



Department
for International
Development



DFID Research Review



October 2016

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1. Foreword from the Secretary of State



From new drugs and vaccines, to forecasting and responding to disaster, to virtual classrooms - the latest advances in science and technology are saving and transforming lives around the world.

The UK, as one of the world's research super-powers, is helping to drive significant breakthroughs in areas such as medicine, agriculture and nutrition.

Thanks to UK aid funded research:

- **more than 300 million infants** have been treated with an anti-malarial medicine developed specially for children
- **more than 4.1 million people** in Africa are being protected from malnutrition and disease with nutrient-enriched beans, maize, and orange fleshed sweet potato
- **more than 20 million farmers** in Asia now grow 'scuba rice', which has been specially developed to withstand flooding

The UK is respected around the world for the quality and impact of our work, as well as the breadth and depth of our programmes. Our research into the prevention of diarrhoea, a major cause of death in infants in the poorest countries, has resulted in an effective new vaccine for Rotavirus. We are improving access to water through a major project to map the hidden sea of groundwater across Africa for the first time. Our tax research with the Ugandan Revenue Authority led to a new unit to tackle tax avoidance in Uganda, which collected an additional £2.5 million in its first few months.

In today's world, I'm clear that the UK's investment in cutting edge research and new technology to tackle the toughest global challenges is more important than ever.

The world is facing profound challenges from protracted conflict and mass displacement, to a rapidly changing climate, to the rise in drug resistant infections. We will only meet these challenges by working together, across continents and across sectors, on bold, innovative solutions that harness the best of human ingenuity. The UK, as a global and outward looking nation, will be at the forefront of this.

As Secretary of State for International Development I am determined to put top-quality research and evidence at the heart of UK aid.

This review, developed in consultation with the UK's scientific community, sets out how DFID will invest an average of £390 million per year over the next 4 years. We will ruthlessly target our investment at high-quality, high-impact projects and partnerships that will help to address the great global challenges of the 21st century.

The UK is a global leader in scientific, research and technical expertise and DFID will work closely with the best of British industry, our universities and other Government departments to maximise the impact of UK aid funded research.



Children enjoy vitamin enriched orange fleshed sweet potato. UK funded research has developed and disseminated fortified crops that protect against malnutrition and disease. Photo: HarvestPlus

DFID will develop rigorous evidence on areas that have previously been neglected such as how to tackle human trafficking and child exploitation. We will identify, and invest in, the technology of the future and test how it can be used most effectively for the poorest and most vulnerable; such as using digital technology to improve education for millions of children. To ensure DFID gets the most out of every pound we spend, we will thoroughly evaluate which development interventions are having the most impact in the poorest places. And we will use this new evidence base to drive reform and incentivise improvement across the global aid system.

In the coming years, I believe our world-leading investment in science, technology and innovation will make UK aid even faster, better value and more effective. This will help us to reduce poverty and alleviate suffering and deliver a safer, more secure world for Britain too.

A handwritten signature in black ink that reads "Priti Patel". The signature is stylized and cursive.

Rt Hon Priti Patel MP
Secretary of State for International Development

2. Summary

- **The UK's scientific, research and technical expertise is one of our greatest strengths.** As countries develop and leave aid dependency behind they will increasingly turn to the UK, not for financial resources, but for its intellectual leadership and scientific expertise.
- **Science and technology can transform development challenges into opportunities.** UK aid funded research has saved and changed the lives of millions of people across the developing world. From drought-tolerant maize, to speeding up tuberculosis diagnosis, to affordable energy paid for through mobile phones, DFID supports high quality, high impact research that transforms lives.
- **As a global leader in scientific, research and technical expertise, the UK is well placed to lead future advances.** By investing in advances in science and technology we will play a central role in responding to the major challenges of our times: population growth, climate change, rapid urbanisation and migration. UK aid-funded research is critical for global development and it contributes to the stability, security and prosperity of the UK.
- **The Research Review carried out a rigorous analysis of the opportunities to maximise the impact of development research investments.** Working with a wide range of internal and external experts, it considered the level of investment and priorities for DFID research during the next 4 years.
- **UK aid is increasing investment in science and technology today to build a more secure and prosperous world for future generations.** We will continue to invest around 3% of DFID's budget on research. We will also invest an additional £357 million during the Spending Review period to fund research on infectious diseases through the Ross Fund Portfolio which has been established to develop, test and deliver a range of new products to help combat serious diseases in developing countries. This amounts to an average of £390 million per year over the next 4 years.
- **DFID's strong comparative advantage lies in its ability to fund high quality research that responds to practical development challenges, and meets the needs of DFID and other development actors.** Crucially, DFID's research focuses on generating evidence on how to address the toughest challenges in the hardest places.
- **DFID research fosters world-leading innovation.** We will work with broad coalitions of partners from developing countries, academia, the private sector and civil society to generate transformational technologies and rigorous new evidence about what works and what does not in order to drive even greater impact and value for money from every pound we spend.
- **DFID will build strong strategic partnerships in priority research areas.** In particular DFID will work closely with the Wellcome Trust, other foundations, the Department for Business, Energy, and Industrial Strategy, the Department of Health, the Department for Environment, Food and Rural Affairs and the UK Research Councils to ensure that all UK government development research investments are well coordinated and focused on maximising impact.

3. Aim and purpose

The UK's scientific, research and technical expertise is one of our greatest strengths. As countries develop and leave aid dependency behind they will increasingly turn to the UK, not for financial resources, but for its intellectual leadership and scientific expertise.

UK universities and industry are already global leaders in many fields from public health to economics and from agriculture to tackling conflict. The UK government's commitment to use science to inform its policies is respected around the world. This country has the most productive research base among the G7 and other leading research nations. With just 3% of global expenditure on research and development and less than 1% of the world's population, the UK produces over 16% of the most influential global journal articles¹.

The UK has the most productive research base among the G7 and other leading research nations

Science and technology can transform development challenges into opportunities, saving lives and accelerating wealth creation. The UK has been at the forefront of international partnerships for tackling global challenges. This includes eliminating the once dreaded rinderpest livestock disease and developing a new drug for sleeping sickness, a disease that causes over US\$4 billion in livestock losses each year in Africa.

The next wave of scientific discoveries and innovative technologies will underpin progress towards eradicating extreme poverty and achieving the sustainable development goals. Advances in science and technology will play a central role in responding to the critical challenges of our times: population growth, climate change, rapid urbanisation, protracted humanitarian crises and migration. UK aid funded research is critical for global development and it contributes to the stability, security and prosperity of the UK.

During the last Parliament, DFID committed to invest 3% of its budget in research. In order to maximise the impact of development research, the Research Review considered what level of investment should be sustained and sets priorities for DFID's research investments during the next 4 years.

DFID will continue to invest around 3% of its budget on research. We will also invest an additional £357 million during the Spending Review period to fund research on infectious diseases through the Ross Fund Portfolio which has been established to develop, test and deliver a range of new products to help combat serious diseases in developing countries. This amounts to an average of £390 million per year over the next 4 years.

¹ International comparative performance of the UK research base 2013: a report prepared by Elsevier for the UK's Department of Business, Innovation and Skills (BIS). 2013. www.gov.uk/government/uploads/system/uploads/attachment_data/file/263729/bis-13-1297-international-comparative-performance-of-the-UK-research-base-2013.pdf.

HIGH IMPACT DFID RESEARCH

Controlling global disease outbreaks, improving health for the poorest



Responding to Ebola: Britain's response to the deadly Ebola outbreak was shaped by DFID's rapid commissioning of scientific research. DFID, leading the international response in Sierra Leone, employed mathematical modelling to map disease trajectories and identify new hotspots; helping to control the outbreak. We worked with the University of Oxford, the University of Westminster, pharmaceutical companies and others on development and trialling of new vaccines and rapid diagnostic tests.



Testing for tuberculosis: DFID-funded research has developed revolutionary tests for the detection of tuberculosis and sleeping sickness. GeneXpert gives fast and accurate results for tuberculosis that avoid lengthy delays between testing and diagnosis. It is now used in the UK to diagnose drug-resistant tuberculosis and 69% of countries recommend it as an initial diagnostic test.



Ensuring clean water supplies: Worldwide, 780 million people live without basic and reliable water supplies. Many rely on hand pumps for their water supply but at any one time a third of pumps are not working. DFID-funded researchers at Oxford University have developed a smart-pump which uses the mobile phone network to call for maintenance when the pump breaks down. Trials in Kenya saw the average down-time after a malfunction drop from 37 to 2 days.

4. Process

DFID conducted consultations across its country offices and policy teams, the UK government science community, and DFID's independent Research Advisory Group to map opportunities and set priorities for future research. This consultation identified 80 practical opportunities to use research to accelerate development.

DFID research teams subjected each of these opportunities to thorough scrutiny to determine the likely impact of research investment by DFID, whether the research was likely to take place without DFID funding and whether there was potential to share risk through partnerships. Each opportunity was also scrutinised for whether research would offer good value for money in helping identify solutions. External experts, including DFID's independent Research Advisory Group, peer reviewed each proposal to help further strengthen the analysis. This process was used to formulate priorities for DFID research, responding to the UK Aid Strategy ('UK aid: tackling global challenges in the national interest'), and the emerging conclusions from the Bilateral Aid Review and the Multilateral Aid Review.

HIGH IMPACT DFID RESEARCH

Creating new opportunities

Transforming access to energy: DFID's innovative research partnership with M-KOPA Solar kick-started a transformative new market for solar lighting and energy in East Africa using mobile phone technology; connecting over 2 million people to affordable solar power so far. The private company that grew out of this partnership recently secured US\$19 million investment in a financing round led by a London-based group of investors.

Improving agricultural productivity: We invest in research to improve crop yields on a global scale and spur economic growth in developing countries. For example, by 2014 almost half of all wheat planted in developing countries had benefited from DFID-funded research to produce higher yielding wheat varieties that are also more resistant to climate stress, pests and disease. This generated additional economic benefits of US\$2.2 to \$3.1 billion per year.

Getting goods to market: DFID-funded research has developed more cost-effective rural road designs and put them into use. Across Sub-Saharan Africa roads act as lifelines for communities and trade. In Ethiopia research has improved the construction of a 70,000 kilometre low volume road network and will inform a further US\$25 billion planned investment over the next 5 years, helping farmers get their products to market and children to get to school.



A low volume road in Hintalo, Ethiopia, links farmers to markets and can be used by transport services as well as by a donkey. Photo: Paul Starkey

5. Review findings

Research will play a critical role in tackling the development challenges of the 21st century. New technologies and rigorous evidence about what works can improve the lives of the poorest and create new opportunities for wealth creation. But we urgently need to develop new solutions for addressing increasingly complex and interconnected global challenges.

High quality research drives better development outcomes from better health systems to more productive agriculture. DFID's world leading research delivers a high return on investment – an expected annual internal rate of return of at least 10% across the research portfolio. Research helps us to drive value for money by improving our understanding of which interventions are most likely to work. In areas such as tackling childhood diseases and malaria – where there is a long history of research evidence and where the UK has led the way – new technologies and rigorous evidence have saved lives and prevented suffering. There are other important areas, including humanitarian resilience and response, education, and migration, where strengthening the global evidence base is an urgent priority.

DFID's strong comparative advantage lies in its ability to fund high quality research that responds to practical development challenges, and meets the needs of DFID and other development actors. Building on its extensive country presence, DFID should continue to prioritise high quality, operationally-relevant research. Crucially, DFID's research should focus on generating evidence on how to address the toughest challenges in the hardest places.

DFID research fosters world-leading innovation and new technologies. Experience has shown how broad coalitions of developing country partners, academic partners, the private sector and civil society can generate exciting and transformational new technologies, including the use of mobile phone networks to bring affordable solar lighting into millions of African homes. DFID should continue to support partnership and innovation.

DFID can drive value for money through its research investment using 5 core questions to test all proposed research investments:

- **impact:** does the research focus on an important and practical development challenge?
- **additionality:** does DFID support address an important gap in research funding?
- **quality:** will the commissioned research be of the highest quality?
- **deliverability:** will the research deliver benefits within a realistic timeframe?
- **cost:** has every possible step been taken to control costs?

Championing accountability and transparency

Enhancing tax collection: DFID-funded tax research helped the Rwandan Revenue Authority to raise an additional £7 million in tax in a few months by using more effective communications to encourage tax payers to improve communications. The research showed that in Rwanda, highlighting how tax is used for key public services is more effective than threatening penalties to increase tax compliance. Increasing tax collection moves Rwanda towards being able to stand on its own two feet.



A poster in Sierra Leone encouraging tax compliance. DFID research is helping to improve tax collection and revenues in countries such as Sierra Leone, Rwanda and Uganda. Photo: IDS

A study in Uganda on taxing high net worth individuals helped deliver an extra £2.4 million pounds of revenue in the first 4 months.

Improving accountability: In Sierra Leone, DFID-funded research showed that public debates between parliamentary candidates improve voter knowledge and choice; and that MPs who had been involved in debates went on to spend more time and money in their constituencies and were more likely to be rated as “doing a good job”. This has prompted more debates to help strengthen accountability.

Driving transparency: A DFID-funded evaluation in Kenya tested a Daily Court Returns Template feeding into a monthly report on how each court is doing. This increased transparency is helping to address weaknesses in Kenya’s Judiciary, which experiences low levels of public trust, weak management and deficient infrastructure. The new template has been made a requirement and now 82% of all courts in Kenya report with it.

6. Vision for DFID research

DFID will support the production and use of high quality evidence, data and innovation to accelerate progress towards the eradication of extreme poverty and the achievement of the Global Goals.

DFID will continue to invest around 3% of its budget on research and an additional £357 million allocated during the Spending Review period to fund research on infectious diseases through the Ross Fund Portfolio.

The total research funds of an average of £390 million per year over the next 4 years will save lives, create new opportunities for strong UK research leadership and help support global research partnerships between the UK and the developing world.

DFID's research investments will form part of a concerted cross-government effort to accelerate progress on development through science and technology, including through the Department for Business, Energy and Industrial Strategy's new Global Challenges Research Fund and the Department of Health's component of the Ross Fund. DFID will work closely with other parts of UK government to ensure coherence, generate synergies, and optimise the overall impact of the UK's research spend on international development.

DFID will increase its investment in research in technologies, including an increased focus on learning how to ensure that these technologies achieve maximum benefit to the poor. DFID has a track record of funding the development and delivery of life saving drugs and vaccines, more productive and nutritious crops and life changing technologies. New research will extend this portfolio further, ensuring that effective technologies can be accessed and used by those who most need them the most.

DFID's research will also focus on ensuring that it produces research knowledge and evidence that can directly inform programming and policy across DFID and the wider development community. DFID's high quality research is focused on determining what works to tackle the most critical development problems such as helping more children to get a decent education as a foundation for economic development. Research will ultimately be judged on its real world impact rather than purely on its academic merits.

DFID will continue to invest in robust evaluations to learn from our own programming and operational research. DFID will continue to support and invest in evidence syntheses and systematic reviews and other forms of analysis to provide rigorous evidence to support programme decisions. The needs of the poorest and most vulnerable will be at the heart of the research that is commissioned, and the specific needs of girls and women will be considered in all of our research.

DFID will work to strengthen the linkages between DFID's research portfolio and its development programming. We will ensure that evidence is being put into use across all Departmental programmes to drive value for money.

DFID will build strong strategic partnerships in priority research areas. DFID recently agreed a new Collaborative Framework with the Bill and Melinda Gates Foundation, and will work closely with the Wellcome Trust, other foundations, UK government departments and

the UK research councils, to help ensure that development research investments are complementary and coherent, and focused on achieving the greatest development impact.

DFID will continue to work with the EU and leading EU donors whilst the future of UK funding through EU instruments is determined as part of the wider UK negotiations on leaving the EU. DFID will contribute to the **UK's outward looking research culture and support global collaborations**. We will work with partner countries to help them build the systems they need, to generate and use knowledge as a foundation for leaving aid dependency behind.

Priority themes

The research portfolio will respond to the objectives set out in the UK Aid Strategy: strengthening global peace, security and governance; strengthening resilience and response to crises; promoting global prosperity; tackling extreme poverty and helping the world's most vulnerable and delivering value for money.



To support DFID's growing focus on fragile and conflict affected states and regions, and the golden thread of development, DFID **will invest in research to address critical evidence gaps, including security and justice, migration, taxation and accountability, and tackling political constraints to growth, peace, and development. New research will include work on how to tackle cross border drivers of conflict and suffering such as serious organised crime, human trafficking and child exploitation.** DFID will initiate new multi-disciplinary research on how to support transformational development in African cities. DFID will significantly increase support for research and innovation in humanitarian settings, including stronger focus on building resilience, addressing protracted crises, reducing vulnerability to shocks, and delivering education in emergencies.



A significant scale up in health through the Ross Fund Portfolio to deliver on the government's commitment to lead a major new global programme to accelerate the development of vaccines and drugs to eliminate the world's deadliest infectious diseases. New research will also provide evidence on how to build stronger and more resilient health systems as the basis for efforts to reach the most vulnerable and respond to health crises, and how to strengthen sexual, reproductive, and maternal health programmes for women and adolescents.



A significant research investment on climate, energy and water, including how to deliver and put into use innovations in access to water and climate science, build resilience and integrate weather disaster risk reduction into development approaches, and scale up access to clean energy.



A continuation of large-scale research investment into sustainable agriculture, to improve nutrition and food security and increase resilience to climate change in developing countries. New research will include evidence on how commercialisation and food systems could be more effective in assisting the poorest people, particularly women. Speeding up the development and use of more productive and resilient crops and agricultural technologies, and understanding how new technologies can be put into use in a cost effective way will improve food security and generate prosperity for poor farmers. This is critical for accelerating economic growth, particularly in Africa.



Research to help better understand what works best to build the foundations for economic development – including how to accelerate development through trade, support innovation and private sector growth, support the critical transition of youth into employment, and address constraints to the economic and social empowerment of women. This will include a significant increase in our investment in education research, including a major initiative to use digital technology to transform learning outcomes.

Conclusion

UK aid funded research has transformed and changed the lives of millions of people across the developing world. From drought-tolerant maize, to speeding up tuberculosis diagnosis, to affordable energy paid for through mobile phones, DFID supports high quality, high impact research that transforms lives.

As a global leader in scientific, research and technical expertise, the UK is well placed to lead future advances that will transform development challenges into opportunities. By investing in science and technology today we can build a more secure and prosperous world for future generations.

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Cover image: Affordable solar lights in Athi River, Kenya are allowing children to do homework after dark, DFID 's research, in partnership with private sector innovators like M-KOPA and others, is helping to bring affordable solar lighting to millions of people across Africa. © M-KOPA/Allan Gichigi.

Images on page 6:

- IRC triage nurse at health facility in Bo, Sierra Leone © IRC
- GeneXpert sample processing © FIND
- A 'Fundifix' smart handpump in operation in Kenya © Rob Hope/REACH

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