.

11. In Kenya, PriceWaterhouseCoopers has been contracted by the funders to establish financial management and provide technical support to the CNHR, which underwent a successful mid-term review by DFID and Wellcome Trust in 2011. CNHR now receives direct funding from both funders as it plans for long-term financial sustainability.

12. The Global Heath Trials scheme funded by the Wellcome Trust, the Medical Research Council and DFID also supports capacity strengthening. This joint scheme funds late phase trials of health interventions in low income settings, with a focus on trials which incorporate research that will lead to effective implementation of results. All research costs that are directly attributable to the trial may be included, for example:

— scientific, technical and administrative staff including statisticians, research nurses, trial managers etc;

— consumables; major items of equipment and travel;

— holding trial steering, data monitoring and ethics committees and training and support for a trial manager.

13. Possible actions to improve the effectiveness of the UK Government's approach to scientific capacity building activities include:

— Increased support for capacity-strengthening as a dedicated activity. We welcome DFID's efforts to support capacity strengthening within its research programmes, and recognise its aim to accelerate progress in this area, by reviewing its activities and considering a more focused approach with targeted funding in future.

— Promoting research capacity strengthening objectives through DFID's broader activities. For example, as part of DFIDs aid programmes (budget support) and its country-offices, DFID could encourage low and middle income countries to dedicate more resources to health research—particularly support for health and clinical workforce development in research skills and training. The country offices have some funds to spend locally on research, which could also be used to increase capacity strengthening. Some, such as the India office, already commit substantial resources to this area.

— Expanding DFID's range of partnerships to leverage additional funding and draw on complementary strengths. For example, DFID can draw on the experience of funders such as the Wellcome Trust and Medical Research Council in assessing research proposals and evaluating the effectiveness of scientific programmes. As UK funders working in this area, we are currently developing further areas of joint-working and partnerships which will add to DFID's capacity strengthening portfolio.

Q2. *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

14. Capacity strengthening is a difficult and complex activity, and funders must be willing to commit for the long-term. It is difficult to identify a single right model or mechanism for supporting research capacity building, as the model chosen needs to be tailored to the specific country and research context. It can also be challenging to evaluate the relative effectiveness of different approaches. It is sensible to support a diversity of approaches, although care must be taken not to spread resources too thinly.

15. In general, effective research capacity strengthening activities are those that:

— aim to improve capacity to both generate and use research evidence;

— promote strong local ownership;

— strengthen the national and institutional research environment in addition to providing training and career support to individual researchers;

— acknowledge the broader policy context—for example, in the health area, strengthening capacity to undertake health research should be coordinated with parallel efforts to strengthen the clinical workforce and improve health delivery.

16. Successful capacity-building initiatives should aim to become self-sustaining over time and demonstrate the ability to leverage additional funding from other sources. Funders need to seriously consider what will happen once funding runs out and develop plans to facilitate a transition to a model which does not include dependence on the original funder. To provide sustainable solutions, funders may need to consider support for research infrastructure, building national and international research networks and developing institutional research strategies alongside the provision of research and training grants.

17. The Wellcome Trust's African Institutions Initiative is an example of this holistic approach to capacity strengthening. This £30 million initiative aims to strengthen Africa's universities and research institutions and help develop research networks. More than 50 institutions from 18 African countries are partners in seven international consortia, each led by an African institution. Each consortium operates independently and sets its own agenda, with the funding going directly to an African lead institution. A recent analysis of the range of capacity strengthening activities underway across the seven consortia identified a wide variety of activities including: leadership training and professional development; research training courses; competitive selection of PhD and postdoctoral fellowships; improved infrastructure (eg, research and computing equipment); the development of financial and research administration systems; engagement and dissemination activities.

18. One of the difficulties in comparing different capacity strengthening models and mechanisms is trying to access accurate and up-to-date information about the different models which are already being used, so as to avoid "reinventing the wheel". There are a number of existing initiatives and partnerships which are attempting to strengthen coordination and promote best practice in relation to international development research, including capacity strengthening aspects:

— the UK collaborative on development sciences (UKCDS), a collaboration of 13 UK funders and stakeholders with an interest in international development research. UKCDS members work together to provide a more coordinated approach to development sciences research and maximise the impact of UK research funding on international development outcomes. A UK funders group specifically focused on health research is facilitated by UKCDS, of which DFID is an active member, along with the Trust, MRC and Department of Health. UKCDS also manages a research capacity strengthening group which helps UK-based stakeholders engaged in capacity strengthening to share information, learn from each other and address common issues.

— the ESSENCE on Health Research initiative is a collaborative framework that brings together funders of health research in Africa to share best practice, supported by a Secretariat in WHO. ESSENCE (Enhancing Support for Strengthening the Effectiveness of National Capacity Efforts) members embrace the principles of donor harmonisation and alignment with country priorities. According to these principles, donors/funders should align with priorities of countries in which they work, and harmonise their actions and procedures in order to facilitate complementarity among funders and to reduce administrative overload for recipients of funding. Projects to date have included developing a common set of monitoring and evaluation indicators, and a study assessing the true cost of research in a low-income setting.

— the Heads of International Research Organizations (HIROs), which brings together a large number of major government and philanthropic funders of biomedical research to share information about new developments in the field and coordinate policy responses where appropriate. HIROs members, led by the National Institute of Health, have been contributing to the development of a mapping project called World RePORT which is an illustrative mapping database system that can be used to share information about projects across funding agencies and other organisations.

It is important for DFID to engage strongly with these initiatives—ESSENCE in particular is a key point of contact for the collation of different capacity-building models employed by the major funders working in this area

19. As poor quality research is unlikely to be effective in improving health, the focus of capacity-building efforts must always be on building capacity to undertake high quality research. However, the research should be appropriate to the setting and the balance of funding between research, training, infrastructure and core support must ensure that the research environment, research and financial management and training elements are appropriately weighted within such programmes

Q3. *How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?*

20. Evaluation needs to be fit-for-purpose. While the Wellcome Trust supports the need for robust evaluation and monitoring of scientific capacity building activities, we are mindful of the challenges in evaluating capacity strengthening activities as well as the resource implications, both for DFID and for the countries where capacity building activities take place. Evaluating the effectiveness of scientific capacity building activities can be a challenging process due to the difficulties identifying appropriate metrics and baseline measurements. For example, it would not be appropriate to simply count the number of people trained to PhD level, as the existence of a viable career structure at more senior levels will also need to be considered.

21. The availability of useful evaluation evidence will depend on the quality of the underlying monitoring data. To enable effective evaluation down the track, appropriate metrics and monitoring tools must be built into a project from the outset. Metrics must be simple and practical, to reduce the burden on grant holders and increase the likelihood of accurate reporting. The DFID logical framework (log frame) is widely regarded in this area and although more investment and focus in this area would also be welcome, additional DFID staff time and resources would need to be included to ensure it could be effectively used.

Q4. *What role does DFID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?*

22. We are not involved in DFID's internal priority-setting process, but in general an effective CSA will have scientific credibility, a clear strategic vision, and the ability to engage in high level discussions with partner organisations. We have found Prof Chris Whitty to be a very effective CSA and one with whom the Wellcome Trust is very pleased to interact.

Q5. *How are government activities co-ordinated with the private and voluntary sectors?*

23. In his speech at the Wellcome Trust on 11 November, Andrew Mitchell MP, Secretary of State for International Development, articulated the Government's vision to develop a whole-of-Government approach to international development, where DFID's activities are integrated with those of the broader public sector, such as the Foreign Office and NHS Global. He also spoke about his desire for Government to play an enabling role, fostering international development activities conducted within the private and charity sector.

24. Charities and government aid agencies often have similar priorities and should be encouraged to work together in areas where they have complementary skills and experience. In the Wellcome Trust's partnerships with DFID, we have benefited from DFID's relationships with the relevant national governments, while the Trust brings expertise in designing and administering research funding programmes. These are examples of where working in partnership can deliver benefits that could not be realised by either party working alone.

25. The India-UK CEO Forum, established in July 2010 by the Indian and British Prime Ministers, has provided a useful focal point for engagement between government, private sector and other agencies around specific issues including health, skills and infrastructure. Sir Mark Walport, Director of the Wellcome Trust, is leading a work stream on health and one promising focus area of activity is the scaling-up of primary care

provision in India. DFID India has been integral in developing this programme of activity and will be vital to taking forward pilot stage projects.

26. Capacity building should encompass the capacity to understand and use research evidence as well as generate new knowledge. DFID has shown valuable leadership in this area through its research communication and "research into use" initiatives, and we consider disseminating scientific evidence to be an important on-going role for the department. We are concerned that the cross-government drive to reduce spending on "communications" activities may have an adverse impact on this area.

December 2011

Written evidence submitted by the School of Natural Sciences, University of Stirling

1. *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

1.1 The linking of earmarked support for developing science capacity in developing countries has declined markedly over the last 10 years. UK Government contributions to multilateral programmes including EC FP7—INCODEV has disappeared and now international partners can only be included in a relatively small number of projects which have a focus on "value for Europe" rather than any specific focus on capacity development for LDCs. Direct support for capacity building from DFID is no longer accessible by many UK HE institutions.

1.2 Previous forms of DFID support included the RNRRS programme (Renewable Natural Resource Research Strategy) which are now discontinued. The network developed during that era in which locally contextualised research was carried out in partnership with local academic and development partners, endures mainly through individuals who were trained to PhD level at that time and are now active in their organisations. Critically the scientific focus of their research was identified in their own country and significant periods of time were typically spent there in terms of conducting research with periods in the UK to analyse and report. Another feature of their training was the flexibility that encouraged learning between countries and individuals through cross visits between countries involved in the research.

1.3 Current funding appears to be directed towards the Research Councils and initiatives such as the UK Collaborative on Development Science. Since the formation of this organisation in 2007 it "has improved communication amongst members and stakeholders, helped form collaborations and raised awareness of development sciences". This is a useful mission but the profile appears to be very limited.

1.4 For DFID-funded Research Council programmes which target the highest quality academic outputs, partnership with LDC organisations is required, as are well developed impact pathways for successful submissions but there is only minor emphasis placed on local capacity building. These mechanisms currently lack key attributes for building long term scientific capacity in LDCs.

1.5 It is unclear how DFID views the challenges of developing the science capacity of low and medium income countries. This is important as numerically, medium income countries have larger numbers of poorer people but are likely to have very different resource profiles.

1.6 Support for British Council managed initiatives such as PMI2/DelPHE and other programmes appear *ad hoc* and typically restrict involvement of core University staff rather than younger contract staff that may have much to offer (such support usually does not cover UK employed staff employment).

1.7 DFID supports training of high calibre candidates from Commonwealth countries through provision of scholarships for training in the UK and distance learning. Both of these are very small investments but we have evidence for the strong development impact of the latter for programmes designed to support the learning of those employed in the Natural Resource sector. The programme in question had an interdisciplinary, problem analysis approach at its heart and used a range of innovative approaches to independent learning that supported students in challenging work and home circumstances.

1.8 A key challenge is to ensure development effectiveness post-training; our experience is that continued availability of mentorship and other support can really improve their longer term impacts. One model of such post education support is the Swedish-funded International Foundation for Science (IFS) that provides small grants to develop the of independent capacity of developing country scientists. DFID is a contributor to this organisation

2. *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

2.1 Linking individuals and institutions in long term collaborations with UK institutions through a range of measures rather than the current reliance on ad *hoc* short term projects would be a far more effective approach.

2.2 Ensuring that a comprehensive understanding of the development context precedes identification of specific training and research activities is critical and a focus on split-site training where at least part of the research is conducted in the students own country are to be recommended. This has implications for both the cost and time for such training and how UK institutions administer such studentships.

2.3 Making the research "fit" with the needs of the country also needs greater attention-this requires that research programmes develop capacity to adequately assess research and development needs and to ensure they match with the training specifications for students embarked on expensive postgraduate programmes. These should pay reference to the MDGs and the poverty assessments of the country themselves and multinational agencies.

2.4 Time and resource is required for developing high quality collaborations with organisations in LDCs. Collaborations need opportunities for younger people from both the UK and LDCs to become involved. Strengthened links between theory and practice at all levels are required. Internships for undergraduates and postgraduate students with the constituency that they will return to serve should become the norm.

2.5 Improved linkages between degree awarding institution in the UKs and CGIAR centres could be strengthened cost effectively. Effective working relationships are often undermined by constraints to funding for university fees (for example under EU FP7 rules) for high calibre individuals working on projects between institutions.

2.6 Opportunities for collaboration between the HE and FE sectors in the UK and organisations in LDCS should be prioritised. The FE and vocational sectors are typically underfunded and have low profiles in LDCs and yet their roles are critical in developing practical skills, typically ignored by universities.

3. *How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?*

3.1 Simplistic analyses of "effectiveness" are unlikely to be useful and our understanding of impacts is in general poor. Many of the development impacts that result from scientific capacity being built (through investments in capacity building or any other) in poorer countries are indirect and occur over long periods of time. In best case scenarios there are powerful multipliers/secondary impacts that need to be assessed in addition to primary effects. Case studies of recipients of previous training/research investment would be useful in terms of identifying the level and quality of these impacts. "Best" and "worst" cases would hopefully allow better targeting (of organisations and individuals) and more programme design.

4. *What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?*

No comment.

5. *How are government activities co-ordinated with the private and voluntary sectors?*

No comment.

16 December 2011

Written evidence submitted by the British Council

Coordination

1. It is important to have effective coordination amongst UK funders of international development in relation to scientific capacity building. In this context, DFID works with the UK Collaborative on Development Sciences (UKCDS) which is a partnership between Government departments, the Research Councils, the Scottish Government and the Wellcome Trust. UKCDS also runs a research capacity strengthening group, which has an expanded membership including the Royal Society, the British Academy and the British Council. This group provides a useful forum for sharing information and knowledge, and could be used more in the future to encourage closer collaboration amongst UK funders.

2. Another useful cross-Whitehall group, which also includes learned academies and the British Council, is the Global Science and Innovation Forum (GSIF). GSIF leads on the strategy for the UK's international engagement in science and innovation which covers four key areas: research, innovation, influence and development. We see the latter as being a critical component of the UK's international strategy and we would recommend a consistent focus on this, together with a strong DFID presence at the group meetings of core officials. The group would benefit from regular development-related items, perhaps bringing in specialist expertise from relevant DFID sector advisors as appropriate.

3. The UK's international strategy and initiatives in this area also benefit from effective coordination between international donors, such as other national governments and global foundations. Co-ordination at a country level would also be beneficial, to avoid duplication of effort and maximise synergy. This is best delivered in-country by a strong national body and DFID should consider how best to support target-country governments in order to achieve this. There are already good examples of coordination between DFID and others, for example their work with IDRC and the Wellcome Trust to deliver needs-driven support in the Health Research Capacity Strengthening Initiatives in Malawi and Kenya.

Environment for Research

4. For science and technology to be an effective tool for development, there is a need to build a supportive environment for research, beyond working with individual researchers and research groups. In key target countries DFID should consider how best to support scientific infrastructure, including strengthening national research bodies (eg research councils, national science foundations) which are independent of short term political influence, have secured long-term funding, and are able to define and set priorities, and assess and monitor the quality of in-country research.

5. Ensuring a stable and openly competitive career structure for young researchers is also a vital part of building national capacity. Linked to this is the need to enable researchers in developing country institutions to participate in the global scientific community, through supporting short-term mobility and developing specialist communication skills. British Council's INSPIRE project is an example of this, where we support mobility of researchers from Afghanistan, Bangladesh, Pakistan, Kazakhstan and Uzbekistan. We have also piloted "English for Researchers" modules in the wider South Asia region to support communication skills.

6. Another important aspect of building an effective research environment relates to developing public understanding and communication on science and research. British Council uses a modest amount of grant funding (approximately £80,000) to run the FameLab International, a partnership with Cheltenham Science Festival, which builds communication skills in young scientists and inspires an interest in science amongst the wider community. FameLab currently runs in 21 countries, including Egypt, Georgia, Serbia and South Africa.

Evidence-based Policy Making

7. DFID funded research can often be used by decision-makers to inform policy on global issues such as health, agriculture and energy. However, sometimes there is a gap between research outputs and their use as evidence in policy-making. DFID has a strong track record in making connections between research and policy development and should build on this success to continue bridging the gap between scientists and research users. The involvement of local stakeholders, including the private sector, local communities, civil society organisations, the scientific community and government, is vital to this process.

Innovation

8. DFID has supported innovation through its funding of research consortia and capacity building. In developing countries, the private sector has the potential to be a driver of innovation. In addition, innovation often comes out of demand rather than supply-driven research. Recognising that DFID may not have the capacity to work with a proliferation of individual researchers, it would be beneficial to explore organisational mechanisms for stimulating innovative research of this nature. In knowledge economy work, models exist for linking SMEs with the research base. Here, too, it is recognised that the organisational mechanisms for coordination would have to be put in place for DFID to engage with SMEs in bridging the gap between the research base and small scale business. British Council runs the African Knowledge Transfer Partnership (AKTP) scheme to link business and the knowledge base through talented individuals; this initiative is based on the UK Knowledge Transfer Partnerships scheme (run by the UK's Technology Strategy Board). AKTP is now running in Ghana, Nigeria, Kenya, Uganda, and starting up in Rwanda, South Africa and Ethiopia

Ownership

9. There needs to be a strong sense of ownership by southern partners in research partnerships. In the Development Partnerships in Higher Education (DelPHE)[6] programme, which British Council manages, this is rated highly. DelPHE is a DfID funded initiative which runs from 2006–13, with a total budget of £15 million. The aim of DelPHE is to strengthen the capacity of higher education institutions (HEIs) to contribute towards the MDGs and promote science and technology related knowledge and skills.

10. 200 projects have been funded to date with an average project budget of around £65,000 over three years. DelPHE fits with core DFID themes in contributing towards each MDG. The majority of funding is allocated to eradicating extreme poverty and hunger; combating HIV/AIDS, malaria and other diseases; and ensuring environmental sustainability.

11. Capacity development of HEIs covers two main activity areas: (i) researchers themselves through collaborative research and product development, preferably with a partner with significantly greater research capacity; and (ii) improved training provision in order to enhance the knowledge and skills of students and other target groups, including groups in the wider community. DelPHE runs in the 22 countries with which DFID has public service agreements (PSA countries).

12. DFID aid is untied so other northern HEI partners have been able to participate in the DelPHE programme and South-South partnerships (with no UK institutional involvement) have been actively encouraged and promoted. Uniquely therefore, DelPHE has 22 South-South partnerships where there is no UK partner involved. These result in cross country and cross regional collaboration and also give total ownership to the Southern partners. This supports national ownership as stated in the Paris Declaration on Aid Effectiveness.

[6] See Mid-term Review of the DFID Development Partnerships in Higher Education Programme (DelPHE), Terry Allsop and Paul Bennell, October 2010, DFID Human Development Resource Centre 276252.

13. Southern Universities benefit from DelPHE through the improvement in their academic capacity by managing partnership finances and leading on partnership implementation. They are able to establish a credible track record to secure future funding from donors and share knowledge and best practice across their regions as they modernise their curricula in a way that is relevant in the fast changing world of today. There are also benefits for Southern Governments as they use the research and academic expertise of their HE sector to influence and stimulate policy debate and pursue achievement of Millennium Development Goal targets.

14. UK HEIs still benefit from these as such partnerships strengthen research leadership in developing countries which lead to stronger mutual partners in the future. Additionally, DelPHE improves UK HEIs international profile, which may lead to increased international student recruitment. Some UK partners have also reinforced their position as world leaders in a variety of science and technology related fields in for example, agriculture and health. DelPHE also supports 68 multi-lateral projects which have all increased scalability, value for money, cross regional working, international sharing of best practice, lessons learnt and networking.

Declaration of Interests

In 2010–11, the British Council's overall turnover was £693 million, with funding from a variety of sources. Just under a third (28% or £196 million) came as government grants. The largest proportion (56% or £387 million) came from selling services such as English language courses and examinations, and from management fees and other partnership income. We also received about £4 million in other income and £105 million in restricted income (funding from contract activity) for running programmes for the UK Government and the European Union. In this respect our main declaration of interest is the management of the DFID funded DelPHE programme.

16 December 2011

Written evidence submitted by ESSENCE on Health Research Initiative

Key Points

— ESSENCE on Health Initiative is supportive of the Department for International Development (DFID)'s activities in the area capacity strengthening for health research.

— International research funders work in partnerships and bring complementary skills and experience. DFID proactively engages in partnerships with the UK and other international partnerships to increase the effectiveness of its investments and efforts.

ESSENCE on Health Research Initiative and the DFID

— In recent years the global health landscape has become crowded with new initiatives, leading to concerns that internationally-funded research projects may not match national priorities and sometimes may even inadvertently work against them. At the same time, multiple donors often fund the same project, with each one demanding different criteria for its evaluation process.

— ESSENCE on Health Research initiative is a collaborative framework that brings together funders of health research in Africa to share best practice, supported by a Secretariat the Special Programme on Research and Training for Tropical diseases (TDR) at the WHO.

— ESSENCE (Enhancing Support for Strengthening the Effectiveness of National Capacity Efforts) members embrace the principles of donor harmonization and alignment with country priorities. According to these principles, donors/funders should align with priorities of countries in which they work, and harmonize their actions and procedures in order to facilitate complementarity among funders and to reduce administrative overload for recipients of funding.

— ESSENCE on Health Initiative is open to a broad range of funders interested in collaboration, harmonization and better alignment with country needs. Some of the current members include the United Kingdom Department for International Development (DFID), Canada's International Development Research Centre (IDRC), Norwegian Agency for Development Cooperation (Norad), Ministry of Foreign Affairs of Denmark (Danida), the Bill & Melinda Gates Foundation, FIOCRUZ Brazil, Howard Hughes Medical Institute, NEPAD (New Partnership for Africa's Development), EDCTP (European and Developing Countries Clinical Trials Partnership) and NIH/FIC (US National Institutes of Health/Fogarty International Center), Rockefeller Foundation and Canada's Global Health Research Initiative (GHRI).

— ESSENCE members embrace the strong agreement within the international development and research communities that funding should be aligned with national priorities. The initiative recognizes that successful research capacity also requires competencies in issues such as governance and management, strategic planning, evidence assessment, ethics and translation of evidence into policy.

— ESSENCE provides a platform for comparing different capacity strengthening models and mechanisms and compile accurate and up-to-date information about the different models which are already being used. ESSENCE is a unique partnership which is attempting to strengthen coordination and promote best practice in relation to international development research, including capacity strengthening aspects.

— With its focus on health research, ESSENCE builds on the principles of the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action, which set standards for good practice in international aid.

— ESSENCE made its first major step with the development of a framework document that is designed to harmonize the planning, monitoring, and evaluation of international health research programmes. The document is designed to create a common methodology and common indicators that donors can use to assess their research capacity-building programmes. Another study under way is assessing the true cost of research in a low income setting and will help harmonize policies and practices of funding agencies.

— DFID is a full and active member of the initiative. It takes advantage of the platform to increase the effectiveness of the efforts and also bring a wealth of knowledge and experience that is quickly shared with other members of the initiative.

For further information on ESSENCE please visit: http://apps.who.int/tdr/svc/partnerships/initiatives/essence

ESSENCE on Health Research Initiative

16 December 2011

Written evidence submitted by the Health Protection Agency

1. *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

1.1 On behalf of the UK, the Department for International Development (DfID) holds the lead role for promoting bilateral and multilateral programmes of international development work through capacity building in developing countries. DfID has a strong focus on Millennium Development Goals (MDG) 4, 5 and 6.

1.2 The Health Partnership Scheme (HPS) funded by DfID was launched in 2011 and was welcomed for harnessing the expertise of UK health professionals to improve health outcomes by transferring skills and supporting skills development in low income countries.

1.3 The *Health Is Global* outcomes framework meanwhile outlines the UK Government's commitment to driving forward improvements in global health by 2015.

1.4 Under the framework, the Health Protection Agency (HPA) is tasked with improving global health security and undertaking global health research initiatives. Both of these tasks assist implementation of the WHO International Health Regulations by proposing, funding and delivering public health capacity building activities in both developing and priority countries.

1.5 In spite of the numerous project proposals arising from DfID work programmes and the outcomes framework, there still remains a need for greater coordination between UK expert agencies and government departments, in particular DfID, in order to maximise outcomes.

1.6 Typically, UK agencies are the national experts in their respective fields. It is only appropriate that government departments directly consult with and involve these agencies where work programmes are focused on their areas of expertise.

1.7 Where DfID funding for capacity building activities has been made available to UK agencies, for instance HPS, the focus has principally been focused on a narrow aspect of international development, ie just MDG 4, 5 and 6.

1.8 Prior to HPS, there were reports of UK institutions recruited to DfID-commissioned projects, but only where an overseas organisation had successfully bid for a tender and subsequently sub-contracted the aforementioned institution.

1.9 This secondary involvement raises questions over existing procurement processes that insert an additional financial cost to the UK taxpayer, as well as an oversight by DfID to engage with UK institutions directly.

1.10 This short-coming is in some part due to the poor awareness among DfID staff of the work of UK agencies. The public health capacity building elements of DfID programmes are examples of where UK experts should have ideally been consulted or recruited for the actual programmes. Without soliciting input from key UK agencies, such as the HPA, these DfID programmes can only be regarded as sub-optimal.

1.11 It is widely regarded that institutional links form the basis for strong, long-term relationships. As a platform to share ideas and information, as well as promote collaboration and exchanges in support of capacity

building, these links require two issues to be addressed: how to forge links between institutions in the UK and developing countries; where to find long-term funding.

1.12 While the HPS provides a health brokerage service, this does not give UK agencies access to DfID's considerable network of overseas contacts. These should be shared with UK agencies in order to allow experts to forge the scientific links crucial to progressing capacity building. Inviting UK agency representatives to meetings between DfID and overseas institutions would also benefit this process and allow early input by UK experts.

1.13 The core funding and remit of most UK agencies is limited by national boundaries. DfID holds significant funding for capacity building activities overseas, it has not implemented a long-term mechanism to allow UK agencies to access DfID core funding directly.

1.14 Ironically, many of DfID's priority countries have at one time sought direct assistance from the HPA, but due to lack of funding, collaboration was not initiated. Had DfID funding been made available in those instances, a long-term link may have followed. Furthermore, any expertise gained by the HPA would then have benefited the HPA and DfID.

1.15 The poor acknowledgement of and coordination with UK agencies to date has meant that any existing DfID links have not capitalised on the expertise that the UK holds.

1.16 The need for DfID to coordinate with and involve relevant UK agencies in their capacity building activities is critical to longer-term approaches to capacity building in a holistic manner in low income countries.

2. *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

2.1 UK agencies, such as the HPA, are often the national leads in their respective fields and have equally strong track records in conducting research.

2.2 This experience positions UK agencies to support institutions in developing countries and raises questions as to why they are not more greatly involved by DfID. In particular, commissioning of research by these agencies.

2.3 The importance of institutional links applies also to supporting research capacity. The WHO Laboratory Twinning Initiative and the EU Twinning Scheme are current examples.

2.4 As with capacity building, DfID must coordinate and collaborate with UK agencies more in order to capitalise on existing national expertise. To disregard these institutions would only mean that DfID had failed to acknowledge and involve recognised UK experts.

2.5 Funding is also a limiting factor for UK agencies wishing to support research capacity in developing countries. This again relates to restrictions placed on national funding, but presents an opportunity for DfID to establish a long-term mechanism to fund the research support role that UK agencies could play.

2.6 As with all global health research initiatives, enhanced research capacity would serve to protect the UK population at a distance.

3. *How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?*

3.1 DfID contributions to multilateral organisations and activities underwent an extensive review in 2011 highlighting strengths and weaknesses.

3.2 With respect to *Health Is Global* activities, an independent review is conducted annually. Identified deliverables are also measured and reported against at six to 12 monthly intervals.

3.3 Given the possibility of follow-up activities, assessment of the degree of coordination with government departments would be welcomed.

4. *What role does DfID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?*

4.1 DfID's Scientific Adviser is well positioned to liaise with partner institutions, including voluntary and private sector partners, where UK institutions play either a lead or a support role in long term relationships.

4.2 It is common for new UK partners to repeat the work of previous partners when engaging with overseas institutions. Training for UK participants would help to mitigate this problem, though ideally an online development network hosted by the Scientific Adviser would assist UK scientific staff working in developing countries to exchange the lessons they have learnt, and perhaps learn a little about development.

4.3 The Scientific Adviser could play a role in helping developing country ministries and professional associations to clarify the science policy, qualifications and career structures of scientists in the target countries. This would only be appropriate where the UK was a lead partner and required coordination with other donors.

4.4 One key issue in connection with career structures is the associated pay levels. Until recently this has not been an area in which donors would assist but this now seems to be changing and some donors directly or indirectly subsidise staff salaries. Clearly such arrangements are sensitive and require long term commitment.

5. *How are government activities co-ordinated with the private and voluntary sectors?*

5.1 n/a.

16 December 2011

Written evidence submitted by the UK Collaborative on Development Sciences

INTRODUCTION

(a) The UK Collaborative on Development Sciences was established in 2006 as a result of the Committee's 2004 report *The Use of Science in UK development policy.* It brings together 13 key UK funders and stakeholders who provide support for research relevant to development:

- Biotechnology and Biological Sciences Research Council.
- Department for International Development.
- Economic and Social Research Council.
- Department for Business Innovation and Skills.
- Engineering and Physical Sciences Research Council.
- Department of Energy and Climate Change.
- Medical Research Council.
- Foreign and Commonwealth Office.
- Natural and Environment Research Council.
- Scottish Government.
- Department of Environment, Food and Rural Affairs.
- Department of Health.
- Wellcome Trust.

We work in partnership with the Bill and Melinda Gates Foundation

(b) Our vision is that UK research funding has maximum impact on international development outcomes and we aim to encourage and facilitate working relationships for effective research for development.

(c) This submission has been drafted by the UKCDS secretariat. It has not been officially approved by UKCDS members since the tight timescale has not made it possible to draft the submission and get approval from 13 organisations. Many of the members will be making their own submissions, but the secretariat decided to submit directly given its role in managing a Research Capacity Strengthening Group (see under Q 5) and the overview we have.

(d) It should be noted that this response focuses on strengthening research capacity in low income countries. We recognise that innovation capacity and the capacity of Government and the private sector to utilise S&T is very important, but have not focussed on those areas in our work.

1. *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

1.1 The UK Government supports the strengthening of scientific capacity in low income countries numerous ways. DFID is obviously the most active in this given its mandate and will provide the committee with details of the range of activities it supports.

1.2 DFID's commitment to scientific capacity strengthening in low income countries has increased significantly since the Committee's 2004 inquiry. We feel that DFID is constantly improving their activities and should be congratulated on the progress it has been making, in what is a very important part of the Research and Evidence Division's remit. We hope that the increase in DFID's budget over coming years (despite recent announcements that the rise will be less) will include increasing the resources that are invested in strengthening research capacity in low income countries.

1.3 However it is labelled, research and innovation capacity strengthening/building/development is complex and the terms themselves can be interpreted in numerous different ways and can cover a range of activities. One way to conceptualise capacity strengthening is as having three integrated and interrelated levels: the individual, the organisational and the enabling environment.[7]

— *Individual:* involving the development of researchers and teams via training and scholarships, to design and undertake research, write up and publish research findings, influence policy makers, etc.

[7] The terms and definitions have been adapted from DFID's "How to" note on capacity building in research.

— *Organisational:* developing the capacity of research departments in universities, research institutes, thinks tanks, etc, to fund, manage and sustain themselves and interact with society on a range of levels.

— *Enabling environment:* changing, over time, the "rules of the game" and addressing the incentive structures, the political and the regulatory context and the resource base in which research is undertaken and used by policy makers, service providers and the private sector.

1.4 Since DFID's submission will provide information on their own activities, we have highlighted a few examples of activities across Government categorised under these headings below.

1.5 *Individual*

Commonwealth Scholarship Commission: http://cscuk.dfid.gov.uk/

The Commonwealth Scholarship Commission in the United Kingdom (CSC) is responsible for managing Britain's contribution to the Commonwealth Scholarship and Fellowship Plan (CSFP), established in 1959, and supports around 700 awards annually. The Commission, which is funded by DFID, FCO, BIS and the Scottish Government supports studentships and fellowships—many of which are aimed at scholars from developing countries. Recently a large number of UK universities have agreed to provide joint scholarships, worth at least 20% of the tuition fee, to Commonwealth Scholars from developing countries. This extra revenue has enabled nearly 30 more Commonwealth Scholars to the UK this year. Many of the additional Scholars will be junior academic staff in developing country universities, whose studies in the UK will help develop capacity in their home institutions.

Joint schemes with ESRC, MRC, BBSRC and NERC

There are number of joint DFID—Research Council schemes (detailed in the RCUK submission) that are open to researchers from developing countries as Principle and Co-Investigators. DFID and the Research Councils are looking at how they can maximise the contribution theses scheme make to capacity building—however the nature of the scheme and that remit of the Research Councils means that capacity building will not be a primary objective.

1.6 *Organisational*

DelPHE: http://www.britishcouncil.org/delphe.htm

DFID has invested up to £3 million a year in Development Partnerships in Higher Education (DelPHE). The programme provides funding to support partnerships between Higher Education Institutions (HEIs) working on collaborative activity linked to the UN Millennium Development Goals (MDGs). The overall goal is to enable HEIs to act as catalysts for poverty reduction and sustainable development. DelPHE aims to achieve this by building and strengthening the capacity of HEIs to contribute towards the MDGs and promote science and technology related knowledge and skills. The programme runs for a seven year period from June 2006 to March 2013.

Darwin initiative: http://darwin.defra.gov.uk/

The Darwin Initiative, funded by Defra, assists countries that are rich in biodiversity but poor in financial resources to meet their objectives under one or more of the three major biodiversity Conventions[8] through the funding of collaborative projects which draw on UK biodiversity expertise.

Darwin projects are diverse. Typically, they may address issues in the following areas:

— institutional capacity building;

— training;

— research;

— work to implement the Biodiversity Convention; and

— environmental education or awareness.

1.7 *Enabling environment*

The Wellcome Trust is working with DFID and the IDRC to enhance the capacity for new health research in Kenya and Malawi. The Health Research Capacity Strengthening (HRCS) initiative aims to strengthen the capacity for generating new health research knowledge within Kenya and Malawi, and to improve its use in evidence-based decision making, policy formulation and implementation. This will be achieved by strengthening key academic research and health policy-making institutions, and facilitating the collaborative engagement of national representatives. The Wellcome Trust and DFID committed £10 million each towards health research capacity strengthening in Africa. The International Development Research Centre, Canada

[8] The Convention on Biological Diversity (CBD); the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); and the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

(IDRC) joined the initiative as an implementing partner with experience in health research programmes in East Africa, and as a funder.

1.8 There is (inevitably) always more than can be done to improve the Government's approach—but this needs to be balanced against other priorities. For example, for DFID to improve its support to organisational capacity and the enabling environment for science and innovation in low income countries it would need to build its own capacity to do this. This would require investment in recruiting and developing appropriate staff. Capacity strengthening is complex and long-term and requires significant support as well as funding, this includes staff that have and an understanding of the global science community as well as the skills to develop an organisation in areas other than in science (HR, finance, etc) and the ability to negotiate challenging social and political contexts within and organisation and a country. Although some of this does not need to be managed directly by DFID it still must have the capacity to manage such programmes. This is in conflict with the Government's priority to reduce size of the civil service.

2. *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

2.1 There is not one model or mechanism that has been shown to be the most effective at supporting research capacity development. There is a lack of systematic evidence around capacity strengthening processes; but also, as capacity strengthening is very complex and often context dependant, it is appropriate that a diverse range of approaches is taken.

2.2 The type of model or mechanism used can also depend on the intention behind the scheme. For example, the schemes managed by the British Council on behalf of the Department of Business Innovation and Skills (England-Africa Partnerships which has become Education Partnerships in Africa), have been aimed at developing institution capacity of higher education institutions in Africa, but also at developing and building on links between British and African institutions—therefore a scheme focussed on the institutions in Africa alone would not achieve one of the key objectives.

2.3 The main objectives of any initiative will help determine the most appropriate model—for example the primary aim may be to conduct excellent research and in the process develop capacity. Whilst doing high quality research is by no means separate from capacity building, the main focus and way in which a programmes outcome are evaluated are likely to influence how much effort is focussed on different activities. Capacity strengthening is likely to be most successful when it is the primary objective of a programme rather than a secondary requirement.

2.4 The UKCDS secretariat recently organised a workshop *Research capacity strengthening: Learning from experience* for UKCDS members, members of the research capacity strengthening group (see q 5) and others. The workshop considered lessons learnt from different schemes aimed at supporting individuals and research careers, organisational capacity and the enabling environment.

2.5 The workshop discussed a range of models and mechanisms. For example, within those programmes aimed at organisational (sometimes called institutional) capacity strengthening there are programmes that:

- support North-South institutional partnerships (eg Royal Society Leverhulme Ghana- Tanzania Award);[9]
- develop Southern-led consortia (eg Wellcome Trust African Institutions Initiative);[10]
- focus on providing targeted support to specific organisations/universities (SIDA's work with Makerere University);[11] and
- develop centres of excellence (eg Next Einstein Initiative).[12]

2.6 It is not yet clear that any of these models is more effective than the others, but it is clear that certain principles should be adhered be to when developing and supporting these programmes to have increase the likelihood that they are effective. These include:

- *Building on existing capacity*—it is important to existing local capacity where possible and enabling local actors to undertake an assessment of their strengths and weaknesses and work in partnership to identify needs and gaps, rather than ignoring what exists or duplicating efforts.
- *Long term commitment and persistence*—Capacity strengthening is not easy and not something that can be wrapped up in a year. To seriously improve capacity in the long-terms requires a recognition that it can be high risk and is likely to suffer setbacks along the way. There are many factors that can affect a programme (political changes; social limitations; changing personnel; historical context, etc) and it need to be recognised that it is likely these will cause difficulties along the way.

[9] http://royalsociety.org/grants/schemes/leverhulme-africa/
[10] http://www.wellcome.ac.uk/Funding/International/WTX055734.htm
[11] http://www.scidev.net/en/features/makerere-university-rebuilding-a-reputation.html
[12] http://www.nexteinstein.org/

— *A considered approach to sustainability*—Over the last few decades there have been numerous programmes aimed at developing capacity in a wide range of areas, including S&T. Unfortunately programmes can fail to leave much of a long-term impact once funding for the programme has ceased. Those involved in developing such programmes need to seriously consider, what will happen when funding is concluded and what plans can be put in place to enable a transition to a model which does not include being dependant on the donor/funder. Obviously research often requires a certain amount of funding "external" to the organisation and often sustainability is considered in terms of whether the individual or organisation can continue to win funding from other donors. This is only part of the picture—it should be the aim of any programme focussed on an individual, team or organisation to develop them to be able to adapt and survive in a changing environment (part of which means able to win funding competitively from a range of sources), but it can also mean stimulating the local environment to continue to enable the person, team or organisation to thrive (eg providing an individual with PhD training for them to return to a department with no career support and no resources can be very limiting for that individual).

— *Local ownership*—It has long been known that for development interventions to be successful a degree of local ownership is required. Identifying and enabling local ownership is not easy and there may be a range of groups who could (and may be should) be engaged. The important thing is that the programme is not imposed on the 'beneficiaries' and that they have a strong say in the aims of the programme and how to get there.

— *Avoiding using parallel processes*—Where possible, it is important to try and strengthen local capabilities and mechanisms across all aspects of the programme. For example, directly funding African institutions (rather than sub-contracting through UK institutions) can help strengthen financial management in an institution. However, this can require time and support and can increase the scope of a programme.

3. *How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?*

3.1 Monitoring and evaluation research capacity strengthening activities is very difficult. The UKCDS secretariat organised a workshop in May 2009 on *Monitoring and evaluating capacity strengthening initiatives—defining the questions, considering approaches.*[13] This helped stakeholders involved in funding and managing capacity building activities to work through what they need to consider in developing their evaluations. Some of the main conclusions include:

— Developing a clear understanding of the change that an organisation or programme is hoping to contribute to, and the assumptions associated with this, will enable better design, execution of activities, and evaluation.

— The vision of success for a programme represents the world view(s) of those who designed it. Involving groups at whom the programme is targeted at in developing and expressing the theory of change could improve the chances that the programme will support outcomes that are meaningful to those groups.

— The question of *why are you evaluating* and *who is the evaluation for* are fundamental questions that need to be addressed before designing an evaluation, (and preferably before designing a programme). Are you evaluating for accountability, to learn lessons for future, or to decide on future funding?

— Funders and programme managers need to be accountable, particularly when tax-payers money is involved. However, if the purpose of the programme is to support and strengthen "local" capacity, then determining if the capacity strengthening is meaningful to the actors whose capacity is being supported should be a significant part of the evaluation.

— The imperative to demonstrate impact to funders or governing boards can result in a focus on success stories, neglecting the useful lessons that can be learn from failure.

3.2 It is crucial that there is capacity and political will within organisations to implement the lessons from evaluations or else there is limited utility in undertaking them. Encouragingly there seems to be, more than ever, an appetite within DFID for learning lessons from evaluations.

3.3 DFID, like many other funders, is continuing to develop its approach to monitoring and evaluating capacity strengthening activities. The complex nature of the initiatives and the range of approaches that are taken mean that there is unlikely to a simple template that can be applied to all activities. However, recent work is providing more support in this area. For example. ESSENCE, a group of international health research funders (including DFID and Wellcome Trust) involved in developing capacity in low income countries, have recently published *Planning, Monitoring and Evaluation Framework for Capacity Strengthening in Health Research.*[14]

3.4 Some funders have not made the evaluations of their programme publically available in the past. We would urge all funders to make their evaluations available so that everyone can learn from them. The Wellcome Trust has commissioned a significant learning and evaluation component as part of their African Institutions

[13] http://tinyurl.com/d2od37z
[14] http://tinyurl.com/cet9637

Initiative and this specifically highlights the need for the evaluation to identify and share lessons about capacity strengthening with other funders; something which we strongly support.

4. *What role does DFID Chief Scientific Adviser plays in determining priorities and in the development and assessment of capacity building priorities?*

4.1 The current DFID CSA has been instrumental in improving DFID's approach to the funding and use of science and innovation over recent years. The CSA should play an important role in ensuring that capacity strengthening is a priority for RED and in articulating its importance, as well as its long-term and complex nature.

5. *How are government activities co-ordinated with the private and voluntary sector?*

5.1 The coordination of capacity strengthening is vital; whilst recognising that a diversity of approaches is required. Different stakeholders can bring different strengths to activities. For example, Learned Societies can work with scientists in their own country and low income countries in a bottom up, small scale approach—addressing particular niche needs and testing different approaches; whereas bilateral funders such as DFID can implement larger schemes and work more closely with other Governments.

5.2 It is difficult to completely coordinate every capacity strengthening initiative across all "donor" countries. However, moves to improve information sharing and lesson learning can be a step towards ensuring better coordination. UKCDS was established to improve communication and coordination between research funders in the UK with an interest in development. It manages a 'Research Capacity Strengthening Group' which brings together UK stakeholders who have some interest or involvement in strengthening research capacity in low income countries. Members include:

- Association of Commonwealth Universities.
- The British Academy.
- The British Council.
- CAAST-Net—an EU African International Cooperation Network led by the UK.
- Department for International Development.
- Economic and Social Research Council.
- International Network for the Availability of Scientific Publications (INASP).
- Medical Research Council.
- Research Councils UK.
- The Royal Academy of Engineering.
- The Royal Society.
- The Royal Society of Chemistry.
- The Wellcome Trust.[15]

The aim of the group is to develop a better understanding and relationship between UK stakeholders and to encourage coordination of and collaboration on capacity strengthening issues.

5.3 A similar initiative on an international level is ESSENCE (as mentioned above)[16] which is focussed on health research capacity strengthening. This group is making important progress on improving coordination amongst funders at an international level.

5.4 Coordination, however, should ideally come from the institutions and actors within low income countries so that they have maximum input into what different funders can help them with or work together on, based on their needs. For example, Makerere University has been attempting to do this, led by their research and publications department. However, organisations do not always have the capacity to do this.

16 December 2011

Written evidence submitted by International AIDS Vaccine Initiative

About IAVI

IAVI is a global not-for-profit, public-private partnership, with offices in the United States, Africa, India and Europe. Our mission is to ensure the development of preventive AIDS vaccines that are not only safe and effective, but also accessible to all people. To that end, IAVI invests the bulk of its resources in the research and clinical assessment of candidate vaccines against strains of HIV that are prevalent in the developing world, where some 95% of new HIV infections occur.

[15] Further details can be found here: http://www.ukcds.org.uk/page-Capacity_strengthening-60.html
[16] http://apps.who.int/tdr/svc/partnerships/initiatives/essence

IAVI's operational strategy is predicated on the conviction that addressing HIV/AIDS and developing a preventive vaccine will require the contributions of researchers worldwide, and especially from countries most burdened by the epidemic. IAVI is also guided by the belief that local scientific and technological capacity is critical to the sustainability not only of the global AIDS vaccine effort but of development efforts in general, since such capacity is what underpins innovation. Investing in capacity building in the context of AIDS vaccine research can have benefits that reach far beyond ending HIV/AIDS.

Our research and product development teams work with more than 40 academic, commercial and government institutions to develop and evaluate candidate HIV vaccines. So far, IAVI and its partners have designed 21 AIDS vaccine candidates, and already evaluated 12 of these in early stage human trials in Asia, Africa, Europe and North America. To do this critical work, we, together with local research institutions, have developed a network of sophisticated laboratories and clinics, including in India and in southern and eastern Africa. Our Human Immunobiology Laboratory at Imperial College London is a central hub that co-ordinates the work of the laboratories engaged in informing the design of novel vaccine candidates and in evaluating their ability to prevent HIV infection and AIDS. IAVI also conducts policy and advocacy programmes to help advance AIDS vaccine R&D worldwide, and supports a comprehensive approach to HIV and AIDS that balances the expansion and strengthening of existing HIV prevention and treatment programmes with targeted investments in research for new HIV/AIDS prevention tools.

Written Submission

We wish to restrict our written submission to questions 1 and 2 as they relate to AIDS vaccines and the committee inquiry regarding scientific capacity in developing countries.

Question 1: *How does the UK Government support scientific capacity building in developing countries and how should it improve?*

The UK is a strong supporter of R&D for AIDS vaccines, both in terms of investments made through DFID's research strategy and by public and private institutions in the UK research field more broadly. The UK government has, quite rightly, taken a long-term view and has demonstrated commitment in its portfolio approach to R&D investments, including by funding IAVI. Strong and sustained leadership of this kind is required if we are to eliminate AIDS. The need to sustain this commitment cannot be overemphasised when faced with an unsustainable and growing treatment bill as global HIV incidence remains high and the population of people living with HIV, and hence our pool of infection, grows. IAVI praises UK leadership in the global arena. The UK is globally the 3rd largest investor in R&D for AIDS vaccines, and in Europe the largest single national investor.

Funding from DFID has made a major contribution to supporting IAVI's efforts to build and maintain scientific capacity in developing countries in the following ways:

1. Build strong networks of clinical trial sites;
2. Foster national research partnerships;
3. Develop a centre of excellence in London to equip, monitor and train scientists in developing countries to conduct clinical trials; and
4. Establish vaccine preparedness programmes

1. *Building strong networks of clinical trial sites*

Since its inception, IAVI has made engagement with developing countries a priority in its approach. To ensure that a future AIDS vaccine would be effective and accessible by people in countries hardest hit by HIV/AIDS, IAVI made a deliberate choice to engage researchers, governments and communities in these countries from the start. The value this would bring to building sustainable capacity and expertise amongst these stakeholders was a particular incentive for this approach.

The first step was to build the capacity to conduct clinical trials in developing countries, where most of those studies would take place. Since 1998, IAVI has built a network of clinical trial research centres in southern and eastern Africa. IAVI conducted its first clinical trial of a candidate vaccine in collaboration with the Kenya AIDS Vaccine Initiative (KAVI) and the United Kingdom's Medical Research Council.

IAVI's Approach

To achieve the scale necessary to conduct Phase I clinical trials in the developing world, IAVI engaged with local research institutes and supported the building of a network of clinical trial sites for testing HIV vaccine candidates to the highest standards of medical science, safety, and ethics. The network of state-of-the-art laboratories and research and health services staff were equipped and trained to process, test, and store tens of thousands of blood samples, and possess the infrastructure for transportation and communication.

2. *National research partnerships*

IAVI formed partnerships with governments in Uganda, India, Kenya, Rwanda, South Africa and Zambia to establish and foster national research partnerships. IAVI also sought out the best national scientists, technicians, public health professionals and community outreach workers to join its country project teams.

3. *Develop a centre of excellence to support clinical trials in developing countries*

Key to supporting the clinical trial network was the establishment of IAVI's Human Core Immunology Laboratory (HIL) in London, in collaboration with Imperial College London and housed at the Chelsea and Westminster Hospital, to train and equip clinical trial sites as well as to help coordinate trials conducted in each country. The HIL helps to train staff at the network's collaborating research centres (CRCs) and to standardise methods and reagents for research, according to international Good Clinical Laboratory Practice (GCLP) guidelines that the HIL helped develop—and ensuring that data generated by labs supported by IAVI are comparable at all times. Today, all IAVI research labs supporting clinical trials have achieved the international standards of GCLP.

4. *Establish vaccine preparedness programmes*

Pioneering a sustainable network of clinical trial sites in the developing world also required a strong local presence and a foundation of trust between research partners, host country governments, media, and communities. IAVI introduced a vaccine preparedness programme to increase awareness, understanding, and national involvement in HIV vaccine clinical trials, and has included setting up community advisory boards to enhance recruitment and improve voluntary counselling and testing and other HIV/AIDS health services. The goal was to prepare for trials of experimental HIV vaccines, both IAVI-sponsored candidates and products developed by other organisations, to ensure support by governments and communities alike, and develop greater ownership of the research by those engaged in it.

Today, the network of IAVI-supported research centres powers IAVI's vaccine development programme. Our approach emphasises building local capacity by training local researchers and developing the infrastructure required to conduct vaccine trials, and clinical HIV studies that describe the epidemic and lay the groundwork for future vaccine efficacy trials.

Threats Posed by Funding Cuts

Sustaining the gains IAVI has seeded in the developing countries in which it operates requires sustained investment. The on-going global economic crisis has inevitably led governments and other funding entities to review, and in many cases, cut their funding. In 2010 global investments in HIV/AIDS R&D fell for the second year running, down 5.9% from 2009.[17] IAVI too has seen a decline in its income since the onset of the global economic crisis in 2008.

For 15 years IAVI has worked tirelessly with support from donors like DFID, to build a strong cadre of scientific personnel who have access to the latest equipment, research and support to maintain internationally recognised standards of research practice in developing country settings. Any cuts to funding threatens to undermine many of the gains we have made in building scientific research capacity in developing countries.

When faced with funding shortfalls, research organisations like IAVI have to make tough decisions about sustaining the overall operation to ensure we remain true to our mission. IAVI aims to maintain its various clinical trial sites around the world to test AIDS vaccine candidates as they move through our pipeline. However, cuts to IAVI's funding remain a significant threat to undermining scientific capacity in developing country settings.

IAVI is currently in receipt of a multi-year grant from DFID which comes to an end in 2012. This grant has been enormously beneficial in helping IAVI in its mission and, as outlined above, in building and strengthening scientific capacity in developing country settings. As we enter 2012, IAVI working hand-in-glove with DFID hopes to agree and sign a further multi-year grant that will allow us to sustain the investments made thus far in building scientific capacity.

Question 2: *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

Product Development Partnerships (PDPs) are a class of not-for-profit organisations focused on developing new products to meet health challenges in the developing world and bringing them to market as quickly as possible. PDPs are currently developing new technologies to diagnose, treat and prevent a range of diseases which impact seriously on the health and livelihoods of people living in low-and middle-income countries.

Although PDPs vary in terms of their focus and approach, all PDPs realise their mission by co-ordinating the contributions of the private, public and not-for-profit sectors. PDPs work with others to engage and direct the public and private sectors to address the scientific, economic, legal and political challenges that exist in

[17] G-Finder, 2011 Is Innovation under threat. Policycures available from http://www.policycures.org/downloads/g-finder_2011.pdf

developing new health technologies for use in developing countries and ensuring rapid and widespread access and use.

PDPs such as IAVI play a key role in accelerating R&D for new health technologies. In 2009, PDPs had nearly 150 biopharmaceutical, diagnostic and vector-control candidates in various stages of development, including 32 in late-stage clinical trials. The recent evaluation carried out by the Government of The Netherlands and the World Health Organisation's action plan on innovation in health care confirmed the high impact of PDPs on developing countries and argued that PDPs provide an "optimal funding allocation at all stages of research and development, in a manner best designed to maximise public health returns in the developing world."

IAVI is unwavering in its dedication to ensuring the development of an AIDS vaccine suitable for use in developing countries where AIDS has taken the greatest toll. Further, clinical capacity-building efforts provide near-term ancillary benefits with far-reaching consequences, contributing to economic growth and poverty reduction by strengthening partner countries' technical and human ability to formulate, implement, and lead research strategies, integrating local researchers into global knowledge networks, and strengthening national legal, regulatory, and policy systems.

Capacity-building in developing countries is integral to the work of PDPs. PDPs collaborate with developing country partners to advance candidates in the R&D pipeline and invest significant resources in partner countries to support and expand existing physical and systemic infrastructures in the communities in which they operate. A few examples of PDP support for scientific capacity-building include:

- diversifying economies;
- enhancing local firm's abilities to compete globally;
- enhancing knowledge-generating institutions' abilities to conduct science and develop new technologies and adapt existing ones;
- creating jobs; and
- strengthening governments' abilities to use science in policymaking.

Additionally PDPs such as IAVI with the ultimate goal of developing and increasing access to health technologies and improving public health play a unique role in strengthening developing countries' scientific capacities by:

- linking developing countries to international knowledge networks,
  - IAVI Neutralizing Antibody Consortium,[i]
  - DNDi Leishmaniasis East Africa Platform,[ii]
- building health research infrastructure.
  - Examples of IAVI's clinical research partners include: Kenya AIDS Vaccine Initiative (KAVI), and the Uganda Virus Research Institute (UVRI).[iii] For example, UVRI's HIV Vaccine Programme consists of state-of-the-art laboratories, clinical space and administrative offices. It was the first programme in sub-Saharan Africa to receive GCLP accreditation and was selected in 2005 to be a central laboratory in the Consortium for AIDS Vaccine Development.
  - DNDi Leishmaniasis Research and Treatment Centre in Ethiopia—Africa's first clinical research facility dedicated to visceral leishmaniasis.
  - Medicine for Malaria Venture (MMV) improved R&D capacity and capabilities in 39 of 55 research centres in over 24 malaria-endemic countries.
  - Foundation for Innovative New Diagnostics (FIND) has been working with the Lesotho Ministry of Health to upgrade the national TB reference laboratory.
- Increasing health research human resources
  - IAVI, MMV, TB Alliance, DNDi all invest in Good Clinical Laboratory Practice (GCLP) accreditation of laboratory workers at their clinical research centres to ensure compliance with international standards.
- Strengthening the evidence-base to inform policymaking.
  - MVI is currently working with WHO and African countries to establish decision-making processes around vaccine use.
  - IAVI works with developing country partners to mathematically model the potential impact of an AIDS vaccine and conduct analysis of their biopharmaceutical innovation systems.

Yet PDPs like IAVI are facing funding cuts. In the most recent G-Finder report (a report that tracks investments in R&D for neglected diseases), it is worth noting that PDPs collectively saw funding cuts of US$ 47 million in 2010. This is a worrying trend that threatens the development of new products to combat neglected diseases.[18]

[18] http://www.policycures.org/downloads/g-finder%20summary%202011.pdf

APPENDIX I

POTENTIAL ISSUES IN AIDS VACCINES RESEARCH STUDIES AND LESSONS LEARNED (IAVI POLICY RESEARCH PAPER #6)

Potential Issues	*Key Lessons*
Community	
Need to ensure that broader community understands and supports the vaccine study	It is essential to have an overall strategy for communicating with the study community, beginning well in advance of study implementation and continuing throughout the duration It is critical to work with a broad range of stakeholder groups, whether through CABs or other mechanisms Clinical staff should collaborate with public health personnel, social scientists, and community liaisons to ensure appropriate and adequate communication
Myths and rumours often arise, and expectations about study outcomes and availability of a vaccine are frequently not realistic	To address such problems research personnel must have a communications strategy in place before the study begins, and should proactively deal with them through the CABs and community engagement Research teams also need to work with the media, early and often, to ensure that appropriate and accurate messages are disseminated Messages about the study should provide a realistic picture of what the outcomes would be and the timeline for a vaccine to become available
Vaccine studies can have an important impact on health care services within the community	The health education and AIDS awareness that result from vaccine studies are felt to be significant; it might be useful to undertake social research studies to measure this impact Integrating vaccine study activities with ongoing healthcare programs/ activities may enable important synergies, not only in terms of raised levels of awareness, but also in terms of greater utilisation of STI clinics, reproductive health services, and other programmes
Host Countries/National Institutions	
Capacity building for regulatory and related authorities is needed	Undertaking vaccine studies requires and has often led to the strengthening of capacity to review protocols, study designs, and research activities; this is predicated upon a commitment from host countries to invest in these capabilities, but also translates into greater ability to oversee other research efforts
Countries should build access provisions into their agreements in undertaking vaccine studies	Governments can and should work with sponsors and manufacturers at very early stages to ensure that adequate provisions are made for access to a vaccine that proves safe and effective Such negotiations with sponsors should also include specific provisions for treatment and care for those participating in the vaccine studies
Participants	
Stigma and discrimination are sometimes encountered by participants	Locate studies in multi-function sites and facilities Study staff should work proactively with volunteers on how to disclose their participation Study staff should have plans/documentation in place for participants who test false positive due to the vaccine, and be prepared to intervene on behalf of volunteers
Trial success depends on the willingness and ability of volunteers to continue participating	To improve retention, establish convenient hours and comfortable surroundings for volunteers to make follow-up visits In addition to many other stakeholder groups in the community at large, research teams may need to work with volunteers' employers to ensure that there is buy-in and understanding of the vaccine study from that group as well

Potential Issues	*Key Lessons*
Research Staff	
Skills development and career experience may require strengthening and longer-term planning	While global R&D efforts and protocols must adhere to strict standards and maintain consistency, local research teams must also be able to provide substantive input at early stages, and be truly involved in decision making throughout the study Career opportunities for research personnel are generally positive, but making long-term commitments to trials may restrict growth and mobility; staff retention efforts should consider reasonable salary levels, long-term career development, and possible rotation of staff (including Pls) Clinical staff have underscored the benefits of collaborating with social science and public health colleagues, particularly in developing communications strategies to work with participants and communities; such efforts have had positive impacts on the studies themselves (recruitment, retention) and should be consistently undertaken
Workload problems encountered by study personnel	To avoid overworking personnel in public health facilities, vaccine studies need to carefully evaluate human resource needs, and probably rely on project staff to a large extent It is important that such efforts do not skew local salary structures and that studies minimise departures from public health positions
Vaccine studies are tied to grant funding, and staff positions may not be sustainable when funding ends	Study sponsors and research institutes should seek ways to even out funding over time to avoid gaps when studies end; this may include diversifying into other types of trials National governments should consider investments to maintain research sites and capabilities, as a supplement to external funds, and to ensure that established capacity can be maintained consistently

References

[i] IAVI's Neutralizing Antibody Consortium (NAC) was formed in 2002 as a pioneering effort to launch the first large-scale collaborative research effort to address a fundamental hurdle in HIV vaccine design: how to elicit antibodies that neutralise a broad range of HIV strains.

[ii] The overall aim of the platform is to strengthen clinical research capacity, which is lacking in part due to the remoteness and geographic spread of the patients, most of whom live in the most impoverished regions of Africa.

[iii] In Kenya, IAVI is partnering with the University of Nairobi and Kenya AIDS Vaccine.

Initiative (KAVI). In Uganda, IAVI is partnering with the Uganda Virus Research Institute (UVRI) under an agreement with the Government of Uganda signed in August 2001.

16 December 2011

Written evidence submitted by Research Councils UK

Introduction

1. Research Councils UK is a strategic partnership set up to champion research supported by the seven UK Research Councils. RCUK was established in 2002 to enable the Councils to work together more effectively to enhance the overall impact and effectiveness of their research, training and innovation activities, contributing to the delivery of the Government's objectives for science and innovation. Further details are available at www.rcuk.ac.uk

2. This evidence is submitted by RCUK and represents its independent views. It does not include, or necessarily reflect the views of the Knowledge and Innovation Group in the Department for Business, Innovation and Skills (BIS). The submission is made on behalf of the following Councils:

Arts and Humanities Research Council (AHRC).

Biotechnology and Biological Sciences Research Council (BBSRC).

Engineering and Physical Sciences Research Council (EPSRC).

Economic and Social Research Council (ESRC).

Medical Research Council (MRC).

Natural Environment Research Council (NERC).

Science and Technology Facilities Council (STFC).

3. RCUK notes that this inquiry is a follow up to the Science and Technology Select Committee's 2004 report into "The Use of Science in UK International Development Policy". Given that this report contained

some recommendations for the UK Research Councils, RCUK believed that a submission on the inquiry would provide the committee with an update on progress made since the report. This notably includes the establishment of UK Collaboration for Development Science (UKCDS) in 2006 as a direct response to the conclusions contained in the 2004 report. RCUK notes that UKCDS have also submitted evidence to this inquiry.

How does the UK Government support scientific capacity building in developing countries and how should it improve?

4. RCUK supports capacity building in developing countries via cross-Council and Council-specific research programmes often in partnership with DFID, by investments in international research facilities and through support for collaborative schemes.

Cross-Council Working

5. Ecosystem Services for Poverty Alleviation (ESPA) is a multi-disciplinary, £5 million research programme involving NERC, ESRC and DFID. ESPA aims to deliver high quality and cutting-edge research that will develop improved understanding of how ecosystems function, the services they provide, the full value of these services, and their potential role in achieving sustainable poverty reduction. ESPA research will provide the evidence and tools to enable decision makers and end users to manage ecosystems sustainably and in a way that contributes to poverty reduction.

6. Part of the impact of the ESPA programme will be capacity building of people and institutions in developing countries.[19] There are two main themes for capacity strengthening in ESPA: (1) providing developing country researchers with the skills to undertake interdisciplinary research and (2) supporting the application of research to inform development practice. Applications led by and involving researchers in developing countries and collaborations between UK and overseas are encouraged, alongside bids from UK academics; this is a good way of helping to build scientific capacity in developing countries. The programme has held two funding rounds that were specifically designed to foster building capacity: Strengthening Research Capacity (2008) and Partnership and Programme Development (PPD) grants (2009). The purpose of the latter scheme was to facilitate development of trans-national interdisciplinary teams capable of bidding successfully for major consortium-scale projects (£2–4 million each). Workshops were also held in developing countries to help to stimulate proposals, and the ESPA directorate has been established, part of the role of which is to help to foster scientific capacity in developing countries.

7. The MRC and DFID work with the Wellcome Trust, Department of Health and ESRC in coordinating UK policy on health research in developing countries through a funders forum established five years ago.

AHRC

8. The Arts and Humanities Research Council does not have a specific collaboration with DFID, although has funded development relevant research, for example recent projects on the legal issues around global land purchase; on craft based industries and sustainable development; and on rights and religion in relation to development. Research on these type of issues is arguably important to development, which suggests that is wise to take a broad based approach when considering the range of areas in which to build capacity (ie including, for example, research on legal, ethical, religious, historical issues).

BBSRC

9. The Biotechnology and Biological Sciences Research Council (BBSRC) has a productive and mutually-beneficial partnership with DFID which they are keen to develop further.

10. BBSRC and DFID work together to support agricultural research relevant to the needs of poor people in Sub-Saharan Africa and South Asia. They have jointly funded three programmes of research, each managed by BBSRC:

(i) Sustainable Agriculture Research for International Development (SARID)—£7.3 million awarded for 12 projects in 2008.[20]

(ii) Combating Infectious Diseases of Livestock for International Development (CIDLID)—£13.5 million (including additional funding from the Scottish Government) awarded for 16 projects in 2010.[21]

(iii) Sustainable Crop Production Research for International Development (SCPRID)—up to £20.0 million available (including additional funding from the Bill & Melinda Gates Foundation and the Government of India) for projects to be assessed in December 2011.[22]

[19] See "ESPA's Impact Strategy" at: http://www.espa.ac.uk/impact
[20] http://www.bbsrc.ac.uk/funding/opportunities/2007/sustainable-agriculture.aspx
[21] http://www.bbsrc.ac.uk/funding/opportunities/2008/combating-infectious-diseases-livestock.aspx
[22] http://www.bbsrc.ac.uk/funding/opportunities/2011/1103-sustainable-crop-production-international.aspx

All of the projects funded through these programmes are based on scientific collaborations between researchers in the UK and developing countries.

11. Whereas BBSRC exists primarily to support science of the highest international quality in the UK, DFID funds research in order to generate knowledge that will help directly to alleviate poverty in developing countries. Those aims are not mutually exclusive, and BBSRC and the Department are committed to working together flexibly to promote and support research that is both of high scientific quality and has substantial development relevance. In particular, in order to address their twin aspirations, BBSRC has developed, in consultation with DFID, tailored peer review and assessment processes that align the parallel requirements for quality and relevance in a common process to the satisfaction of both partners.

12. For its part, BBSRC is keen to encourage excellent researchers amongst the BBSRC-funded community to devote some of their effort to addressing problems that are directly relevant to the needs of agriculture in developing countries; an additional priority for DFID is to contribute to the enhancement of those countries' own scientific capabilities. These aims have been similarly combined by incorporating in the assessment of proposals a rigorous scrutiny of the proposed trans-national partnership, with a view to ensuring both that it is based on a meaningful and balanced intellectual collaboration which will provide added value by bringing together complementary expertise, and that it has the potential to enhance the scientific capacity of southern partners for the longer term.

13. In addition, each of the three existing joint programmes has included a (progressively more explicit) formal capacity-building element. For SARID, grant-holders were able to apply for supplementary funding for capacity-building activities—for example, to enable the southern partners to extend the reach, beyond their own institutions, of capabilities they had developed during the projects. For CIDLID, wider capacity-building considerations formed a more explicit element of the initial project assessment process.

14. For SCPRID, the call for proposals set out a more substantive expectation that up to 10% of the funding requested by applicants would be for scientific capacity-building in developing countries. That might include activities to develop and strengthen the knowledge and skills of individuals, or to improve institutional structures and processes—for example, through knowledge-sharing events, international exchanges, mentoring schemes or training courses, as well as visits (of varied duration) to laboratories in other institutions (including those in other countries) by individuals of any level of seniority or experience (from doctoral students to principal investigators). As for SARID and CIDLID, proposals could also include requests for funding of doctoral research studentships for individuals from developing countries of Africa or South Asia (but the capacity-building component of the proposed project must also include other appropriate activities, not just the provision of support for studentships).

15. Additionally, a distinct element of the SCPRID call was targeted at early-to-mid career scientists from developing countries, who were invited to submit proposals for Projects for Emerging Agricultural Research Leaders (PEARLs). Under this aspect of the call, funding would be provided specifically for a small number of projects each initiated and led by a "PEARL Fellow" whose full-time salary costs would be covered for the duration of the project.

16. The purpose of a PEARL is to enable the Fellow, as lead investigator, to devote himself or herself to the proposed project, and to spend significant periods of time working in another relevant laboratory outside his or her own country, as well as in his or her home institution which would be expected to relieve him or her of all teaching and administration duties for the duration of the award. The award of a PEARL is intended to contribute to improving the scientific capacity of the Fellow's home institution in Africa or Asia, as well as enhancing his or her individual development and career progression. The response to this aspect of the call was relatively disappointing, for reasons that are not entirely clear but appear to include the reluctance of institutions to release potential Fellows from all of their existing responsibilities should an application be successful.

17. The capacity-building requirement of SCPRID and earlier programmes is intended primarily to enhance the capabilities of the national research programmes of individual countries, as distinct from international organisations (such as the Consultative Group on International Agricultural Research) whose institutions might be located in those countries. While all of the projects funded by BBSRC and DFID are based on partnerships between researchers in the UK and developing countries, the programmes' success in facilitating local engagement with national programmes has been relatively limited.

18. The existence of BBSRC and DFID for different purposes is reflected in the different "due processes" to which their activities are subject, but the Council has always found the Department to be open to discussion, and good working relationships have allowed the amicable resolution of any operational differences. However, there is one issue that has posed particular challenges. On the one hand, BBSRC is able to provide funding only to universities, Research Council institutes and certain other institutions in the UK. On the other hand, under the provisions of the International Development Act 2002, DFID funding cannot be "tied" to particular countries or institutions. The extension to DFID's research funding of the requirement that the UK's aid funding must not be tied has presented some difficulties for the Council and the Department in defining the terms of institutional eligibility to apply for support from their joint funding schemes.

19. BBSRC's preference is to require that any project funded jointly with DFID must include, as a minimum, one eligible scientific partner from the UK and one from a developing country (but with no restriction on the number or location of additional partners, or on the location of the researcher responsible for the overall scientific leadership of the proposal). Such a condition does not sit entirely comfortably alongside the requirement for DFID's research funding to be accessible globally, but is preferred by BBSRC because of the Council's aim to encourage excellent UK scientists to align their expertise with that of overseas collaborators in order to address problems of direct relevance to the needs of developing countries.

20. In addition, a fully open global call for research proposals has the potential to attract a very large number of applications disproportionate to the funding available, not only causing a heavy administrative workload but also, and more importantly, placing a very considerable burden on assessment panels and the peer review community, and increasing the likelihood of unfair outcomes from an over-loaded system as well as representing a great deal of wasted effort expended by the large proportion of unsuccessful applicants. Furthermore, in BBSRC's experience of the SARID programme, for which the call was an open one, many of the applications that did not include a UK partner were of poor quality and uncompetitive in the assessment process. Understandably, aside from scientific considerations, there appear to be clear benefits to applicants from developing countries of being associated with a UK partner familiar with the practices and procedures of the Research Councils and their peer review systems.

21. Finally, effective capacity-building is a gradual process that needs to be viewed from a long-term perspective. Partnerships between researchers at the cutting-edge of their disciplines in the UK and colleagues in developing countries are well placed to enhance the scientific capabilities of the latter. However, continued interaction is necessary to enable such relationships to flourish and extend their influence more widely. In particular, there is a need for ongoing access to appropriate funding sources to sustain and develop international partnerships, not just occasional calls for proposals.

22. BBSRC and DFID continue to build on its good relationship by addressing several areas of interest (eg institutional eligibility, encouraging the best scientists to align their expertise and build capacity among developing countries' collaborators to become familiar with the practices and procedures of the Research Councils and peer-review systems) and looking for solutions, and expanding their mutually-beneficial strategic partnership over the next few years.

ESRC

23. In addition to ESPA, the Economic and Social Research Council (ESRC) supports two further schemes in partnership with DFID, which have an element of scientific capacity building:

(i) ESRC-DFID joint scheme for research on international development (poverty alleviation) was first established in 2005 with a total budget of £13 million (£7.5 million from ESRC and £6 million from DFID). A second Phase started in 2009 with a total budget of £23 million (£8 million ESRC and £15 million DFID). The scheme funds world-class scientific research on a broad range of topics to enhance the quality and impact of social science research and contribute to the achievement of the MDGs. As well as research excellence, all applicants have to demonstrate that research outputs have potential impact on poverty reduction and relevance to decision makers.

(ii) DFID-ESRC Growth Programme was established in 2010 with a budget of £10 million The Programme funds world-class scientific research on issues relating to inclusive economic growth in Low Income Countries (LICs), with high potential for impact on policy and practice.

24. These schemes use similar mechanisms to ESPA to support scientific capacity building (see paragraph 5). The scheme managers are clear that he focus is on capacity building through doing research and all applications must spell out how capacity building will be approached through the research programme. The ESRC-DFID Poverty Alleviation Strategic Advisory Team has a carried out a review of Southern led applications which will help to inform future approaches relevant to capacity building. Recommendations include using a two stage process (outline and full proposals) to focus the often limited effort available on the most promising proposals; further proposal writing workshops and workshops for shortlisted applicants; and reviewer comments more focused on how proposals could be improved. Another approach is for southern research students and research assistants to spend a substantial part of the research programme in a UK HEI.

MRC

25. The Medical Research Council (MRC) has had a concordat agreement with DFID and its predecessor the Overseas Development Administration in place since 1993. The concordat is the basis of a partnership to support UK or African—led biomedical and public health research which tackles the priority health problems and health inequalities of people in developing countries. The current concordat (2008–13) allocates £45 million to the MRC over five years, which is more than matched by MRC expenditure on global health research.

26. In addition to the concordat the MRC and DFID have worked together on a number of joint projects and schemes. We have jointly supported large international trials on microbicides and antiretroviral therapy for HIV and in 2010 launched a joint scheme between the MRC, DFID and the Wellcome Trust to support clinical trials for global health in developing countries. The MRC and DFID jointly finance the UK contribution to the European and Developing Countries Clinical Trials partnership (EDCTP).

27. The MRC also work with DFID and other government departments on development research through the UK Collaborative on Development Sciences (UKCDS).

28. The MRC is often called upon to assist DFID in policy development and has been consulted on DFID's current research strategy launched in 2008 and other initiatives.

29. The MRC recently established an expert oversight group to advise on Global Health issues. DFID is represented on the group by their Chief Scientific Advisor, Chris Whitty.

30. MRC and DFID officers meet quarterly to discuss operational issues but communicate informally more frequently. There is an annual meeting between DFID Chief Scientific Advisor and MRC Chief Executive to maintain high-level policy alignment.

31. Following the publication of the 2008–13 research strategy DFID provided guidance notes on Capacity Building for its Research Programme Consortia which defines Capacity Building as "enhancing the abilities of individuals, organisations and systems to undertake and disseminate high quality research efficiently and effectively". Such a definition encompasses a broad range of activities with an ambitious goal. That goal cannot be achieved in a single step but individual activities, supported locally, can contribute towards establishing a sustainable network of capacity building activities.

32. The MRC is able to contribute to building research capacity though close working with DFID through the concordat. The MRC has research Units in The Gambia and Uganda. The MRC/UVRI Uganda research Unit on AIDS was established following a request in 1988 from the Ugandan Government to the British Government for collaboration on the research of HIV infection and AIDS. The Unit has the mission to conduct research on HIV disease and related infections to facilitate their control in Uganda and elsewhere in Africa.

33. MRC The Gambia Unit was established in The Gambia in 1947. The Unit is the UK's single largest investment in medical research in a developing country. The Unit's research focuses on infectious diseases of immediate concern to The Gambia and the continent of Africa, with the aim of reducing the burden of illness and death in the country and the developing world as a whole.

34. Capacity building through these units takes place at many levels. The most important is the training and career development of staff creating the next generation of local researchers. The Directors of both units are nationals of the two countries and have developed their careers in the context of the MRC units. They are both role models for younger scientists locally and raise the profile of research within the Governments and other agencies within their countries.

35. Delivery of clinical research by the two Units has necessitated investment in clinical infrastructure and the training of staff under Good Clinical Practice (GCP), and Good Clinical Laboratory Practice (GCLP) guidelines. In these cases capacity is developed through practical involvement with high quality research activities and through interaction with international research teams. Research capacity can best be built by active participation and leadership in research activities rather than through unlinked funding or theoretical training.

36. The MRC and DFID have jointly supported the large European initiative to advance the development of new drugs and vaccines against HIV, TB and malaria—the European and Developing Countries Clinical Trials Partnerships (EDCTP). A major component of the initiative is to build capacity for clinical trials in sub Saharan Africa. This has been realised through a number of approaches including:

- Support to develop ethics review boards.
- South-South networking of institutions.
- North-South networking of institutions.
- Senior career fellowships.
- GCP/GCLP training.
- Project management training (including finance and HR development).
- Harmonisation of regulatory frameworks.
- Development of clinical trials registries.
- Specific short term training schemes.
- MSc and PhD support.

37. The MRC and DFID have also invested in an African Research Leadership scheme. This scheme is a prestigious award for non-clinical and clinical researchers of exceptional ability. The aim of the scheme is to strengthen research leadership across sub-Saharan Africa by attracting and retaining talented individuals undertaking high quality programmes of research.

NERC

38. In addition to its investment in ESPA, the Natural Environment Research Council (NERC) supports capacity building in developing countries via the Changing Water Cycle programme.[23] The four year

[23] http://www.nerc.ac.uk/research/programmes/cwc/

(2009–14) £10.1 million programme will foster interdisciplinary research that links applied water resources issues seamlessly to fundamental climate system science. A partnership with the Ministry of Earth Sciences (MoES) in India has been established, which has funded five collaborative projects with an investment of over £2.5 million from NERC and £1.6 million from MoES. The project will be investigating how the water cycle will change in response to climate change and the impact that this will have in South Asia. Capacity will be built among local researchers through participation in the research process.

STFC

39. The Science and Technology Facilities Council (STFC) supports the development of overseas facilities and certain collaborations. Examples are detailed below:

(i) STFC supports the University of Bristol project "Applying the Grid: Landslide Modelling for Risk Reduction in Developing Countries" through grant funding which was awarded in 2010.[24] The project uses the STFC developed Grid software (as utilised at the Large Hadron Collider) alongside proven, cutting-edge software in the field of slope hydrology and geotechnics. The technology will allow engineers and planners involved in national infrastructure and risk management projects throughout the developing world, to effectively predict and mitigate landslide risk without substantial investment in large and complex local computing facilities. STFC's funding for this project came through its Innovations Partnership Scheme (IPS). The IPS is not targeted at international development projects, but is designed to transfer technology and expertise developed through STFC research into the market place.

(ii) STFC has supported the development of the Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) in Jordan through the gift donation of high-tech components formerly used by the now decommissioned Synchrotron Radiation Source (SRS) at Daresbury Laboratory.

SESAME[25] will serve as a driver for scientific, technical, and economic development of the region and strengthen collaboration in science across the globe. Bringing together Governments and scientists from the nations of Bahrain, Cyprus, Egypt, Jordan, Iran, Israel, Pakistan, the Palestinian Territories, and Turkey, the centre will be open to all scientists from the Middle East and elsewhere. SESAME will be the region's first major international research centre and be will built in Jordon under the umbrella of UNESCO.

(a) STFC funds the UK's membership subscription of CERN (European Organization for Nuclear Research) on behalf of the United Kingdom. CERN is Europe's particle physics laboratory and one of the world's largest and most respected centres for scientific research. Around 10,000 scientists use the facilities representing 608 universities and 113 nationalities, which includes many scientists from developing countries. A number of non-European states, including India, have Observer status and many others have co-operation agreements.

(b) Amongst CERN's core values are its commitments to bringing nations together through science and training the scientists of tomorrow. CERN operate educational programmes for summer students and high school students, which attract attendees from all over the world, including over 900 teachers in 2011. Outreach and development initiatives with developing nations, most notably across the African continent are significantly operated in this respect. For instance, alongside several international collaborators, CERN supports the African School of Fundamental Physics and its Applications (ASP).[26] The first of these biennial events was first held in Stellenbosch, South Africa in October 2010. The project supplied 50 fully financially supported places for Physics students from across 17 African countries to attend an intensive, three week school aimed at raising future development across the continent. The next of these events will be held in Kumasi, Ghana in 2012.

(c) Other areas of activity include those with UNESCO under the umbrella of the International Basic Sciences Programme (IBSP). Examples of this work include, the organisation of two schools on digital librarianship in Rwanda and Morocco and in-depth training for 30 participants in 2010, with the aim of passing on the knowledge and experience that CERN has gained from handling documents for the high-energy physics community.

(d) CERN supports AFRICA@home, which encourages the use of volunteer computing to help solve health and environmental problems. African students and universities are involved in the development and running of these volunteer computing projects, the first of which related to the epidemiology of malaria. CERN also has projects funded by the EU, for example HELEN (High Energy physics Latinamerican-European Network), which has helped collaboration in that area.

EPSRC

40. EPSRC's interest is in taking a broad global overview of addressing research challenges in both developed and developing countries. For example, EPSRC has supported research into renewable energy technologies (including plans to develop collaborative research between EPSRC, DECC and Bangladesh), a

[24] http://www.stfc.ac.uk/gow/Sm/grls.asp?cx=06&sc=0&so=dd&nv=XXXX&pi=-586
[25] http://www.sesame.org.jo/sesame/
[26] http://africanschoolofphysics.web.cern.ch/africanschoolofphysics/

collaborative programme of research supported through the Digital Economy programme and the Indian DST on use of Digital technologies to bridge the urban rural divide and participation in understanding the role of engineering in managing earthquakes and flooding. EPSRC has also been actively engaged as a member of the UK Water Research and Innovation Framework which looks at the research and development and skills needs around future water security and supply and is also a member of UKCDS.

What are the most effective models and mechanisms for supporting research capacity in developing countries?

41. The funders of development research in the UK, including DFID, BBSRC, EPSRC, ESRC, MRC, and NERC, work under the umbrella of the UK Collaborative for Development Science (UKCDS).[27] UKCDS manages a subgroup which specifically looks at research capacity building initiatives and sharing of best practice.

42. The factors affecting research capacity are complex and vary between sector and countries. It is therefore essential that specific schemes designed to build research capacity follow consultation and discussion with researchers already working in country as well as with donor countries and organisations. Access to information can be a fundamental issue in supporting the research base and online access to journals, networking of specialist support such as ethics or clinical trials management, can be as important as investing in people or training.

43. Capacity building schemes should be designed to ensure that the impact of a scheme to build capacity for research in one area does not distort the investment profiles of local institutions or universities. Pump priming of areas with funding from the UK can lead to neglect of other areas, distort local salaries, and redirect training and manpower. If short term funding stops the institute may be ill equipped to benefit from the pump priming. Once again, partnership is key to a successful initiative and there should be appropriate institutional engagement from the start in order to support rather than undermine the research environment where investment is taking place.

44. If they are to be sustainable, capacity building activities should "plug in" to and complement individual countries' own ambitions and strategies to develop research capacity. As individual countries frequently want to "grow" their higher education sector, encompassing a very broad range of research sectors, capacity building activity may need to reflect this breadth (or be mindful of the implications of targeting activity to specific sectors).

45. It is important to recognise the UK is only one part of a much wider universe of actors with responsibility for capacity building. The most important stakeholder should be national developing country governments, higher education agencies, and users of research (eg the private sector, policy-makers), with DFID—via it's country offices—and UK agencies focussing on adding value to the activities of these key players. For example, the ESPA directorate is looking for ways to work in partnership with such stakeholders. If too much capacity strengthening is provided externally there is limited incentive for national governments to make this a national priority.

46. The challenge is to use external support to help get the capacity building process started, to fill immediate gaps and stimulate demand, whilst working towards a transition to a situation where national developing country governments recognise the importance of investing in science. DFID increasingly promotes the importance of evidence-based business cases for development and at the same time promotes the need for nationally owned development priorities. The logical extension of this would be to look forward to having a more joined up approach in DFID to capacity building for research and evidence linking both the central RED activities with country-level activities (and hence national development priorities).

How does the Government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight required?

47. ESRC has an annual review of progress for the three Programmes described above using the DFID logframe methodology.[28] In addition more overarching evaluations of the programmes are carried out periodically. For example, the ESRC-DFID Poverty Alleviation programme is currently being reviewed by an independent organisation.

48. MRC has agreed to participate in the ESSENCE initiative to monitor and evaluate capacity building activities. ESSENCE (Enhancing Support for Strengthening the Effectiveness of National Capacity Efforts) was established by funding agencies to assist in the coordination and harmonisation of the research capacity investments within a common framework.[29]

49. RCUK is working internally to consider the current approach to RCUK-DFID partnership to maximise the benefits of this very positive relationship which has been welcomed both by the funders and by the academic community that it serves. Part of the internal discussion is likely to include evaluation of mechanisms, including guidance to applicants, and to look at opportunities to improve access of the various schemes to developing

[27] http://www.ukcds.org.uk/index.php
[28] http://www.dfid.gov.uk/Documents/publications1/how-to-guid-rev-log-fmwk.pdf
[29] http://www.ukcds.org.uk/publication-ESSENCE_Good_practice_document_series-659.html

country collaborators. This will involve developing the capacity of institutions to take a leading role in successful proposals.

What role does DFID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?

50. DFID's Chief Scientific Advisor (CSA), Professor Chris Whitty maintains oversight of research work undertaken at the MRC, NERC and UKCDS in respect to International Development. He is a member of MRC's Global Health Group, which advises on global health policy and funding, and holds an annual meeting with MRC's CEO. In addition, MRC and DFID have quarterly meetings to ensure alignment of priorities, which are fed back to the CSA. NERC and DFID also hold similar meetings. The CSA also sits on the board of the UKCDS and is therefore responsible for oversight of the work of the organisation.

51. The CSA is also informed by discussions at officer lever of the UKCDS and the UK Funders Forum for Health Research in Developing Countries.

How are government activities co-ordinated with the private and voluntary sectors?

52. Government activities are co-ordinated with the private and voluntary sectors particular through the UKCDS which has membership from across the sectors. In addition there are a range of contacts at the level of individual programmes, including with overseas organisations such as the Hewlett Foundation and NWO.

53. The UK Funders Forum for Health Research in Developing Countries involves representatives from the Wellcome Trust, Department of Health, DFID, MRC and ESRC. MRC works informally with Product Development Partnerships (PDPs) though participation in EDCTP, and through ad hoc bilateral discussions. DFID works much more closely with the PDPs and this has had many positive effects such as the increase in clinical trial capacity for research on neglected tropical diseases in developing countries.

Conclusion

54. RCUK welcomes this inquiry as an opportunity to demonstrate the progress that has been made, both by individual Research Councils and by the UKCDS since 2004.

16 December 2011

Written evidence submitted by the Special Programme for Research and Training in Tropical Disease (TDR)

DfID SUPPORT TO THE SPECIAL PROGRAMME FOR RESEARCH AND TRAINING IN TROPICAL DISEASE (TDR) FOR BUILDING CAPACITY IN RESEARCH ON DISEASES OF POVERTY

The Special Programme for Research and Training in Tropical Disease (TDR) was established in 1975 with the objectives to: (1) develop new methods of preventing, diagnosing and treating tropical diseases; and (2) strengthen—through training and support to institutions—the capability of developing endemic countries to undertake the research required to develop disease control tools and technologies. From the beginning, there was a strong emphasis on the involvement of both funders and recipients.

DFID has made significant core funding contributions to TDR over the past 35 years totalling over US$ 60 million, of which a significant amount was used for TDR's activities in building research capacity in low and middle income countries.

TDR has undergone four reviews of its capacity building activities since it was established. All four studies reported high success in training programmes and a high satisfaction rate from the grantees. Most of the grantees trained abroad have returned to their country of origin and have moved up to higher positions in their institutions or in government agencies. Both institutions and individuals have increased their publication records, their national and international collaboration and the number of competitive grants gained in the post-grant period. The majority of grantees attributed a high proportion of their research skills to the TDR-funded training. They reported that this training allowed them to participate in international meetings and establish collaborations with policy makers. Consistently, the Special Programme has been advised to maintain and expand its investment into training and capacity building.

First Review Cycle (1975–90)

Over these 15 years, 179 institution-strengthening were awarded to 134 institutions in 45 countries, with five countries (Argentina, Brazil, Kenya, China, Thailand) receiving more than 10 grants. The majority of these grants were long-term institution-strengthening grants (LTG), which were the only institutional grants awarded until 1988.

The review showed that the scientific publication record at these institutions increased from six to 14. Most of the institutions increased the number of competitive grants received compared to the pre-grant period. All institutions established or improved their national and international collaborative activities during and after the

grant period: 96% of them had collaborations with national government, 83% with other national institutions and 48% with international institutions, this last factor being an important measure of success. Most of the individuals trained with these grants stayed in the training institution and some moved to higher positions. Among the most cited factors of failure were macro-political and macroeconomic ones, and a lack of leadership and senior scientists to provide support.

During the same period, 1,241 training grants were awarded to 993 individuals, with the majority of grants (57%) awarded to individuals coming from Africa and Latin America. About 90% of the respondents were satisfied with the training they received through the TDR grant. The review reported a high rate of training completion (90%) and almost all the grantees returned home (93%). However, many grantees also experienced some problems after returning to their home countries. The most frequently cited constraints were: lack of material and financial resources, low economic reward for research and poor research career structure; lack of access to scientific literature, lack of transport and logistic support for field work, burdensome administrative procedures; lack of support from supervisors and lack of trained technicians. A large proportion of the grantees were still active in their fields, and most had gone on to higher positions in their institutions or other institutions in their country or in governments or academic centres.

The review identified a good publication record (ranging from one to five papers in international peer-reviewed journals) for 71% of the grantees. About 45% of the grantees gained international competitive grants after their TDR training and over 50% of re-entry grants recipient were successful in competing for TDR R& D grants. Only 26.6 % of the training was awarded to women, with large variations from different geographical areas (the highest rate was in South East Asia at 42.2%).

The main recommendation of this review was to make the training of promising, motivated and talented young researchers the cornerstone of the TDR capacity building strategy, and to support more in the Least Developing Countries (LDCs). Some concerns were raised about the gender balance and research topics balance. Few grants were awarded to women and most funded projects were on epidemiology, entomology and basic research. Malaria accounted for 50% of all funded projects. Also recommended was the promotion of research in social sciences and health economics to help translate research findings into public health policies and to develop a suitable TDR-grants monitoring system.

Second Review Cycle (1990–97)

The second review included all TDR-funded PhDs (131), re-entry grants (30) and three modalities of institution strengthening grants (25):

1. The programme based grants (PBGs) awarded on a competitive basis to strengthen research and/or training programmes.
2. The "3+2"-year grant which was awarded mainly to institutions in the least developed countries to develop core research staff in countries where research was not well developed.
3. The partnership grants established in 1988 in cooperation with the Rockefeller Foundation to establish cooperation between northern and southern institutions with complementary expertise.

The review noted that the programme made a large effort to train highly motivated and talented individuals in developing countries and this led to an extraordinary growth of scientific knowledge and techniques for tropical diseases. Interestingly, in response to the recommendation of the first review, the least developed African countries accounted for 51% of all grantees. Publication records showed that African trainees published more compared to the others, and a Medline review showed that 60% of the trainees published more in the post-grant period. The TDR-PhD graduates were more successful in obtaining other TDR grants such as re-entry grants or R&D grants. Some 63% of the re-entry grants were awarded to African scientists who introduced modern laboratory techniques such as Polymerase Chain Reaction (PCR), gene cloning and sequencing in developing countries.

Third Review Cycle (1990–2000)

The results from this study, conducted on 133 individual research training grants, showed a high score of satisfaction from the grantees. About 80% had published more than four articles in peer-reviewed journals, and they reported that their findings were incorporated into policy or programme changes. All reported that they had at some stage contact with policy-makers and had participated in national and/or international meetings; 75% were principal investigators (PI) or co-PIs in research projects. The TDR grant allowed most of them to develop national and international collaborations, mainly with universities and one quarter developed new tools or methodologies, essentially diagnostic tools.

Fourth Review Cycle (2000–08)

During this time, TDR supported the development of 116 research training grants (RTG), 22 career development fellowships (CDF), 83 re-entry grants (REG), 57 research grants for the Multilateral Initiative on Malaria (MIM/TDR), and 41 institution-strengthening grants (ISG).

Most grantees (individuals and institutions) were satisfied with their collaboration with TDR. However, there was disequilibrium with regards to gender and the majority of the grantees came from the English-speaking

countries. In least developed countries, the training grants were highly appreciated due to the lack of qualified scientists and the poor research infrastructure there. In high income countries, the TDR research grants were even more highly appreciated, because they were perceived as useful additions to the local funds, particularly for young researchers who were yet established and could not compete for international competitive grants.

The main recommendation was that TDR should maintain and even expand its investment into training and capacity building, and should consider developing country-specific programmes in collaboration with WHO country offices and national authorities to address specific needs of each country.

Special Programme for Research and Training in Tropical Disease (TDR)
Geneva

16 December 2011

Written evidence submitted by the Agricultural Biotechnology Council (abc)

In response to the Science and Technology Committee's call for evidence, abc has prepared the following submission that outlines abc's views in terms of supporting research capacity in developing countries.

The views expressed in this submission are those of abc—the umbrella organisation for the agricultural biotechnology industry in the UK. abc, comprising of six member companies, works with the food chain and research community to invest in a broad range of crop technologies—including conventional and advanced breeding techniques, such as GM. These are designed to improve agricultural productivity by tackling challenges such as pests, diseases and changing climatic conditions whilst reducing water usage, greenhouse gas emissions and other inputs.

abc is unable to provide comprehensive responses to all of the questions as part of the Committee's Call for Evidence, however this response does provide relevant examples of where the application of scientific research is helping to address the food security challenge across the developing world.

1. Introduction

1.1 1.4 billion people worldwide live in poverty, and an estimated one billion of these people live in rural areas.[30] This problem is particularly acute in rural Sub-Saharan Africa, where over 60% of the rural population live in poverty. A recent report by the ODI showed that issues of poverty can be best tackled by investment in the agricultural sector, with GDP growth in agriculture contributing twice as much to poverty reduction than any other sector.[31]

1.2 With the world's population set to rise to nine billion by 2050, more food is needed from a similar amount of agricultural land—otherwise food price instability will continue to increase and the pressure on precious areas of natural land will intensify.

1.3 abc believes that research into GM is a particularly relevant area of science for the developing world. The use of technology in agriculture together with better agronomic training will be critical to the feeding of this increased population. abc believes that biotechnology is one such technology that, appropriately introduce, can make a difference.

1.4 Commercialised GM crops include maize, cotton, canola, soybean, squash, papaya, sugar beet, tomato, cassava, sweet pepper and alfalfa. Trials are currently in progress on crops including sorghum, bananas and wheat.

2. Current Application of GM in the Developing World

2.1 GM technology is currently being used by over 15 million farmers on 148 million hectares of land (the equivalent land mass of France, Germany, the UK and Ireland put together).[32] Over 90% of those using the technology are resource-poor farmers in developing countries growing food, feed and materials on an area often considerably less than 10 hectares per farmer.

2.2 Without significant increases in yield and utilising solutions to crop destroying diseases, policy makers will struggle to address hunger and under-nutrition—something that affects almost 1 billion people today. GM technology is one of a range of tools available to help deliver these yield increases.

2.3 GM crops offer the potential for increased yields, greater pest and disease resistance, lower machinery and fuel costs, better nutritional value and greater drought tolerance. All of this makes GM technology (also known as agricultural biotechnology) an option for farmers across the developing world; from small-scale sorghum farmers in sub-Saharan Africa, to rice farmers in Asia.

[30] International Fund for Agricultural Development. (2011). Rural Poverty Report. IFAD.
[31] Overseas Development Institute. Agricultural Productivity and Poverty in Developing Countries. ODI.
[32] *ISAAA, (2011)* Global Status of Commercialized Biotech/GM Crops: 2010 http://www.isaaa.org/resources/publications/briefs/42/executivesummary/default.asp

2.4 Drought tolerance technology, which allows crops to withstand periods of low soil moisture, is anticipated to be commercialised within five years. The technology will have particular relevance for areas like sub-Saharan Africa, where drought is a common occurrence and access to irrigation is limited.

2.5 A number of internationally-respected reports have recognised the role of GM in dealing with the challenges faced by the developing world. In January, the Government Office for Science published the Foresight Report on Global Food and Farming Futures. It called for the inclusion of GM as a key part of the approach of policy makers to meeting soaring demand and pressure on resources and for a sensible and science based assessment of the role that the technology can play.

3. Effective Models and Mechanisms for Developing Research Capacity in Developing World

3.1 abc member companies are partners in a number of (non-DfID related) initiatives for resource poor farmers, for example in collaboration with the Bill and Melinda Gates Foundation and other NGO's. Most commentators agree that such public-private partnerships are the best way forward in many cases.

3.2 Positive and robust regulatory regimes in other parts of the world have allowed public private partnerships to flourish, with local scientists taking the lead on producing tailored crops for specific climatic conditions. An example of an abc partnered initiative in relation to the development of disease-resistant GM bananas in Uganda is provided below.

3.3 In central Uganda, one of the main banana-growing regions, Banana Xanthomonas Wilt (BXW) hits up to 80% of farms, sometimes wiping out entire fields. To get rid of BXW, it is necessary to dig up and burn the affected plants, disinfect all machinery and tools and allow the ground to lie fallow for six months before replanting. For small-scale farmers, leaving their gardens lying empty for this long is not an option, and they switch to other crops.

3.4 Bananas are the staple food of Uganda and are the country's second largest cash-crop after coffee. The disease is endangering the livelihoods of the nations' farmers, 75% of who grow bananas, and threatening an important food source in one of the poorest nations in the world. Damage caused by BXW is now estimated to cost farmers in the East Africa region half a million US dollars per year.

3.5. The International Institute for Tropical Agriculture and the African Agricultural Technology Foundation have been developing a GM solution to the problem of BXW, in conjunction with a Taiwanese biotechnology institute, Academia Sinica (AS). AS has issued IITA and the AATA with a royalty-free licence to use its Hypersensitive Response Assisting Protein (HRAP) gene technology. As successfully transplanted the sweet pepper HRAP gene into the other vegetables where it produces a protein that kills cells infected by disease-spreading bacteria. This is the first time it has been tried with a banana, although initial trials are promising, with six out of eight strains showing 100% resistance to BXW. Development of wilt-resistant GM bananas has now progressed to the confined field-crop testing stage and is showing promise.[33]

3.6. At the same time, Ugandan banana farmer Mr. Erostus Wilberforce Njuki set up Agro Genetic Technologies—(AGT) the only private enterprise firm in Uganda that uses biotechnology to produce tissue cultures for crops such as bananas that have historically suffered from disease. AGT has a capacity to produce five million banana planting materials which are distributed through a chain of 26 nurseries, five of which are owned and operated by AGT and 21 others are operated by farmer organizations with the support of the National Agricultural Advisory Services. AGT also operates one nursery in Kigali, Rwanda. Currently, through the National Agricultural Research Organisation (NARO), AGT is currently conducting research into GM Bananas enhanced with vitamin A, as well as research on bacterial wilt and Black Sigatoka resistance.

3.7 abc therefore suggests that a more effective regulatory regime in Europe would lead to a flourishing of public private partnerships, leading to significant injections of funding into research centres such as the National Institute for Agricultural Botany (NIAB) whose agricultural R&D could then be applied across the developing world in order to tackle food security.

4. The Role of DfID in Supporting Agricultural Technology Research in the Developing World

4.1 The UK Government, through the Department for International Development, is heavily involved in supporting agricultural projects in the developing world, through organisations such as the African Agricultural Technology Foundation.

4.2 DfID works in partnership with research funders and institutes in the developed world to ensure that their advanced expertise in agricultural technology is directed towards solving global problems.

4.3 DFID has already demonstrated its willingness to invest in research into the expanded role that GM technology could play in adapting crops to the conditions brought about by climate change in the developing world. However, this funding is being directed overseas because the current EU process for regulating agricultural biotechnology is heavily politicised and dysfunctional.

[33] http://www.sinica.edu.tw/manage/gatenews/showsingle.php?_op=?rid:4043%26isEnglish:1

4.4 A good example of these partnerships is the recent grants from DfID and the Bill and Melinda Gates Foundation to the Durable Rust Resistance in Wheat (DRRW) project at Cornell University in the US.

4.5 Through this new collaboration, Cornell University will continue its work to develop GM wheat varieties that are resistant to emerging strains of stem rust disease, such as Ug99, which are spreading out of East Africa and threatening the world's wheat supply. Kenya is among countries set to benefit from the research, which will support efforts to identify new stem rust resistant genes in wheat, improve surveillance, and multiply as well as distribute GM rust-resistant seeds to farmers.

4.6 DfID has made a five year grant of $15 million to the project, while the Bill and Melinda Gates Foundation will provide $25 million.

4.7 However, this $15 million of UK tax payer funding could have been invested in UK research. This is mostly due to the erosion of industrial R&D over the past decade caused by the current EU process for regulating agricultural biotechnology. In addition, abc believes that more thought should be given by the Government to how the remaining UK research base could provide solutions to the challenges identified.

4.8 abc welcomes this commitment by DfID to the research and development of agricultural biotechnology solutions to some of the key challenges facing global agriculture. However, it is regrettable that such a significant investment was not made in the UK, thereby increasing the ability of the UK research sector to achieve its full potential in addressing the challenges facing global food supply.

4.9 Through its refusal to allow the cultivation of biotechnology, Europe is continuing to erode the industrial R&D base including jobs, skills and corporate infrastructure across the EU which is required to catch up with global competitors and contribute to tackling issues such as food security in the developing world.

16 December 2011

Written evidence submitted by The Royal Academy of Engineering, The Institution of Civil Engineers, and Engineers Against Poverty

1. The Africa-UK Engineering for Development Partnership (A-UK Partnership)

This response has been prepared by The Royal Academy of Engineering on behalf of the A-UK Partnership, which brings together the UK and African engineering communities in a capacity building partnership. This response focuses on the experience of the key UK stakeholders involved in the A-UK Partnership: the Institution of Civil Engineers, Engineers Against Poverty and The Royal Academy of Engineering.

ICE, EAP and the Academy have all interacted with DFID over a period of several years. Whilst historically those interactions have taken place on a bilateral basis, over recent years and particularly since the establishment of the A-UK Partnership in 2008, the three organisations have sought to engage collectively with DFID, recognising the need for the UK engineering community to work in a joined-up fashion both with partners in developing countries and with other organisations in the field of international development.

It should be noted that ICE, EAP and the Academy have strong links to many other organisations with a stake in engineering and international development, including Engineers Without Borders, RedR, Association for Black Engineers (UK), other science and engineering professional bodies, and most of the major engineering companies with relevant activities. In a 2008 report by the Innovation, Universities, Science and Skills Committee, "Engineering: Turning Ideas into Reality", the committee recommended that the Academy should be "the first port of call for engineering advice".[34] The Academy is committed to fulfilling its role in providing a coherent voice for the engineering community and is keen to work with DFID in this capacity.

2. Engineering and International Development

Engineering has a necessary and central role to play in achieving the UN Millennium Development Goals (MDGs) and DFID needs to recognise this by building a prominent engineering element into its programmes. Engineering is critical to the development of, and provision of access to, new medical interventions, safe drinking water and sanitation facilities, sustainable energy generation technologies and other public services. Globally more than 2 billion people lack access to safe drinking water, 2.5bn don't have toilets or access to basic sanitation, while 2.32 billion have no reliable source of energy.[35] The World Food Programme estimates that up to half of global hunger could be due to transportation and storage problems.[36] Through the provision of basic infrastructure, engineering provides the means to tackle these issues.

Engineering is also a key enabler of wealth creation, both underpinning the innovation process and being necessary for building the infrastructure (physical and virtual) required for enterprises, supply chains and

[34] http://www.publications.parliament.uk/pa/cm200809/cmselect/cmdius/759/759.pdf

[35] Ali H et al. "Engineering a Better World": Conclusions from the Commonwealth Engineering Council and Institution of Civil Engineers 2010 Commonwealth Week Conference p 3.

[36] Interview with Josette Sheeran, Executive Director, UN World Food Programme: http://www.foreignpolicy.com/articles/2008/04/22/seven_questions_the_silent_tsunami

markets to function. Through these actions and, for example, its key role in manufacturing, engineering also provides a route to increased employment rates in developing countries.

Efforts to build engineering capacity could improve the sustainability of all DFID interventions by helping communities to develop the necessary skills and institutions to develop their economies, alleviate poverty and build political stability. Such efforts should be focussed on local and regional needs and should include building the capacity of professional, educational and governmental institutions as well as on developing the skills of individuals within the engineering sector.

3. UK Government Support for Scientific Capacity Building

Current DFID policy on scientific capacity building appears to be tightly focussed on research support. Increased funding for research within the DFID budget has been very welcome, however DFID could have more impact if it also funded scientific and engineering capacity building activities within professional, educational and governmental institutions. Educational institutions need to be able to provide students with skills that are relevant to local industry needs whilst governmental bodies must develop an understanding of the importance of engineering and must be able to engage effectively with the engineering community. Professional institutions require the capacity to develop and enforce professional qualifications,[37] to recognise education courses,[38] to support policy makers by providing expert advice and to promote engagement between government, industry, academia and civil society.

As engineering straddles DFID policy on both science and infrastructure, the lack of an up-to-date infrastructure strategy must significantly hamper progress for DFID programmes to build engineering capacity. The latest infrastructure strategy, *Making Connections: Infrastructure for Poverty Reduction,* was published in 2002 and a proposed new strategy in 2008 never materialised. A new infrastructure strategy is urgently needed in order to ensure that DFID policy is informed by changes that have occurred over the last decade, such as the growing importance of digital infrastructure to development.

4. Engaging within DFID on Engineering Capacity Building

The engineering cadre within DFID appears to be of limited size, disconnected internally and not sufficiently well-connected with the UK engineering community. This limits DFID's potential to harness the strengths of UK industry and academia for improving development outcomes as well as making it difficult for external stakeholders to engage with DFID on engineering issues.

Our own experiences of attempting to engage with DFID have been frustrating at times. Continual restructuring within DFID means that responsibility for projects changes frequently. This results in a lack of responsibility and continuity and makes it difficult for external stakeholders such as ourselves to engage effectively.

In many cases there appears to be a disconnection between DFID London HQ and country offices. In all but one case (in Tanzania) we have found it very difficult to identify appropriate contacts in country offices and met reluctance from those offices to engage with us. In some cases we were told that they aid the country through budget support and are therefore not interested in particular sectors but it would no doubt be beneficial for those offices to maintain their knowledge of development activities in all the sectors that they are supporting.

The drive for increased focus on evidence-based policy making by the previous and current DCSAs is very welcome. The Partnership is also supportive of the systematic reviews that the DCSA has initiated, although a more demand-led approach in which the intended consumers of the knowledge generated are more closely involved in the framing of questions could help to improve the impact of the reviews.

December 2011

Written evidence submitted by The Royal Society

*Background***:** In 2004, the Science & Technology Committee issued a report on "The use of Science in the UK international development policy", identifying a number of concerns in the way DFID addressed capacity building in the developing world. The main issues that were raised, chimed with the concerns expressed by the Royal Society and other G8 academies on the donor's lack of support for the institutions of higher education and research in the developing world, in the wake of the comments made at the 2005 G8 meeting at Gleneagles.

In 2009, the Society submitted a DFID consultation response on "Eliminating World Poverty: Assuring our Common Future", highlighting the main issues for strengthening the educational and research base in developing countries. The seven points highlighted in this document were:

1. Need for investing in a strong and diverse higher education system at all levels.
2. Need for a demand-led research agenda driven by the developing countries.
3. Urgent need to improve in-country PhD training.

[37] Lawless. "Numbers and Needs": Addressing Imbalances in the Civil Engineering Profession. 2005.
[38] Alutu & Iruansi. "Education and Development of the Structural Engineer in Nigeria: Some Gaps in the System". 2008.

4. Lack of functioning post-doctoral research domain.
5. Lack of translational research.
6. Lack of linkage between researchers and institutions in and between developing countries.
7. Need to shift the focus of capacity building in Research & Technology from creating "centres of excellence" to a more realistic objective of developing "functioning institutions".

We believe that the current consultation response need to be interpreted in the context of the above comments provided in 2009.

The views here reflect those of a select number of Fellows with experience in capacity building and working in, and with, developing countries. They do not necessarily reflect the views of the Royal Society.

The Royal Society's role in capacity building: The Royal Society has endeavoured to address these major issues during the development of the Leverhulme—Royal Society Africa Awards. This funding scheme is based on consultation with science communities and institutions of higher education in Ghana and Tanzania. The research priority areas were defined by the recipient countries, and are linked to the wider developmental goals of the two nations. The consultation is a continuing process, mainly through regular award holder meetings co-organised with the national academies of Ghana and Tanzania. The first of these events held in 2010, resulted in the Royal Society's successful submission of an application for a second phase of the scheme to the Leverhulme Trust, proposing a revised scheme design. For the next three rounds of applications, awards will provide additional ring-fenced support for a PhD student, who has to be registered at a university in Ghana or Tanzania, as well as the inclusion of an optional South-South collaboration component. In the context of the Leverhulme—Royal Society Africa Awards, the Society will be looking more closely over the next few years at developing a strategy for an incremental transition, during which resources provided through the Society's programmes will be increasingly replaced by indigenous investments.

The Society is currently in discussions with DFID to explore the possibility of establishing a programme to support research consortia across sub-Saharan Africa.

The Royal Society has also partnered with Pfizer and NASAC (Network of African Science Academies) to support capacity building in Africa through the Pfizer African Academies Programme. The Royal Society plays a mentoring and support role to the national science academies in Tanzania, Ghana and Ethiopia in order to help build their capacity to influence policy makers; communicate science effectively to wide constituencies (including funders); inspire the next generation of scientists; collaborate regionally and internationally; and ensure the quality of science in their respective countries. These themes reflect the role of a modern national science academy in recognising, promoting and supporting high quality science and encouraging its use in public policy. Bespoke business plans have been developed in partnership with the academies to reflect their different stages of development and their own respective priorities. By developing these capacities, the Academies have an important role to play in demonstrating the value of investment in science and innovation, and creating an in-country demand for it. The first National Science Congress in Ethiopia in December 2011 perhaps demonstrates the progress we have been able to make in working closely with the Ethiopian Academy and its dynamic research community. The Society is currently designing a second phase of this work, building on progress to-date and working more strategically with NASAC, as well as helping academies to engage with wider regional and continental bodies in Africa, in order to leverage resource and influence.

*Science & Technology Committee consultation***:** In order to formulate an official response, the Society has consulted with number of experts, the majority of whom are Fellows of the Royal Society:

1. Prof Martyn Poliakoff FRS, Foreign Secretary of the Royal Society and University of Nottingham
2. Prof Tony Cheetham FRS, University of Cambridge
3. Prof Brian Greenwood FRS, London School of Hygiene & Tropical Medicine
4. Prof John Pickett FRS, Rothamsted Research
5. Prof Richard Catlow FRS , UCL
6. Prof Paul O'Brien FRSC, University of Manchester

Terms of Reference of the Inquiry: Referring back to the Committee's 2004 report on "The Use of Science in the UK International Development Policy", submissions of comments on five matters have been invited. The Society will not be able to respond to all of the questions, others can only be partially addressed. In the following, some aspects have collated, which might be relevant to address at least some of the matters arising. Our comments should be viewed in the light of the fact that the Royal Society's contact with leading scientists in the developing countries indicates that DFID's support is widely appreciated and valued:

1. *How does the government support scientific capacity building in developing countries and how should it improve?*

There are a number of ways, in which the government is currently supporting capacity building efforts. Amongst them are the MRC centres and units in the Gambia and Uganda, collaborations between DFID and certain research councils (MRC and BBSRC) on health and agricultural research, support for the Commonwealth Scholarship programme and such like. Other successful initiatives supported by DFID are the

direct funding provided for the CGIAR system and other institutes working collaboratively with national programmes, thereby providing core funding for this purpose. However, several of those consulted felt that some of the research funded directly by DFID has been less effective in creating successful capacity building programmes, mainly due to a lack of adequate quality control. One of the main difficulties is that DFID has lost many of those in its workforce with the adequate qualifications to operate and deliver scientific programmes. DFID needs to improve its research management as well as considering the option of outsourcing specific programmes to agencies with the adequate skills to deliver such programmes. In addition, in the past, the inclusion of Science & Technology into poverty reduction strategies was significantly hampered by the strict interpretation of the Millennium Development Goals (MDGs). This strict adherence to the MDGs should be reviewed, as there is a need for a stronger emphasis on S&T in the overall strategy of poverty reduction, and there is an urgent need to develop new mechanisms to target younger talented researchers working or thinking of returning to institutes of higher education, especially in sub-Saharan Africa. In addition, the consulted Fellows felt that special attention should be paid to significantly improving PhD programmes at universities in developing country, encouraging a tradition of post-doctoral research, and improving the overall quality of teaching and research. Selected universities and research centres in developing countries should be encouraged to become centres of excellence that can compete on the world stage. However, it is important to help existing institutions to develop to the stage where they can support the broader research needs of their country and act as a source of outstanding scientists who will become key members of the centres of excellence. The support should not be restricted to adaptation of existing technology platforms, but should also aim to develop an indigenous research portfolio. In the past, one issue that has rarely been address successfully is that of sustainability. More attention should be paid to succession planning; long-term strategies need to be developed to enable national institutions to gradually take over responsibilities of providing improved (ad hoc) funding for researchers in their own countries. We are encouraged that DFID, in partnership with the Wellcome Trust, is engaging in supporting the development of funding bodies in Kenya and Malawi, but such activities need to be expanded to other countries. In addition, if DFID were faced with limited capabilities of managing capacity building programmes, one possible solution, at least in the short-term, would be for DFID to enter into partnerships with other organisation, which are better positioned to deliver particular projects within a wider DFID strategy of capacity building. This is important, because there appears to be an increasing willingness on DFID's part to recognise the importance of capacity building in the higher education sector of developing countries, and the need for Science & Technology in the context of poverty reduction. There would also be merit in helping policy-makers in target countries to recognise the value of national investment in science, technology, and innovation, and to encourage them to use science to inform policy, ie creating an in-country demand or appetite for science and its application.

2. *What are the most effective models and mechanisms for supporting research capacity in developing countries?*

There is no particular single model available, neither tested or as a concept, that would provide the best mechanism of building capacity. In fact, one of the major current challenges is to develop novel strategies to successfully assist developing countries in their efforts to build their own capacity in higher education, research, research training, and innovation. The most promising scenario will be one in which several models are created, and evaluated over the next decade. However, there needs to be a set of principles guiding all organisations engaged in capacity building (resonating with the Five Principles of the Paris Declaration):

(a) Agenda setting by the South, and a programme that is demand-driven.

(b) Safeguards to avoid dominance of one partner, especially the Northern partner.

(c) Definition of clear objectives against which the success of a programme can be measured.

(d) Integration of evaluation in to the programme at the outset of every project.

(e) Development of an overarching evaluation framework, to provide compatible data derived from different programmes.

(f) Long-term commitment.

(g) Acceptance that a programme needs to be repeatedly adjusted during its life-span, based on consultation with recipient countries, to react to a changing historical context.

(h) Succession planning to be an integral part of the initial concept of any new capacity building programme; this requires a clearer definition of the role of the recipient partner and (agreed) mechanisms for holding the partner accountable to the agreed contributions (ie a stronger onus on recipients, eg as part of the Paris Declaration to mobilise indigenous resources to sustain programmes following the end of external funding).

In the context of capacity building of Science & Technology, those consulted believe that the focus should be placed on the following issues to maximise the long-term benefits of the investments:

(i) Assistance in strengthening the quality of in-country PhD programmes.

(j) Assistance in the development of career structures at HEIs and strategies for the retention/recruitment of younger scientists.

(k) Assistance in the development of the post-doctoral research domain including the provision of a career structure.

(l) Support for infrastructure (plus maintenance), but accompanied by the necessary training for researchers and technicians to use the equipment adequately and professionally (skill transfer).

(m) Facilitation of the integration of African scientists into the global scientific community.

(n) Inclusion of vocational training elements through skill transfer (seminars and workshops on grant-writing, training for senior researchers on the supervision and mentorship of graduate students and post-doctoral researchers, etc).

(o) Support of indigenous institutions to develop national merit-based ad hoc funding programmes.

(p) Institutional support for the national funding bodies in terms management of scientific programmes, governance, accounting and reporting.

(q) Institutional support for organisations that promote science and its application, and in doing so create an in-country demand for it.

The UK has also to ensure that its own institutions retain and develop their own capacity to engage successfully and efficiently in capacity building. One option could be to establish UK centres, focussing on specific research areas that could provide training through summer schools, workshops, and exchange programmes with partners in developing countries. In addition, a programme to support short visits by UK-based scientists to lecture in developing countries, could yield significant returns.

3. *How does government monitor and evaluate the effectiveness of the scientific capacity building activities it supports? Is further assessment or oversight needed?*

The Society cannot provide a comprehensive response to these questions. There is a sense that, in the past, there have been shortcomings in the DFID approach to the issue of evaluation. However, it appears that DFID is becoming increasingly aware of the necessity of robust and effective evaluation tools. The main challenge is how to develop an evaluation programme that can be used across different capacity building programmes to produce compatible data, and to identify indicators that can be used as predictors. In this way donors and funding bodies can detect problems, and undertake course corrections during the lifespan of a programme, rather than just using evaluation as a "post-mortem" device.

4. *What role does the DFID's Chief Scientific Adviser play in determining priorities and in the development and assessment of capacity building policies?*

The Society does not feel in the position to comment on this matter, other than to note that it welcomes the decision of DFID to appoint a CSA who has been provided with the actual power and resources to formulate and deliver capacity building programmes, by combining the important role of CSA with the post of Director Research and Evidence Division. The Society has noticed a growing readiness by the CSA to recognise the value of Science & Technology and to put a stronger emphasis on capacity building in this area in the future. It is pivotal that the CSA engages with the DFID Scientific Advisory Board led by Prof Sir Leszek Borysiewicz FRS to create an effective two-way dialogue.

5. *How are government activities co-ordinated with the private and voluntary sectors?*

The Society is again not in a position to address this matter comprehensively. One issue that needs to be address is the possibility of DFID entering into partnerships with organisations such as the Royal Society to deliver specific capacity building projects as part of DFID's overall strategy and ambition, particularly in cases where DFID's current in-house capability might be insufficient to manage certain projects directly. In the context of capacity building, DFID is already delivering certain programmes in collaboration with other funding bodies, for example with the MRC, BBSRC, and the Wellcome Trust. One issue of concern is the lack of co-ordination and perhaps governance of the many initiatives managed by the private and voluntary sector. There appears to be an overall lack of leadership by government to harness the undoubted enthusiasm and resources within this sector to increase the effectiveness of the assistance offered.

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Written evidence submitted by the Overseas Development Institute

Introduction

1. We would like to thank the committee for inviting us to prepare a formal submission to this inquiry; in which we outline issues that have arisen since the initial terms of reference were issued and which we believe are important to the committee's deliberations. We have had the opportunity to read through the written submissions that have already been received, and agree with many of the points made. Our focus for this submission is on how science can influence policy with reference to the whole system of generating and using knowledge.

2. While a focus on building scientific research capacity will help address issues of market failure in the provision of science as a public good, this is not the whole picture. Science is a public good in its own right,

but it is also a means to help deliver other public goods such as a cleaner environment, improved health, better education, broad-based economic development and improving trust between citizens and their government.

3. Developing capacities to ensure that scientific research is used to deliver these wider public goods via the policymaking process means looking at the system as a whole (drawing on approaches like Innovations Systems (IS)) but also paying attention to specific parts of the system namely:

- strengthening and systematising policymakers' demand for science by equipping them with the tools and methods to be able to procure and use science cost-effectively;
- adding value to scientific research by ensuring its implications are well understood and embedded in broader policy processes; and
- recognising the central importance of intermediary organisations which facilitate policy debates and convey narratives around science.

4. Building capacity is a not a straightforward process and doing so successfully requires long term commitment, a systemic approach, innovation and a high level of professional rigour. We elaborate on these points below.

Taking a "Whole Systems" Approach in Delivering Policy Goals

Why this is important

5. The simple linear model, where research results are disseminated to target audiences who assimilate this new knowledge and act upon it, is too simplistic (Barnard, *et al*, 2006). Scientific research is clearly just one of many competing factors influencing policy decisions and changes in practice (see Court, *et al*, 2004 and Young and Mendizabal 2009). Decisions about how to use science to deliver wider public goods are intimately bound up with the policymaking process in a reflexive and complex set of relationships (see Jones, 2011; Ramalingam, *et al*, 2008). As such there is a real need to understand and focus on the processes and drivers behind the use and uptake of new or existing knowledge. The RAPID framework,[39] for instance, identifies four groups of factors that shape the science-policy interface: the political context, the nature of the evidence, the mechanisms which link evidence with policy processes, and external influences.

6. Such whole system approaches have been taken up by a number of initiatives developing research capacity. DFID has funded the Research into Use (RIU) programme which aimed to contribute to sustainable agriculture in South Asia and sub-Saharan Africa by adopting a pro-poor "whole system" or, in this case, Innovation Systems (IS) approach to getting (DFID-funded Natural resources-related) research into use and to increasing the understanding of how this is done. An innovation system is a network of organisations and individuals—comprising knowledge users, producers and intermediaries (at national, sub-national, regional and/or international level) involved in generating, modifying and using new knowledge. The IS approach considers not only the totality of the entire research, development and extension spectrum, but also the institutions, systems of production, and social relations in which these activities take place (Clark 2010).

7. In Indonesia, AusAID is about to launch an almost two decade long AUS$ 300 million programme to develop what they call the country's "knowledge sector". The Programme's "knowledge to policy" model contains four inter-connected pillars, each of which will be supported through this program: 1) research organisations that produce knowledge and evidence that influence policies; 2) policy makers who demand and use evidence in formulating policies; 3) intermediary functions and bodies that translate, package, and communicate knowledge and; 4) the enabling environment—the policies, regulations, and procedures that govern how the supply and demand sides operate and interact (AusAID, 2011).

Implications for DFID

8. As Jones, *et al* (2009) suggest, taking a whole systems approach emphasises:

- not just the supply but also the demand for knowledge (including scientific research) and the need to strengthen this demand by amplifying the voice of knowledge users (such as farmers, small and medium sized enterprises as well as policymakers) and providing knowledge services;
- the importance of different types of knowledge (beyond scientific research to include citizen or stakeholder evidence and evidence from practice);
- that often structural factors and national context, such as the social value placed on "policy entrepreneurship" or the strength of basic infrastructure, can shape the use of knowledge;
- the importance of networks and linkages as channels for increasing the role of knowledge in policy and practice and the need to facilitate trust and interaction between a diverse range of actors; and
- the need for actors carrying out "intermediary functions" to facilitate continuous exchange between the "supply" and "demand" for knowledge.

9. There is a widespread belief that the blockages to using science effectively in policymaking arise because of barriers within government that can be overcome with more or better science, or more or better

[39] See www.odi.org.uk/rapid/tools/Documents/Framework.pdf for more information

communication. A whole systems approach demonstrates the importance of conducting early and thorough diagnoses of the system to identify the weak points in both supply and demand.

Supporting Decision Makers to Demand and make Use of Scientific Research

Why this is important

10. Strengthening the demand for science by policymakers has received relatively little attention internationally: while there has been a great deal of work internationally on strengthening the supply of science to policy via academia, think tanks and other organisations, considerably less has been done to help developing country policymakers understand how to use science and other forms of evidence effectively.

11. It is not enough for policymakers to use science instrumentally. Promoting better governance means helping to align policymakers' incentives to use science with the policy goals they are charged with delivering in a set of robust and transparent decision-making processes. If an impact assessment is just a tick-box affair there is very little incentive for policymakers to seek out evidence to answer the questions. Likewise, strategy development processes may be purely about negotiating policy positions without reference to what the evidence says, and budgeting processes may be simply an accounting exercise rather than a systematic effort to underpin policy priorities with the necessary resources.

12. There is also an important set of questions relating to how cost-effectively science is procured and used to inform policy: specifically how the budgets at the disposal of government departments are used to procure scientific research for policymaking. For the purposes of this enquiry, we include donor-funded projects in the definition, as developing country governments, particularly those with low incomes, generally have minimal budgets for procuring science themselves and often rely on external funders to deliver what they need.

13. Lessons from Whitehall show the importance of developing a clear line of sight between policy goals and the science base to ensure that government budgets spent on science are focused on delivering those goals cost-effectively. This is perhaps best exemplified by the Department for Environment, Food and Rural Affairs (Defra)'s Evidence Investment Strategy process.[40]

14. Strengthening policymaking processes such as these helps make the procurement and use of science more cost-effective. It also contributes to the good governance agenda; improving the effectiveness of policymaking processes by ensuring that that the business processes of government departments (strategy, planning, budgeting, options appraisal, citizen engagement and monitoring) actively encourage policymakers to seek out evidence in a structured and systematic way (see for example Hallsworth & Rutter, 2011 and Laughrin, 2011). In addition, clarifying policy's needs for science helps create a "demand-pull" on the science base, aligning incentives to supply science with demand from government.

15. This on its own is not enough, however. It is also important to build policymakers' own capacity to articulate their science needs to researchers more effectively and systematically; to help them understand the scientific process, recognise good and bad science, and know how to deal with uncertainty in the science base.

Implications for DFID

16. More systematic and political analyses of policy processes would help identify the different actors or stakeholders involved and understand how their interests and perspectives influence the ways they use scientific research, or not. This can help inform knowledge-to-policy programming—allowing DFID to identify key entry points to help partner governments ensure that policy processes engage more widely and draw on multiple types of knowledge (see for example Datta *et al*, 2011; Jones *et al*, forthcoming 2012).

17. We believe that some of the best examples of tools to systemise demand are to be found in Whitehall, for example in the Government Chief Scientific Adviser (GCSA)'s Guidelines on the Use of Scientific and Engineering Advice in Government[41] and the work on Evidence Strategies that has been done by Defra and other departments (referenced above). While more needs to be done to determine the extent to which this Anglo-Saxon model of evidence-based policymaking is truly relevant to other countries and cultures, we believe there would be merit in:

- seeking to adapt the GCSA guidelines to country-specific circumstances. While we recognise that there are substantial differences in the capacity of Whitehall and developing country departments, the GCSA principles are equally relevant. The process of producing country-specific guidelines would help identify where the particular science-related weaknesses are *inside* departments and help focus efforts to strengthen them;
- draw lessons from the work in Whitehall to develop evidence investment strategies, to begin the process of stimulating and systematising the demand for science and other forms of evidence by policymakers. As we note above, this would speak to the twin agendas of value for money and good governance;

[40] The original Evidence Investment Strategy can be found at www.defra.gov.uk/publications/files/pb13346-eis-100126.pdf and the 2011 update at www.defra.gov.uk/publications/files/pb13471-eis-110427.pdf

[41] www.bis.gov.uk/assets/bispartners/goscience/docs/g/10–669-gcsa-guidelines-scientific-engineering-advice-policy-making.pdf

— support techniques which encourage policymakers to think ahead, help them consider what evidence they need to future-proof policies and strategies, and explore future risks and opportunities; and

— consider support to programmes like the Canadian Health Services Research Foundation (CHSRF)'s Executive Training for Research Application (EXTRA) program which develops capacity and leadership to optimize the use of research evidence in managing Canadian healthcare organizations.[42]

18. Strengthening and systematising the demand for science and other forms of evidence in policymaking is a long-term process, but we believe there are sufficient examples of good practice in the UK that could be adapted to the different realities of developing country governments.

Adding Value to Scientific Research by Strengthening Science-Policy Dialogue

Why is this important

19. Communication is fundamental to science's ability to make a meaningful difference to policymaking processes. But improving science communication is not simply an issue of marketing the results of scientific research by for instance, producing policy briefs and working papers, or targeting key decision-makers with information. As indicated above, good communication can create the conditions for, facilitating dialogue among and, critically engaging with, key policy actors (including citizens as well as scientists and policymakers) to improve the rigour and quality of policymaking. For instance, scientific research is more likely to be integrated into policy if policymakers (and other users) are consulted about their views and priorities at the outset of a research project, rather than presented with a completed research report over which they have little sense of ownership (Jones, *et al*, 2009). Such dialogue can:

— help policymakers who are not technical specialists understand the results of complex scientific processes and their relevance to current policy priorities;

— help policymakers understand how to recognise good and bad science, the implications of scientific uncertainty and translate this into a better appreciation of how to deal with risk;

— alert policymakers to the possible implications of new and emerging evidence and to engage widely and openly about the implications, such as upstream public engagement work on nanotechnologies (see, for instance, Datta, 2011);

— amplify the voices of knowledge users, such as farmers, and owners of small and medium-sized enterprises (SME), and provide knowledge services to strengthen them; and

— ensure that messages from science are delivered in a timely way, anticipating policy's likely needs for information or responding to them as rapidly as possible.

20. In Peru, for instance, the Consorcio de Investigación Económica y Social (CIES) (Economic and Social Research Consortium)—a Peruvian umbrella organisation with 44 institutional members, including think tanks, research centres, NGOs, private consultancies and public agencies—designed its research awards around the knowledge demands (ie a research agenda) outlined by the Public Sector Consultative Group (PSCG) made up of government, the Central Bank, regulatory entities and Parliament (Jones, *et al*, 2009).

21. In another example, a deliberative citizens' jury on food and farming futures in Zimbabwe convened by a group of actors including a government agency (overseen by a panel of senior officials from the Ministry of Land and Agriculture) enabled an information exchange amongst farmers, scientists and policymakers on what stakeholders wanted to see in the smallholder agricultural sector in Zimbabwe by 2010 (Rusike, 2005).

Implications for DFID

22. DFID has led the way internationally in ensuring that sufficient attention is paid to communicating the results of scientific research to policymakers, stipulating that research projects and programmes actively consider communications from the outset, through its policy of 10% minimum spend on communications within RPCs and requiring each one to produce a strategy to show how research would be put into use; providing web portals such as Research for Development;[43] bringing international groups of researchers together to discuss how to improve the impact of scientific research on policy (see Shaxson, 2010) and reviewing the impact of its research communication spend (see Hovland, *et al*, 2008).

23. While the past decade of DFID-funded work has given the international community a real appreciation of the need to think systematically and rigorously about how to communicate science to policy, more work still needs to be done to understand the impact of different research communication strategies and the wider public value they ultimately add to scientific research. The evaluation of DFID's policy of a minimum spend on communications in RPCs suggested they continue with this policy, increase the threshold to 15 % for future rounds, provide more practical support to RPCs in implementing the communications policy and fund cutting edge research on research communication (Hovland, *et al*, 2008). The current moratorium on communications and marketing spend by Whitehall departments has had an unfortunate impact on funding for communicating

[42] www.chsrf.ca/Programs/EXTRA/about_extra.aspx
[43] www.dfid.gov.uk/r4d/

scientific research to policymakers, because research communications (*to facilitate policy dialogue*) has been conflated with central communications (*to "sell" the DFID message*). Should this continue, it will have significant impacts on the value that can be added to DFID-funded research.

Working with Intermediaries to Facilitate the Interpretation and Use of Science

Why is this important

24. There are limits to what individual research centres can achieve on their own, particularly smaller organisations that operate outside the traditional academic environment (as noted by the STEPS Centre's points about citizen science). The importance of creating networks and linkages as channels for increasing the uptake of knowledge, and the need to facilitate trust and interaction between a diverse range of actors is now well recognised.

25. The print, broadcast and online media have to some extent facilitated this interaction, by publicising and critiquing research findings, promoting and widening debate, and demanding accountability. But spurred on by rapid developments in information and communication technologies over the last decade (particularly the development of web-based tools, social media and smart phones), these roles are increasingly being played by other intermediaries; ones who do more than simply transmit information. Instead they contribute to interpreting information, creating new knowledge and fostering social learning and innovation in a variety of ways by, for instance, by strengthening relationships and networks of actors or contributing to collective engagement around an issue.

26. These intermediaries can sit outside government (such as prominent academics and communication specialists within universities, networks—enabling collaboration beyond the usual institutional, cultural, and functional boundaries of an organization, think tanks and civil society organisations), inside government (such as strategy units and evidence teams) or somewhere in between (high level commissions, science advisory councils and legislative committees). Given the growing importance of legislatures in many developing countries, supporting the knowledge requirements of legislative committees in particular could help them fulfil their oversight function more effectively and drive up the quality of policymaking (see, for instance, Datta & Jones, 2011 for legislator-research linkages).

27. Examples include, Jean Drèze, a development economist who has been influential in Indian economic policymaking particularly on issues of hunger, gender inequality, child health and education. He helped conceptualise and draft the first version of the National Rural Employment Guarantee Act (NREGA) (Datta & Mendizabal, forthcoming 2012). The African Centre for Economic Transformation (ACET) is a think tank which was established in 2007 to provide policy analysis and advice to African governments. It is unique in that it champions an African perspective, harnesses African talent from within the continent and from its diaspora, and draws on a network of international experts and preeminent African professionals (Datta & Young, 2011). The Vietnam Economic Research Network (VERN)—a community of young researchers formed to address inadequate capacities of existing research organisations—works with both government and legislative committees to develop policy options in a range of social and economic policy areas.

28. The Inter-Agency Network for Education in Emergencies was established in 2000 after it was realised that humanitarian emergencies were an obstacle to the fulfilment of the global commitment to "Education for All". The network created a great deal of value through collective action in formal and self-organising groups of representatives from aid agencies engaged in producing, translating and sharing knowledge; successfully advocated for more attention to education in emergencies; and provided training and advice on minimum standards (Mendizabal & Hearn, 2009).

29. Several large scale initiatives have aimed to fund and support intermediaries to improve policymaking processes. The ODI managed Mwanainche programme aims to build the capacity of key interlocutors such as the media and civil society organisations, but also government departments, in improving state-citizen relations in several African countries.[44] The African Capacity Building Foundation (ACBF) helped to establish and support economic oriented government and non-government policy think tanks in sub-Saharan Africa and established 12 national and regional knowledge networks. These helped raise awareness among policymakers of the need for more evidence-informed policymaking, and many of the organisations won a visible and credible voice in their country's policy discourse (Daima Associates, 2006 in Datta & Mendizabal, 2008). The Think Tank Initiative (TTI), which DFID is contributing to, has provided core budget support to 51 think tanks across the developing world to help them improve their research and engagement work as well as their organisational structures.[45]

30. In an increasingly interconnected world, actors are increasingly joining forces in partnerships and networks that cut across national boundaries to generate and use knowledge more systematically to address regional and global challenges. The Climate and Development Knowledge Network (CDKN) for instance, is a large-scale global alliance of Northern and Southern private and non-governmental organizations working to support decision makers in designing and delivering climate compatible development (Datta & Young, 2011).

[44] See www.mwananchi-africa.org/

[45] www.idrc.ca/EN/Programs/Social_and_Economic_Policy/Think_Tank_Initiative/Pages/About.aspx

Implications for DFID

31. Visualising science and policy as separate communities does not help efforts to make science meaningful to developing country policymakers. DFID could perhaps do more to recognise that intermediary organisations take various forms and can play a wide range of roles. This includes support to different types of knowledge intermediary (such as policymaker or issue based networks) to work in ways that are more tailored to different contexts and would help foster wider engagement around science in general.

Building Capacity for Lasting Solutions

Why is this important

32. An assessment of the research environment in Africa commissioned by DFID and conducted by ODI suggested that capacity building should not be viewed as a simple add-on to existing initiatives (Jones and Young 2007). Capacity is a multidimensional concept; building it can lead to outcomes that are not initially obvious or clearly attributable. It is an inherently political task which requires long term commitment, a systemic approach and a high degree of flexibility.

33. Approaches focussed on single entities have tended be limited in their impact as they do not deal sufficiently well with actors and their relations with one another. Hence, capacity development needs to focus not just on the capacities needed to achieve technical results such as knowing how to communicate research to non-specialists, but also on what it takes to build more effective and dynamic relationships between different actors—such as scientists, policymakers and intermediaries—within a system (be it an organisation, a sector or a country).

34. Promoting capacity development can be a difficult process: it needs an appreciation of many domains of knowledge and disciplines including organizational development and management science; multi-stakeholder processes, related insights from social and political science; behavioural psychology and others. Like doctors and teachers, an understanding of these issues is not necessarily brought about through formal teaching processes. Field experience is also crucial, through for instance, immersion in context and learning by doing (Datta, *et al*, forthcoming).

35. Capacity development services are often overseen by Northern based organisations with local capacity development providers, although growing in number, still playing a marginal role. While foreign organisations may have staff with excellent technical skills, they often lack for instance, an in depth understanding of the local context and cultural sensitivities; are unable to speak the local languages; or may be unfamiliar with professional, formal and informal networks.[46] Moreover, Northern consultants building capacities of Southern organisations, can, if not carefully managed, reinforce existing power and knowledge asymmetries.

Implications for DFID

36. Given the complex and multidimensional nature of human systems, building capacity effectively would involve:

- promoting ownership of strategies: locally designed and monitored and context-specific capacity building initiatives can help to ensure their sustainability;
- delivering long term and flexible support: long-term core funding and providing space to local organisations to deliver what they think is needed (drawing on both conventional and advanced approaches) when they think its required can help them respond to complex and changing organisational and environmental contexts;
- encouraging the growth and development of national (and sub-national) level capacity development service providers (such as civil society and consultancy organisations) and promoting South-South learning/collaboration;
- encouraging higher levels of professional rigour and innovation amongst those who manage and implement capacity development programmes through for instance, support to more and better development and learning opportunities, communities of practice, ensuring minimum professional standards and more information for local organisations about the kinds of solutions and support available.

Conclusion

37. There is a real need to take a whole systems approach to developing capacity in producing and using scientific research. Within government this means being clear about what the policy goals are and being open about what science is needed to inform the policy development and delivery processes. Outside government, it means being clear where science has something to say about policy and engaging in a conversation with multiple stakeholders. This also requires a "brokering" process to decide which of those messages are currently most useful, whether they challenge received wisdom, confirm what we think we know, explain complex relationships, enrich our understanding of an issue, or scope opportunities for policy change. As policy priorities shift and as new scientific information emerges, their implications have to be set in context of what

[46] www.snvworld.org/en/ourwork/Pages/LCDF.aspx

policymakers are trying to deliver. And finally, capacity building in all these areas requires a long term, systemic and flexible approach rooted in local ownership.

Declaration of Interests

The Overseas Development Institute is a UK based think tank working on international development and humanitarian issues. Its mission is to inspire and inform policy and practice which lead to the reduction of poverty, the alleviation of suffering and the achievement of sustainable livelihoods in developing countries. The ODI does this by combining applied research, practical policy advice, and policy-focused dissemination and debate. It works with partners in the public and private sectors, in both developing and developed countries.

ODI's Research and Development programme (RAPID) works to understand the relationship between research, policy and practice across different contexts, exploring factors that may contribute to or limit the ability for knowledge to play a role in policy and practice. RAPID then uses insights from its research, learning and practical experiences to develop new competencies and skills in those wanting to use research evidence to influence and improve policies and practices. Given our remit, we have a keen interest in the findings of the Inquiry.

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February 2012

Written evidence submitted by International Network for the Availability of Scientific Publications

Introduction

1. In response to the committee's terms of reference, this document has been prepared by the International Network for the Availability of Scientific Publications (a UK based charity). We have provided comments and insights into two of the five questions being asked. While we find the other questions important, we do not feel that we are best placed to respond to them.

How does the UK government support scientific capacity building in developing countries and how should it improve?

2. Below we present three elements of UK government support to scientific capacity building. These three areas are presented due to their particular importance and central role that they play in embedding sustainable scientific capacity advances in developing countries; maximising the returns of science for development; and the impact that these can have on people's lives. There are other equally important areas of support that the UK government provides (eg primary laboratory and field research) however we will not be commenting on those here.

3. The first area of support is based around building the research information infrastructure that is required by researchers in developing countries, or indeed anywhere in the world, to effectively undertake research. This information infrastructure includes:

4. An effective information environment including libraries; access to scientific journals and books; well functioning information services; the local production and sharing of scientific outputs and publications; effective physical (computer) and human networks; etc.

5. A culture of scientific enquiry such that existing and future scientists demonstrate basic levels of scientific enquiry and educational processes generate scientifically literate high school and university graduating students.

6. A well functioning information exchange environment and supporting web of networks. These are increasingly based around the electronic exchange of information and interaction between scientists within and between developing countries and with partners in the north. This environment is based on a well functioning internet/telecommunications network and people's ability to maximise their use of those networks in a human and scientific networking capacity.

7. The Department for International Development (DfID) have been active in strengthening the research information infrastructure for a number of years and we have witnessed the impact of this support. This work is not a simple, short term intervention; it is a long term fundamental building of the foundations required for scientific capacity to function effectively and grow. It is difficult and slow work to undertake sustainably and effectively and so the impact of this work may not be immediately apparent.

8. An effective information environment must be built and cannot simply be provided. An example of this is with access to scientific literature; at a simple level, this can be easily provided—a donation of literature can be purchased and dispatched (electronically in many cases today) but unless the demand is built, the capacity to support its access and use is in place and the local ownership and resourcing decisions are in place, then the value of any access is questionable. Therefore it is essential that access to information resources in built; the infrastructure in which they are provided is functional and maintained; the human skills and resources to support them are developed; and there is advocating and lobbying by and to local decision makers for this to be owned and supported locally.

9. DfID should continue its important work in this area but look at expanding it and embedding it more deeply with any and all other forms of research strengthening support provided. DfID should also continue to collaborate with other international development funding organisations to ensure coordination of this work and value for money.

10. The second area of support is focused on that of research communications. If research is to have impact, it is not enough for it to be undertaken but the results of it need to be communicated effectively. Research communication can and must be directed at:

11. Other researchers (so that research outcomes and results are shared with others who can use and build on them effectively). This is particularly important in relation to researchers in the south being able to access and share the results of their work with other researchers in their country and region and on a global scale. There have traditionally been unequal flows of scientific information from the north to the south and sharing of information between researchers in the south has historically been difficult. Researchers working on the same challenges and under similar environmental conditions are likely to be to produce results relevant to others in the south but if research results are not communicated effectively and accessible to others then they are of little value.

12. Policy makers and influencers, so that they can take the results of research and use them to design policy, public services and support private sector development that leads to effective and sustainable national and regional development.

13. Research communications focused at the research community can be thought of as primary research communications ie locally owned and published research publications and scientific journals; researcher communication and writing skills; and research networks and information exchange channels. These are also the foundations that are required for the true value of research to be realised by those who are producing that research. Therefore the capacity to design, deliver and own the research communication outputs from within developing countries is required to support sustainable scientific capacity.

14. DfID have been working in this area for a number of years and continue to do good work. This must be continued, as it is the ability to have ownership and take benefit from locally undertaken research that is essential to support policy and resource allocations at a local level.

15. Research communications focused on policy makers and influencers may different skills in particular the ability to synthesise, interpret and effectively package research. Policy makers and influencers are less likely to be scientists than active researchers working in the field. Therefore they are likely to have different levels of scientific and information literacy (indeed this is a global phenomenon and all countries would benefit from capacity development in this regard) and so require a high level of interpretation and specialised communication. For this to happen it is essential that the local capacity to do this exists. In many developing countries this is not the case eg the media have very poor levels of capacity to report on science; civil society organisations have low levels of scientific literacy to support their work, etc.

16. DfID have been doing some work in this area over the last couple of years but this can usefully be increased and extended so that capacity of the research communications sector is built and owned in developing countries.

17. The third area of support is around building capacity for research uptake amongst policy makers and citizens. This is closely related to the second area above but is different—the second area above, and indeed the first, is focused on the supply side of research outputs and outcomes. They aim to ensure that the supply of research information is locally owned and driven, effectively being undertaken, embedded and sustainable. Those are all essential elements of science supporting development in developing countries however there is also a need to build demand for and the ability to use research outcomes by policy makers and citizens. Without this demand, the long term sustainability of any scientific capacity is brought into question as well as the potential benefit that science can bring to development being missed.

18. Research and evidence from science (in the broadest sense) can benefit developing countries. The ability to access and use that evidence outside of the immediate research and scientific community is dependent on effective knowledge, attitudes and skills as well as functioning communication channels. All of these support and require basic levels of scientific and information literacy within policy makers, policy influences and society at large.

19. An emerging body of research suggests that many policy makers and policy advisors in developing countries lack the capacity to access, evaluate and use research. Without these skills, research outputs will not be effectively translated into policy no matter how well they are communicated. One particular issue is that policy makers may not be aware of their capacity gaps and therefore any needs assessment which relies on policy makers' self-reported "needs" will not identify this area. We therefore feel that DfID could do more to understand and assess the capacity of policy makers to use research and to invest in programmes to respond to any capacity gaps.

20. As well as lacking capacity to use research, some policy makers lack the incentive or motivation to use research. DfID has made good use of political economy approaches to understand the drivers of change in

various context and we would encourage them to expand these approaches to understand the drivers of evidence use by policy makers.

21. One potential incentive to use research could be pressure from the public in response to a general increase in evidence-literacy and a strengthened culture of enquiry amongst the populations in developing countries. Celebrity scientists (such as Ben Goldacre and Brian Cox) and organisations such as Sense about Science have done a good job at building scientific literacy and understanding of evidence in the UK. We would encourage DfID to consider whether such approaches could be usefully supported in developing countries.

22. Furthermore, we encourage DfID to consider the importance of good quality science journalists in educating the public and also putting pressure on policy makers to be more evidence-informed.

What are the most effective models and mechanisms for supporting research capacity in developing countries?

23. Important elements of research capacity are built on those foundations outlined above; research information infrastructure, research communications and research uptake amongst policy makers and citizens. These capacities are often only emerging, low or even missing in developing country environments and therefore they need to be actively built. However, these capacities are structural in nature (they are an essential part of the environment), are subject to renewal (in terms of the changing nature of the skills and knowledge needed and due to turn over of people within these sector areas and institutions) and self reinforcing (in the sense that capacity in these areas builds more capacity and conversely, lack of capacity undermines the development of further capacity). It is therefore essential that the capacity to develop this capacity is actively built and exists in developing countries. Examples of this in practice would include;

24. Scientific journal access is supported by local library consortia and institutional management integrating content collection strategies and resource allocations.

25. Library school curricular are producing effective graduates who have the skills, knowledge and attitudes to support effective research information environments.

26. Researchers are being trained at undergraduate and graduate level to effectively write and communicate their research outputs.

27. Policy making institutions have information and research services that provide effective information services that adapt to the changing information environment.

28. Journalists are trained in scientific and information literacy by teachers and peers who demonstrate those skills in their practice.

29. Perhaps a useful metaphor for this approach would be that it's not enough to train the fisherman how to fish effectively but rather it is essential to train the person training the fisherman to undertake that training effectively, repeatedly and to adapt their approach as time goes by.

30. This capacity building of capacity builders is a difficult and time consuming task but it is important and so should be undertaken. Building organisations and individuals' capacities to build capacity is a task that often benefits from specialist development organisations. It is not enough to be a good scientist, but rather one should also be, or be working with, a specialist capacity development professional.

31. DfID could do more to ensure that the capacity building skills and experience of their implementation partners are as well developed as possible.

32. Effective models for capacity building in the areas outlined in this document are often best sourced from the south and so an essential element of any work in this area is south-south collaboration. Efforts to ensure that the experiences and outcomes of such work are shared as widely as possible, particularly amongst similar stakeholder groups outside the immediate environment of the case in question are important. In addition, there is a large and important body of stakeholders active in international development initiatives in this area both in the south and north. Sharing the experiences from the south is therefore increasingly important.

[47] www.inasp.info/

Declaration of interests

The International Network for the Availability of Scientific Publications (INASP) is a UK based charity working to support global research communication through innovation, networking and capacity strengthening, focusing on the needs of developing and emerging countries.[48]

February 2012

Written evidence submitted by Julie Makani MD, DIM, MRCP, PhD

Intervention Area

Biomedical Science, Technology and Innovation in Tanzania.

Rationale

Scientific knowledge has been applied to provide solutions to address biomedical issues. Furthermore, science, technology and innovation (STI) is recognized as integral to spurring economic growth and progress. Unfortunately, current approaches to addressing diseases such as malaria, HIV, Tuberculosis in many African countries including Tanzania, have not made optimal use of STI. As a result, solutions have aimed at "control" and not "eradication" of disease, as eradication requires application of scientific knowledge that is locally applicable. As a consequence, resources in Tanzania have been aimed at interventions which achieve short-term success, but result in dependence particularly on foreign aid. Long-term sustainable solutions can be achieved by global partnerships to generate scientific knowledge that will be locally-appropriate. Historically, scientific knowledge is generated elsewhere and brought to Africa to be applied or implemented. Therefore, most of the activities in biomedical research in Africa are geared to address and answer operational questions.

There is a need to invest in STI to generate knowledge that will provide solutions to local problems but will also contribute to scientific knowledge globally. Unfortunately in Tanzania, biomedical STI is under-resourced and is not a priority as hospitals focus on health and Universities on education. However, the economic growth and eradication of health pandemics in countries such as Brazil, China, India and South Africa has resulted from considerable investment in STI. Scientific knowledge is generated from research institutes and universities which receive considerable funding. Research in universities (Oxford, Imperial, Rockefeller, Berkley, Stanford and) and research institutes (Wellcome Trust Sanger Institute, Broad Institute, MIT) receive funding from government, industry and philanthropic organizations. Industry supports research for the potential entrepreneurial outcome (13% research in MIT is funded by industry) and philanthropy via endowments from individuals, institutions and industry; MIT receives 7,000,000,000$ in endowments and The Wellcome Trust spends £650 million a year supporting biomedical research. Although, Tanzania has committed 1% of its GDP on STI, partnerships with industry and the private sector are minimal and there is limited philanthropy from within Africa to fund STI.

There is a dearth of human resource capacity in biomedical STI in Tanzania. This is illustrated by the skills gap in scientific research and technology. Although there has been an expansion of education programmes, particularly at tertiary level, the proliferation of relatively well-funded (and well meaning) programmes in health, research and education has resulted in parallel systems with difficulty in retention of people in academia and research. Furthermore, the issue of quality and excellence in education particularly at tertiary level has not been adequately addressed. An increasing number of graduates do not have the necessary skills to be technologically competent and globally competitive. In addition, there is failure to retain and attract "world class" biomedical professionals who would be independent, innovative and dynamic leaders. This is happening in other sectors such as finance and ICT but not rapidly enough in biomedical STI. The absence of independent scientific leaders will mean that research, both generally and within global collaborations, will not be driven from Tanzania. In order to address this skills gap, Tanzania has to commit to training high-quality scientists and providing the environment that will encourage "brains" to stay or return to Tanzania.

Recent Developments; Justification for Centres of Excellence (CoE)

— Most countries have recognized the value of consolidating resources into centres of excellence (CoE). This requires innovative and collaborative partnerships, interdisciplinary approach and substantial funding. The Francis Crick Institute scheduled to open in 2015 will bring together scientists from all disciplines.[49] Its aim is to improve health but will also keep the UK at the forefront of innovation in medical research. This will attract high-value investment, and strengthen the economy. In order to establish high-quality, competitive research in Africa, the same approach in Africa that is being used in the UK can be applied. This will require a major paradigm shift by stakeholders in STI, health and education.

[48] www.inasp.info/
[49] www.crick.ac.uk/

— CoE can be "stand-alone" institutions; however in order for the impact to be sustainable and far-reaching, CoE should be integrated into universities. It is critical to revitalize African universities and support the development of CoE (/SciDev_Net\Joint science academies' statement Science and Technology for African Development.html ; appendix a). Research universities are usually the (highly specialized) top of a pyramid resting on solid undergraduate production. In the US, 5% of universities (200 of 4,000) are research universities.

— Expansion, access, equity problems are generally not solved by CoE which is why this should not be seen as a replacement, but should complement the efforts of the governments and development partners to improve education and health care.

— Sustainability of the CoEs will require entrepreneurship, the ability to attract high-value investment from industry and commercialisation of scientific knowledge into drugs, vaccines, health models with economic value.[50]

— Although most CoE seek to excel in a limited number of fields there are "apex institutions" which are large, well-funded, seek to be excellent across most disciplines. Apex institutions are rare by definition; Rockefeller University was founded as a research institute and is a world leader in biomedical research, where its faculty accounts for 5% of winners of Nobel Prize in science. Other research institutions include Wellcome Trust Sanger Institute and Francis Crick Institute. However, most universities have encouraged the formation of semi-autonomous centres/institutes such as the Wellcome Trust Centre for Human Genetics and Weatherall Institute of Molecular Medicine in University of Oxford. This allows focus and development of excellence in one area, but allows the extension and collaboration with other disciplines.

Strategic Focus on Genomics as a Basis for Developing Science Technology and Innovation in Tanzania

Tanzania is developing excellence in healthcare, academia, STI in the area of genomics. There have been significant advances in genomics but one of the greatest challenges is to translate genome-based knowledge into health benefits. The limitation is not from the technology for genotyping, but includes poorly characterised phenotypes, limited informatics and analytical capacity and the failure to understand the relationship between genes, environment and disease. Tanzania is in a strategic position to be a key player in genomic research. First, Tanzania has considerable diversity in disease as well as environmental and genetic factors. Second, there are well-established programmes of health and high-quality research. As a result, Tanzania established the Tanzania Genome Network (TGN) which consolidates existing, and develops resources in genetic research in research institutions and universities in Tanzania. TGN, through its partner institutions, have formed collaborative networks with institutions in other African countries and institutions outside Africa. This involves networks that are disease specific as well as around cross-cutting areas. The focus is on, but is not limited, to the following research areas; infectious diseases—malaria, HIV and TB. Non-communicable diseases (NCD) include sickle cell disease (SCD),[51] diabetes mellitus, hypertension; cancer, neurological and mental health disorders. Cross-cutting areas include biorepositories and genotyping, bioinformatics, epidemiology and analysis, ethical, legal, social and cultural issues (ELSI), research administration and management, Research training. This strategy will build on global partnerships with UK institutions including The Wellcome Trust Sanger institute, University of Oxford, London School of Hygiene and Tropical Medicine. It has also established and will actively ensure south-south collaborations with institutions in Africa.

Tanzania has a unique and unprecedented opportunity to use genomics to develop STI for health and societal benefit. The Human Heredity and Health in Africa (H3Africa) (http://h3africa.org/) is a research initiative (Wellcome Trust and NIH). It aims to support genetic studies in Africa. The vision of H3Africa is to create and support a network of centers in Africa that will be equipped to apply leading-edge research integrated into genetic studies, which cut across all areas of biomedical science. This is a research initiative and in order for it to have significant impact need to have complementary initiatives that are innovative and bold in the area of health and education.

Objectives

The overall objective is to develop excellence in biomedical science, technology and innovation in Tanzania. Specifically, the objectives will be to: 1) To develop centres of excellence in high-quality research programmes in Biomedical STI. 2) To encourage the development of excellence in education and training in Biomedical STI. 3) To ensure the integration and translation of Biomedical STI into high-quality healthcare.

Strategies and Activities

1. Develop a CoE in Biomedical STI in Tanzania that will consolidate and coordinate existing research programmes in research universities and institutions. The initial focus will be in genomics but this will have a multidisciplinary approach from basic science, laboratory research to public health interventional research.

[50] www.newsweek.com/id/82041

[51] http://royalsociety.org/news/Tanzanian-scientist-Pfizer-Award/

2. Develop excellence in education and training in Biomedical STI through:

- Core funding to research universities and institutions.
- Funding institutional links that strengthen biomedical education and research.
- Promoting excellence in graduate and research programmes. The Royal College of Pathologists (RCPath) submitted an application to DFID to fund strengthening of training in Pathological sciences in East, Central and Southern Africa (applicant K Fleming).

3. Facilitate the integration of research into high-quality healthcare. Health programmes and facilities need to be supported to actively engage in research (both generating, participating and translation of research)

Partner-Organizations/Institutes

Science and Technology; Health; Education.

Resources

This will require bold, innovative steps as substantial resources will be required. The Francis Crick Institute will receive around £650 million to establish the Institute and to ensure that it is resourced to make a major impact. When it is fully operational, The Francis Crick Institute will employ 1,500 staff, including 1,250 scientists, and have an operating budget of over £100 million. In order to do this in Tanzania, it is proposed to start in one area such as genomics to demonstrate that this is possible, before developing a multi-disciplinary institute. The first step requires utilisation of existing resources (Science, Health and Education) in a cohesive and coordinated manner. Secondly, as substantial and long-term funding is required there is a need for funding partnerships that include public (government and development partners) and private institutions (industry and philanthropy) to invest in this initiative.

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