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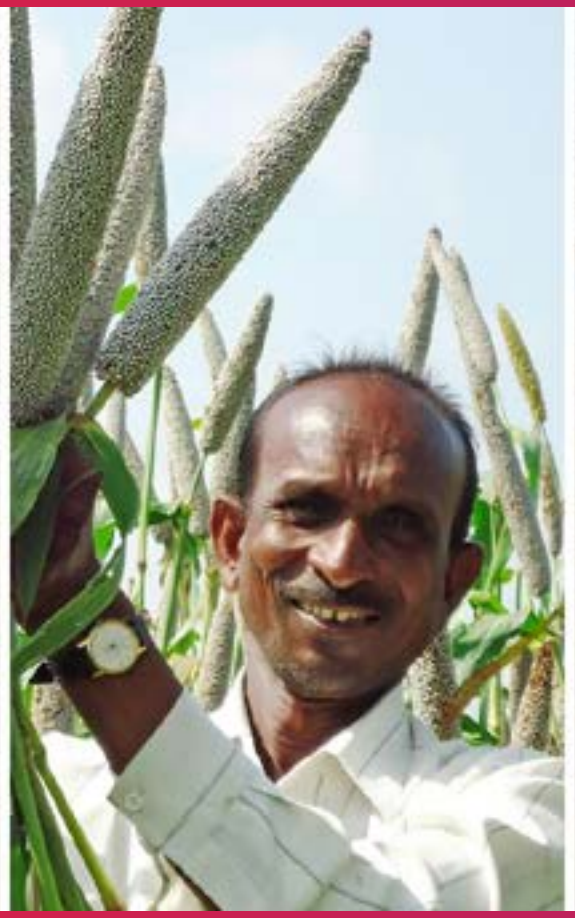

The Global Impact of UK Research

Impact Success Stories

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The global impact of UK research

Introduction

The UK has consistently met Sustainable Development Goal (SDG) Target 17.2 of providing 0.7% of Gross National Income as official development assistance (ODA), and since 2015 this target has been enshrined in law.

The UK also leads the way among donors in spending on research and development – this made up about 10% of UK ODA between 1997 and 2010. The UK Collaborative on Development Research (UKCDR) has now produced a series of success stories to highlight the contribution of UK research to meeting the SDGs.

UK research has had a global impact, be it in terms of direct human development or influence on policy geared towards meeting the SDGs across the spectrum of international development. The success stories presented are a representative, though not exhaustive, showcase of the UK's engagement with the world through research. In this regard, innovations and breakthroughs in the natural and social sciences are as vital as the UK's demonstrated political will in setting the global agenda for sustainable development.

Partnerships for funds, research and implementation

As the SDGs make clear – explicitly in Goal 17 on a global partnership for sustainable development – governments must work together to provide support for agreed-on goals. The research landscape, too, is now characterised by international consortia of funders, institutions and individual researchers capable of responding in a dynamic fashion to events on the ground. The response to Ebola, including the simultaneous development and trials of vaccines in multiple countries, is emblematic of this collaborative approach.

The success stories demonstrate that the UK Government has played a leading role in advocating for action on individual SDGs, and providing significant support for research, either as core funding to multilateral organisations or focused funding to institutions and programmes. This can be seen, for example, in its support for the many research initiatives that underpin the work of the Intergovernmental Panel on Climate Change (IPCC): that there is a broad scientific consensus on the human causes of climate change and the political will to address the problem owes much to the IPCC.

But the UK's contribution is also demonstrated by its willingness to support the private sector to deliver agile, customer-orientated interventions to boost economic growth, such as its seed funding for the highly successful mobile banking application M-Pesa. The UK government has also provided support for targeted research that has led to collaborations between research institutions and tax revenue authorities in the developing world to improve domestic revenue mobilisation, with significant impact across multiple countries and ongoing input into more equitable tax regimes globally.

Combining the natural and social sciences to reach those in need

UK-based and UK-funded biomedical research has played a key role in the global response to HIV and malaria over the last few decades, as well as the West African Ebola crisis of 2014–16 and the ongoing outbreak in the Democratic Republic of the Congo. Breakthroughs in vaccine development and treatment have saved millions of lives. But in incorporating the anthropological insights of fora such as the Ebola Response Anthropological Platform, and developing preventative strategies for HIV and malaria grounded in the needs of vulnerable communities, UK research has deployed 'social science intelligence' to ensure that scientific breakthroughs benefit targeted communities.

Similarly, the UK has contributed massively to SDG 2 to eliminate hunger through research to improve crop yield and resilience, and improve existing livestock vaccines and develop new ones. The achievements of the Human Genome Project, completed in 2003 with key UK contributions, have lent crop genomics new impetus. Here, too, the focus of organisations such as the Global Alliance for Livestock Veterinary Medicines (GALVmed) on neglected livestock diseases impacting smallholders has been crucial in ensuring that medical advances are accessible and affordable for those for whom livestock is a lifeline.

Shifting the discourse to influence policy

UK-supported research has influenced public and policy discourse in several areas, transforming global approaches to addressing problems such as climate change and chronic poverty. How we understand and measure poverty determines our response to it, and UK-based research has been key in shifting the paradigm from framing poverty in terms of income to one that recognises the multidimensional experience of being poor. UK research institutions have also led the way in identifying gender as a cross-cutting issue, and their work on measuring and preventing gender-based violence has been taken up internationally. Finally, in a world increasingly characterised by urban living, the UK's role in advancing a 'New Urban Agenda' cannot be overstated. Such an approach to urban governance has alerted local authorities across the world to the possibilities of a safer, more resilient and participatory urban future.

Reaching across disciplines for new solutions

The 11 success stories provide an overview of UK research's contribution to improving the lives of people globally.

They will help stakeholders assess the value of research funding and provide guidance for future research. Overall, they underscore the value of a multidisciplinary approach aligned with the holistic ethos of the SDGs – the acceptance of which is evident in the launch of several major multidisciplinary research funds in recent years, notably the five-year, £1.5 billion Global Challenges Research Fund.

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Building the Case for Climate Change Action

PROJECT PARTNERS

Funders: Natural Environment Research Council (NERC), Department for Business, Energy & Industrial Strategy (BEIS), UK Met Office, Department for International Development (DFID)

Collaborating research institutions: Tyndall Centre for Climate Change Research, UK Forest Research, British Antarctic Survey, the Met Office Hadley Centre, the University of Bristol and the University of Leeds, University of Exeter, UK's National Oceanography Centre, the British Antarctic Survey (BAS), Queen Mary University, the University of Liverpool, the University of Oxford and the University of Southampton

Find out more

The climate science behind the Intergovernmental Panel on Climate Change (IPCC) reports has shaped the global discourse on climate and provided the basis for international action.

The recent United Nations Intergovernmental Panel on Climate Change (IPCC) special report states that an increase in global temperatures of more than 1.5°C above pre-industrial levels will increase the risk of extreme weather events, sea-level rise, biodiversity loss and land degradation. Sustainable Development Goal (SDG) 13 calls for urgent action to combat climate change and its impacts.

Enabling the IPCC

According to the United Nations Convention on Climate Change (UNFCCC), the IPCC's assessment reports are the most credible source of information on climate change and the baseline for making evidence-based decisions in international negotiations. They have provided the scientific consensus needed to convince governments to ratify landmark agreements, such as the Kyoto Protocol, the Marrakesh Accords, and the Paris Agreement.

Underpinning all international climate change strategies is climate science, to which the UK has made a crucial contribution. UK-driven climate research in the areas of climate modelling, sea-level projects, extreme weather forecasts, and greenhouse gas emission estimates has formed the bedrock of IPCC reports.

Influencing global climate policy

A number of UK research programmes have fed into IPCC assessments

- **Quantifying and Understanding the Earth System (QUEST) Programme (2006-10)**, funded by NERC, enhanced understanding of the Earth as an integrated system and improved climate change predictions, which proved critical in securing an EU position at the Cancun Conference in 2010.
- **Understanding the Pathways to and Impact of a 1.5°C Rise in Global Temperatures (2016-18),** co-funded by NERIC and BEIS, identified the climate research and evidence needed to inform global policy following the Paris Agreement.

UK funding has supported research to assist climate adaptation and resilience in Africa and Asia.

- **The Future Climate for Africa (FCFA) Programme (2015-19),** co-funded by NERC and DFID, aimed to provide more reliable information about climate processes and extremes in order to help policymakers understand climate change impacts and build climate-resilient development.

Driving national adaptation plans

IPCC research has also informed the guidelines for national adaptation plans (NAPs), designed to help countries conduct adaptation planning and integrate climate change into national decision making.

Low and middle-income countries (LMICs) are more vulnerable to an increased frequency of extreme weather events caused by climate change.

Through International Climate Finance (ICF) programmes, the UK has supported more than 57 million people to cope with the impacts of climate change and helped reduce or avoid greenhouse gas emissions totally 16 million tonnes.

Reaching a consensus on a zero-emissions future

The impact of climate research can be seen at the highest levels of government. In May 2019, the UK announced a climate change emergency and became the first G7 nation to legislate reducing greenhouse gas emissions to net zero by 2050.

In September 2019, the UK Government announced the Ayrton Fund (DFID/BEIS), which will provide up to £1 billion of aid funding for British scientists and global innovators to develop and test new technologies targeted at tackling climate change in LMICs.

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Growing for growth: improving crops to meet demand for food

PROJECT PARTNERS

Funders: Biotechnology and Biological Science Research Council (BBSRC), Department for International Development (DFID)

Collaborating research institutions: Bangor University, Earlham Institute, HarvestPlus, Institute of Biological, Environmental and Rural Science (IBERS) at Aberystwyth University, International Center for Tropical Agriculture (CIAT), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), International Maize and Wheat Improvement Center (CIMMYT), International Rice Research Institute, John Innes Centre, Quadram Institute Bioscience, Rothamsted Research Institute, Rwanda Agriculture Board (RAB), University of Oxford

Find out more

Cutting-edge research to improve the resilience, yield and nutritional value of crops is key to feeding a growing global population.

By 2050, the world's population will reach an estimated 9.7 billion people. To meet demand, food production will need to increase by 70%. Achieving increased productivity requires crops that are more resilient to environmental conditions.

The UK supports crop improvement through several pathways:

- In 2016/17, BBSRC invested **£71.2 million in crop science research**
- Since 2011, DFID has contributed **US$631.1 million to CGAIR** - the global partnership uniting organisations engaged in food security research
- DFID is the largest donor to **HarvestPlus,** which supports the development of biofortified crops

Better yields through pest and disease-resistant crops

Globally, 30% of crop yield is lost to insect pests, plant pathogens, and weeds. Improving crops to make them more disease-resistant helps to increase yields.

- **Pearl millet:** Downy mildew is the most destructive pearl millet disease. The pearl millet variety HHB67-Improved, developed through DFID funding, is resistant to it. It was released throughout India in 2005, and by 2011 losses from downy mildew had decreased by 30% (valued at £7.8 million), improving food security for approx. 3 million people per year.

Better yields through more climate-resilient crops

Drought has the greatest detrimental effect on crops worldwide.

- **Wheat:** BBSRC-funded research is looking to improve the resilience, recovery and productivity of wheat under drought conditions. They're researching the modification of a single gene that could enhance drought tolerance.
- **Rice:** The CGIAR International Rice Research Institute has had major success developing new rice varieties to support 35 million farmers across Asia and Africa and the 3.5 billion people who rely on rice as their staple crop.

More nutritious food through biofortified crops

Nutrient deficiency affects 2 billion people worldwide. Crops can be biofortified to provide these vital micronutrients.

- **Sweet potato:** HarvestPlus uses traditional plant breeding techniques to biofortify crops. In 2007-2009, it disseminated vitamin A-fortified sweet potato in Mozambique and Uganda, resulting in at least a doubling of vitamin A intake for children and women.
- In 2019, DFID announced £33 million funding for HarverstPlus and partners to develop new, biofortified varieties of eight staple food crops.

Advancing research through genome sequencing

Genetic and transgenic improvement of wheat and other crops are high priorities both in the UK and globally. Sequencing the genomes of crop species provides a foundation for the work, and UK researchers have been involved in sequencing the genomes of banana, barley, pearl millet, potato, rice, soybean, wheat, and yam.

Speed breeding improved crops

The current rate at which important crop species can be improved is too slow to meet future demand for food. In 2018, researchers in the UK and Australia developed a 'speed breeding' method for crop improvement. Plants are grown in a chamber with controlled lighting and temperature to optimise photosynthesis and promote rapid growth. Most generations of crops species can be grown in a year, meaning genetic improvements can be fast-tracked.

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Containing the West African Ebola outbreak

PROJECT PARTNERS

Funders: Department for International Development (DFID), Public Health England (PHE), Wellcome, Elhra

Collaborating research institutions: The Institute for Development Studies (IDS), London School of Hygiene and Tropical Medicine (LSHTM), University of Sussex, Njala University

Find out more

The 2014–2016 West African Ebola crisis was contained by combining biomedical interventions with social science intelligence, an approach that may hold the key to managing the current COVID-19 pandemic and future outbreaks.

The West African Ebola outbreak was the largest in history, 28,616 infections and 11,310 deaths in Guinea, Liberia and Sierra Leone between 2014-2016. Declared a public health emergency of international concern (PHEIC) by WHO in August 2014, it triggered a coordinated international response. There was real concern that Ebola would spiral out of control. Yet, by March 2016, the crisis was declared to over.

International coordination was crucial in turning it around, in which the UK had a leading role.

UK-based and funded research:

- Established laboratory protocols for diagnosing and treating Ebola victims
- Strengthened healthcare systems of affected countries
- Set up innovative Ebola Response Anthropology Platform (ERAP), applying social science insights to help implement containment measures
- Accelerated efforts to develop and test vaccines.

The UK's contribution comprised a valuable partnership between the natural and social sciences, lessons of which can be applied to the COVID-19 pandemic today.

Understanding and containing the Ebola virus

The UK has a long history of outbreak response, applied by sending researchers to European Mobile Labs (EMLabs), Guinea and Liberia, and the Public Health England (PHE) lab, Sierra Leone. Diagnostic research led to the publication of revised patient management guidelines.

In 2014, Wellcome and DFID launched a £6.5 million emergency humanitarian research fund, investigating approaches to combating Ebola; awarding eight Research for Health in Humanitarian Crises (R2HC) grants.

The Ebola Response Anthropology Platform (ERAP)

Ebola spread far and quickly not only because of contagiousness, but also because of social conditions. Conflict, poverty and weak health systems undermined trust between communities and government.

ERAP - R2HC grant, IDS partnership with anthropologists at LSHTM and in Sierra Leone - aimed to support and rapidly publish socio-cultural research on Ebola. Deploying 'social science intelligence' to compromise between traditional practices for patient care and management of dead, as well as a biomedical focus on reducing new cases. Briefings to the Scientific Advisory Group for Emergencies (SAGE) directly influenced the UK Government's response in Sierra Leone and was widely acknowledged to significantly impact humanitarian intervention successes.

Fast-tracking a vaccine

Ebola vaccines were under development long before 2014 – Porton Down facility (now run by PHE) undertook Ebola virus studies since 1977. However, efforts were redoubled by UK and US pharmaceutical companies during the outbreak. Affected countries and WHO authorised administration of experimental vaccines due to the urgency of the situation. Merck's rVSV-ZEBOV vaccine (in the US, with UK-funded support) and Gavi's cAd3-EBOZ vaccine (in the UK) undertook trials. Gavi's Vaccine Alliance (substantial UK funding) committed US$300 million for vaccine procurement.

Combating the current Eastern Congo crisis

Following this outbreak, DFID boosted its early-warning system. The UK set up a £188 million fund to fight diseases with epidemic potential. The international community was better prepared when the Ebola outbreak in the Democratic Republic of the Congo (DRC) was declared a PHEIC in July 2019, with six diagnostic tools; a global network of medical professionals; and the safe and effective Merck vaccine – over 111,000 vaccinated by May 2018.

Social science intelligence is now embedded with the IDS-hosted Social Science in Humanitarian Action Platform (SSHAP) providing briefings and remote support to operational agencies.

The UK Government has advocated a holistic approach and is committed to "stay the course ... until Ebola is defeated".

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Tackling HIV/ AIDS in Sub-Saharan Africa

PROJECT PARTNERS

Funders: Department for International Development (DFID), Economic and Social Research Council (ESRC), Medical Research Council (MRC), The Wellcome Trust, Unitaid

Collaborating research institutions: Imperial College London, London School of Hygiene and Tropical Medicine (LSHTM), University College London, University of Oxford

Find out more

Preventing infections, improving public health services, and testing new treatments have been critical to slowing the HIV/AIDS pandemic.

According to the World Health Organisation (WHO) 37.9 million people were living with HIV in 2018. Africa is the most affected region, accounting for almost two-thirds of new HIV infections.

UK research has taken an integrated approach to tackling HIV/ AIDS epidemics in Low- and Middle-Income Countries (LMICs).

Supporting the global effort to achieve zero infections

UK research focused on prevention strategies has included:

- **'Cash plus care' (2009-2012)**: (co-funded by ESRC) Explored if increasing adolescent access to social welfare grants and free schooling could be an effective HIV prevention strategy in sub-Saharan Africa. It showed these programmes helped reduce transactional sex by 50%, older sexual partners by 70%, and unprotected sex by 50%. **The approach has been adopted across 10 sub-Saharan Africa countries, potentially benefitting 2 million adolescent girls.**
- **Promoting circumcision for men (1997-2008):** This series of trials conducted by LSHTM, showed that male circumcision reduced the risk of HIV infection by 48-60%. Many at-risk countries in sub-Saharan Africa have since initiated circumcision programmes.

Improving the delivery of essential health services

UK research evaluating the effectiveness of healthcare provisions for people living with HIV/AIDS has informed the development of cost-effective and efficient public health systems.

- **Population Effectiveness of Antiretroviral Therapy to Reduce HIV Transmission (PopART) Initiative:** This trial (sponsored by NIH, led by researchers at LSHTM and Imperial College London) analysed the impact of the 'test and treat' approach, on HIV incidence in South Africa and Zambia. This combined: universal HIV counselling and testing at household level, linking HIV-infected people with care providers, and early-stage antiretroviral therapy (ART).

  The study found that HIV infections were 30% lower in communities enrolled in 'test and treat', compared to those receiving standard care.
- **The Pan African Harmonisation Working Party (PAHWP):** This initiative (facilitated by LSHTM) creates a framework for harmonising regulations related to medical devices and diagnostics in Africa. It is working to ensure a new generation of diagnostic tests are used at the point of care to help prevent the spread of HIV.

Identifying life-saving drug treatments

UK-funded (MRC, DFID, Wellcome) medical research trials have evaluated the effectiveness of antiretroviral drugs, drug combinations, and application strategies.

- **Development of Antiretroviral Therapy in Africa (DART) (2003-2008):** This trial (co-funded by MRC, DFID, and international funders) studied ways to manage ART in public health programmes in Africa and other resource-limited settings. The study showed that **ART can be delivered without expensive routine blood tests. This finding has enhanced access to treatment.**

Sustaining the charge against HIV

Between 2000-2018, new HIV infections fell by 37% and HIV-related deaths by 45%. However, there are worrying signs that prevention may be stalling. The WHO has attributed this to social and legal barriers that prevent people accessing HIV services.

Research initiatives such as 'Cash Plus Care' and PAHWP have identified prevention strategies and supported the development of robust, responsive, and accessible public health systems.

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Livestock vaccines: supporting the most vulnerable

PROJECT PARTNERS

Funders: Biotechnology and Biological Sciences Research Council (BBSRC), Department for Environment, Food and Rural Affairs (DEFRA), Department for International Development (DFID), The Wellcome Trust

Collaborating research institutions: Animal and Plant Health Agency (APHA), Carter Center, Global Alliance for Livestock Veterinary Medicines (GALVmed), Harbin Veterinary Research Institute, Indian Immunological Ltd, International Livestock Research Institute, MCI Santé Animale, Moredun Research Institute, Pirbright Institute, University of Melbourne

Find out more

Protecting livestock from disease will benefit not just animals, but also the health and wellbeing of the people who rely on them.

Up to 1.3 billion people worldwide rely on livestock for food and livelihoods. Many are smallholder farmers in Low- and middle-income countries (LMICs). Improving livestock health could improve the lives of millions of the world's poorest people. UK-funded research is developing vaccines for livestock diseases and working to make existing vaccines more robust and accessible to smallholder farmers.

Funding vaccine development

- The **Global Alliance for Livestock Veterinary Medicines (GALVmed)**, incorporated in 2005 with £2.6 million from DFID, channels much of the UK government' support for livestock vaccine development. GALVmed works to improve livestock keepers' access to affordable and effective medicines for their animals. GALVmed has brought 10 new livestock products to market. **Its work has reached 2.5 million households and averted livestock disease mortality to the value of US$167 million.**
- The **Pirbright Institute** conducts research into livestock diseases, and alongside £19.3 million awarded to the institute from BBSRC in 2017-18, Wellcome invested £3.1 million in Pirbright in 2019 to develop an affordable and effective vaccine to foot-and-mouth disease. The International Livestock Research Institute in Kenya also received support from Wellcome (2012-2015) to develop effective vaccines against Rift Valley fever.

Innovating to improve: Newcastle disease

Newcastle disease kills up to 100% of infected birds and is one of the greatest constraints on village poultry production. In India, effective control of Newcastle disease could save an estimated US$182 million each year.

UK-supported research has sought to make existing Newcastle disease vaccines more suitable for use where they are needed most. Existing vaccines are expensive, must be kept cool, and are only available in large quantities.

Research supported by GALVmed led to the development of two new technologies for vaccine delivery that are cheaper (<£0.02 per vaccination), can be kept at higher temperatures, and are suitable for use by smallholder farmers. By 2018, 170 million doses of Newcastle disease vaccine had been sold to an estimated 2.1 million households, mainly in South Asia.

Protecting people too: porcine cysticercosis

Research into livestock vaccines also benefits people by reducing the risk of disease transfer from animals to humans. Porcine cysticercosis (an infection of pigs caused by the tapeworm *Taenia solium*) is responsible for approx. 5 million human cases of neurocysticercosis (neurologic infection caused by the tapeworm) and 50,000 deaths annually.

GALVmed and partners licensed a vaccine and showed that by using it together with an oral de-wormer, cysticercosis in pigs can be eliminated, reducing its potential transmission to people.

Breaking new ground

African Swine Fever is a highly contagious and usually fatal viral disease of pigs. It is prevalent in many African countries and in the past decade has been spreading through Europe and Asia. There are currently no treatments or vaccine available. In June 2019, researchers at Pirbright announced that they are developing different types of vaccines. **The UK's Chief Veterinary Officer described the research as demonstrating the UK's world-leading role in vaccine development.**

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Reducing the threat of malaria

PROJECT PARTNERS

Funders: Medical Research Council (MRC), Wellcome, The Department for International Development (DFID)

Collaborating research institutions: Cochrane, London School of Hygiene and Tropical Medicine (LSHTM), Mahidol Oxford Tropical Medicine

Find out more

Efforts to control and eradicate malaria have focussed on strengthening public health systems, increasing access to critical health services, and delivering life-saving medicines and resources.

The World Health Organisation (WHO) estimated that in 2017 there were 219 million cases of malaria worldwide, the vast majority in Africa (92%), and approximately 435,000 deaths from malaria. Children under five were most vulnerable, accounting for 61% of deaths. However, the number of malaria cases has dropped in recent years – WHO estimates there were 20 million fewer malaria cases in 2017 than in 2010.

UK research provides leading contributions to malaria control and eradication efforts, through:

- **Prevention strategies** - encompass behaviour and infrastructure changes
- **Control strategies** - focus on gaining a better understanding of malaria epidemiology (its frequency, distribution, causes, and risks) to inform planning
- **Treatment strategies** - include improving methods to detect malaria parasites and evaluating the effectiveness of treatments.

Influencing behaviour and infrastructure changes

UK research has identified prevention strategies that can lower transmission rates in malaria-prone regions:

- **Hanging and re-treating insecticide-treated nets (ITNs):** Researchers at Cochrane analysed 23 trials in Africa, Asia and Latin America revealing that **ITNs reduce child mortality, saving between 3.5 – 5.6 lives per 1,000 children.**
- **Housing improvements and malaria risk:** A study led by the University of Oxford examined how housing in sub-Saharan Africa could be modified and improved to lower malaria infections. Housing with metal roofs and brick or concrete walls can reduce mosquito entry.

Improving control strategies

UK funding has supported several major control strategy initiatives:

- **Malaria Atlas Project (MAP):** This project (Wellcome and MRC funding) brings together a global network of researchers to assemble global databases and develop innovative methods to better understand the global landscape of malaria risk. MAP has informed global policy design and implementation, including the WHO World Malaria Report and Global Technical Strategy (2016-2030).
- **Tracking Resistance to Artemisinin (TRAC):** This initiative (funded by DFID and coordinated by MORU), mapped resistance to Artemisinin, the antimalarial, across Southeast Asia. TRAC insights will help enhance the efficacy of Artemisinin-based combination therapies in malaria-prone regions.

Improving the treatment of malaria

Medical research trials to improve the treatment of malaria have:

- Improved methods to detect and identify malaria parasites in human blood
- Evaluated the effectiveness of vaccines and drugs
- Identified human antibodies that prevent malaria parasites entering blood cells

Researchers at LSHTM trialled a new strategy, called **intermittent preventive treatment in infants (IPTi),** which involved administration of an antimalarial drug at specific times, regardless of the presence of malaria parasites.

The trial showed it could reduce clinical malaria by 30%. WHO now recommends IPTi as a malaria control tool.

Current and future research

Almost 80% of the global malaria burden is concentrated in a small number of countries where additional support is needed to strengthen public health systems. UK research will need to address the challenge of inaccessibility by targeting resources where they are needed most.

UK research will also be critical in responding to the threat of increasing resistance to antimalarial drugs. Current initiatives include a large multi-centre trial across 5 Asian and 10 African countries, coordinated by MORU, studying two new malaria treatments.

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Supporting technological innovation to improve financial inclusion

PROJECT PARTNERS

Funders: Department for International Development (DFID)

Collaborating research institutions: GSMA, M-KOPA, Safaricom, Sagentia, Vodafone

Find out more

A mobile banking system targeting the rural poor is transforming the financial sector across Africa and Asia, enhancing household resilience, boosting economic activity and creating new enterprises and jobs.

Financial inclusion can drive development. A third of adults in low- and middle-income countries (LMICs) do not have a bank account. However, mobile banking services have boomed in the last decade. Since its launch in Kenya, mobile banking system M-Pesa has recruited over 28.5 million users across East Africa and gained considerable traction in India.

Timeline:

- **2000:** DFID establishes the Financial Deepening Challenge Fund to improve availability of financial services in 15 countries in Africa and Asia.
- **2003:** £1 million awarded to Vodafone to launch mobile currency service allowing small business owners to repay micro-finance loans by text. Mobile app and software are developed by UK-based R&D firm, Sagentia.
- **2007:** The app's potential in enhancing financial inclusion among Kenya's unbanked population is recognised, and M-Pesa is launched. 1.2 million users join within first year.

Sending money securely

M-Pesa transfers are easy, reliable and cheap: it costs 47p to transfer £10. Cheaper transfers allow users to send remittances more regularly, enhancing urban-rural support networks and encouraging household saving. Secure and reliable remittances are particularly liberating for women, reducing reliance on male relatives who may be freer to travel to a remittance centre. Withdrawing money is also simple: there are over 160,000 M-Pesa agents in Kenya alone. This network saves rural people time and money travelling to a bank.

Supporting enterprise

M-Pesa has helped small- and medium-sized enterprises overcome business challenges. Its secure and reliable payment system has helped companies lower their transaction costs. M-Pesa has been credited with boosting the Kenyan economy, contributing to the country's 14% per capita real income growth and 3.4% total factor productivity growth between 2006 and 2013.

People in rural areas have been able to start their own business ventures, knowing they have savings to fall back on. M-Pesa has also provided loans to kickstart small enterprises. For example, the M-Pesa Women Empowerment Initiative in rural Tanzania combined interest-free loans and business training. In India, digital platform system M-Pesa Pay enables merchants to receive cashless payments from customers.

Ensuring a sustainable future

M-Pesa is also used to pay bills. Working with M-KOPA (a solar energy company also receiving DFID funding), M-Pesa allows users to rent a solar home system and pay for the energy by text. This pay-as-you-go system makes sustainable energy affordable for low-income families.

M-KOPA had connected 600,000 homes by January 2018, and projects US$450 million customer savings and 780,000 tonnes CO_2 reductions within four years.

Tackling corruption

By recording transactions and ensuring they are traceable, M-Pesa helps tackle corruption. In Afghanistan, using 'M-Paisa' to pay police officers ensured that officers received their full wages (30% higher than what they usually received) by removing the opportunity for their superiors to take a cut. In India, M-Pesa is also being used to transfer welfare benefits and help reduce welfare corruption.

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Understanding the multidimensional nature of poverty

PROJECT PARTNERS

Funders: Department for International Development (DFID), United States Agency for International Development (USAID)

Collaborating research institutions: Chronic Poverty Advisory Network (CPAN), Chronic Poverty Resource Centre (CPRC), Institute of Development Policy Management, HelpAge International, Institute of Development Studies, International Food Policy Research Institute, Overseas Development Institute (ODI), Oxford Poverty & Human Development Initiative, University of Manchester, University of Sussex

Find out more

Understanding and measuring poverty better provides poverty reduction strategies with an evidence-based approach to meet the Sustainable Development Goals' pledge to "leave no one behind".

Until the 1990s, poverty was measured in per capita income. It was assumed that economic growth (with appropriate demographic and political changes) would reduce poverty. Despite achievements in poverty reduction, 731 million people were still living in poverty in 2015, with a rate of 41% in sub-Saharan Africa.

The Millennium Development Goals (MDGs) pledged to halve the number of people living in poverty between 2000-2015. DFID funding in 2000 established the Chronic Poverty Resource Centre (CPRC) at the University of Manchester: a partnership between universities, research institutes, and non-governmental organisations. Its aim was to challenge the omission of almost a billion people (the remaining half) from the MDGs' poverty target.

Recognising chronic poverty

The premise of the CPRC was that "those who are chronically poor are likely to be poor in several ways, not just in terms of income". The concept of 'chronic poverty' quickly gained currency. DFID's 2006 White Paper cited CPRC's flagship report, observing that progress in poverty reduction had been uneven and that social transfers were a means of addressing persistent, multidimensional poverty. Between 2001-2015, DFID provided £201 million per year in cash transfers.

Reflecting the realities of the poor

Recognising chronic poverty also means focusing on the contexts that keep people poor. This requires a different approach to poverty-reduction policies based on new measures.

- Launched by the United Nations Development Programme (UNDP) in 1990 and based on Nobel-prize winning economist Amartya Sen's 'capabilities' approach to poverty, the **Human Development Index (HDI)** combined life expectancy, education, and per capita income indicators.
- The Institute of Development Studies' DFID-funded work on **Participatory Rural Appraisals (PRAs)** led to second-generation Participatory Poverty Assessments (PPAs), which included poor people's views in poverty analysis and poverty reduction strategies. By 1998, 42 PPAs had been carried out.
- Research at the Oxford Poverty and Human Development Initiative (OPHI) (co-funded by DFID), led to the Multidimensional Poverty Index (MPI). It included health, education, standard of living, empowerment, work, environment, safety from violence, social relationships, and culture. In 2018, the global MPI was integrated in the UNDP Human Development Report to align with the Sustainable Development Goals (SDGs).

Changing understandings of poverty and pro-poor policies

In 2019, the Global MPI identified 1.3 billion people as multidimensionally poor – much higher than previously report. The influence of the MPI has been broad:

- Nearly 60 countries are building national MPIs
- The Women's Empowerment in Agriculture Index monitors the impact of 'Feed the Future' (2010), a programme covering 19 countries with commitments of over US$20 billion from the G20.

In changing how poverty is understood and measured, research has provided "an evidence-based approach to the eradication of chronic poverty" and influenced the direction and scale of poverty reduction strategies across the world.

UKCDR

Working towards stronger, fairer tax systems

PROJECT PARTNERS

Funders: Department for International Development (DFID), Bill & Melinda Gates Foundation, Norwegian Agency for Development Cooperation (Norad)

Collaborating research institutions: Institute of Development Studies (IDS), International Centre for Tax and Development, Oxfam, ActionAid

Find out more

Collaborations between researchers and revenue officials can guide bold reforms with big impacts, boosting domestic revenue mobilisation to finance the Sustainable Development Goals.

Many low- and middle-income countries (LMICs) are rich in resources, but wealth generated is concentrated among a small number of individuals - high-net-worth individuals (HNWIs) have financial assets over US$1 million. In Africa, 166,760 HNWIs were worth US$1.6 trillion in 2018. Tax revenues make up over a third of GDP in OECD countries, but less than a fifth in Sub-Saharan Africa.

The International Centre for Tax and Development (ICTD) at the Institute for Development Studies (IDS), co-funded by DFID, conducts research on making tax policies more conducive to pro-poor economic growth and good governance. This research has informed high-impact reform measures, which have improved domestic revenue mobilisation (DRM)

Reaping a tax harvest in Uganda

In 2015, the Uganda Revenue Authority (URA) approached the ICTD to conduct research on how to better tax HNWIs. The study's findings on tax evasion by HNWIs led the URA to set up a dedicated HNWI unit. In three years, the filing of tax returns by HNWIs increased from 13% to 78%. Consequently, the URA collected an extra £14.7 million in revenue.

Learning lessons across Africa

This success became widely recognised and the URA and ICTD were approached by other tax revenue authorities for advice.

- The URA and ICTD shared knowledge with revenue authorities in Ethiopia, Ghana, and Kenya, and with the East African Revenue Authorities' Technical Committee.
- Work with the Rwanda Revenue Authority raised £7 million in 2016 by improving voluntary tax compliance through more effective communication with taxpayers.

The principles of engagement for collaborative research between academics and government agencies developed by the URA and ICTD were endorsed by the United Nations University World Institute for Development Economics Research (UNU-WIDER) and adopted by the African Tax Administration Forum and the African Tax Research Network.

Taxing local, thinking global

The ICTD followed its locally-grounded research with advocacy to embed it into policy at the highest level.

- The UK supported the set-up of the Addis Tax Initiative (ATI) supporting LMICs to strengthen tax systems, drawing on ICTD research in Africa.
- The ICTD advises multilateral organisations and development agencies, including DFID and the World Bank's Global Tax Team, and consults with major civil society organisations.

Domestic revenue – collecting more, collecting better

DRM is crucial to achieving the SDGs. A 2% increase in LMICs could add US$144 billion to their budgets, equivalent to the value of overseas development aid annually.

However, taxation policies can affect citizens differently. Research from ICTD and others (Oxfam, ActionAid) has demonstrated that targeting the informal economy (where women make up a disproportionate percentage of workers) and providing tax holidays for influential corporations (mostly employing men) is inequitable. The sensitisation of governments to the equity aspects of taxation could help ensure that collecting increased revenue does not deepen poverty and inequality.

Property taxes, an equitable source of funding for local public services, are underutilised by LMIC governments. The African Property Tax Initiative (run by the ICTD and DFID co-funded DFID), is working in 10 African countries to improve tax policies and implementation.

UKCDR

Urban futures: orientating policy towards sustainability, resilience and participation

PROJECT PARTNERS

Funders: Department for International Development (DFID), Natural Environment Research Council (NERC), Economic and Social Research Council (ESRC), Global Challenges Research Fund (GCRF)

Collaborating research institutions: UN-Habitat, FRACTAL, Future Climate for Africa, London School of Economics and Political Science, University of Oxford, International Institute for Environment and Development (IIED), Bartlett Development Planning Unit University College London, Homeless International, King's College London, Slum Dwellers International (SDI), Urban Africa: Risk Knowledge (Urban Ark), Urban Equity (KNOW), Urban Risk/ Tomorrow's Cities, Accountability in Urban Health (ARISE), Peak Urban

Find out more

Long-term research collaborations have introduced sustainability and participation into urban governance and shifted the focus towards safe and resilient urban futures.

By 2050, 70% of the world's population will live in urban centres. Urban centres produce 80% of GDP and over two-thirds of energy related greenhouse gases.

There has been a shift in dialogue towards sustainable urbanism, with a focus on livelihoods, quality of life, and the rights of people who live in cities, led by UN-Habitat's New Urban Agenda (NUA). This shift owes much to collaborative research across the world, but especially in the UK, with sustained support from DFID and the Research Councils.

The UK's support for practical and policy-orientated research on urban governance has:

- Pushed a sustainability agenda in urban governance
- Allowed space for more participatory urban practice
- Advocated safe and resilient urban futures

Introducing sustainability to urban governance

The Cities Alliance is a good example of a UK contribution involving consortia of UK research institutions and funders working across multiple projects. DFID provided core funding between 1999-2003 and continues to support specific projects, including:

- **Future Cities Africa** – (DFID-funded) Supports 18 African cities as they transform themselves into resilient, inclusive centres of economic growth. This initiative has informed Cities Alliance Country Programmes, such as in Liberia.
- **Future Resilience for African Cities and Lands (FRACTAL)** –(DFID/NERC-funded) Aims to advance scientific knowledge about city-region responses to climate change. City Learning Dialogues in three African cities, with 'embedded researchers', have helped co-produce knowledge between research and decision-makers, e.g. integrating climate information into urban planning.

Bringing urban dwellers into urban practice

Over 1 billion people worldwide live in slums. Support for global urban social movements such as **Slum Dwellers International (SDI)** from DFID and UK-based institutions such as the **International Institute for Environment and Development (IIED**) and **Homeless International** pushes for co-production of knowledge with beneficiaries to improve the success of programmes.

Projects such as **Urban Africa: Risk Knowledge (Urban ARK)** - ESRC/DFID-funded, led by King's College London and University College London - draw on a tradition of livelihoods research over the last two decades.

Securing, not securitising, urban spaces

Much violence in non-war settings take place in cities. Understanding the typology of violence, and the contexts within which it occurs, is key to achieving safe and resilient cities.

UK research has not shied away from difficult settings: **The Security on the Move** project, with Durham University (DFID/ESRC-funded), captured the experiences of internally displaced people in Somalian cities and provided a forum to reach policymakers.

80 projects cutting across materials science, infrastructure, big data and urban health under the ESRC-funded Urban Transformations portfolio based at the University of Oxford could make up the next wave of a large-scale urban shift in UK-driven urban thinking and practice.

Mirroring the complexity of urban life across disciplines

The GCRF hubs, in partnership with UK's Research Councils, are part of a £1.5 billion fund that supports cutting-edge, development-oriented research.

Four of the GCRF hubs specifically address urban issues. These collaborative, multidisciplinary projects have great potential to promote a sustainable urban governance agenda under an interdisciplinary umbrella.

UKCDR

Violence against women – a global violation of human rights

PROJECT PARTNERS

Funders: Department for International Development (DFID),South African Medical Research Council, Economic and Social Research Council (ESRC)

Collaborating research institutions: World Health Organisation, Centre for Gender and Violence Research (CGVR), Bristol University, Gender Violence and Health Centre, London School of Hygiene and Tropical Medicine (LSHTM), London Metropolitan University, Child and Woman Abuse Studies Unit (CWASU), Centre for Research into Violence and Abuse (CRiVA), Durham University, Connect Centre for International Research on Violence and Harm

Find out more

UK research has been central to revealing the alarming extent of violence against women and is now firmly embedded in international efforts to combat it.

One in three women has experienced physical or sexual violence. Gender-based violence (GBV) includes domestic violence and abuse, forced prostitution and human trafficking, rape and sexual violence, forced marriage, 'honour' killing, female genital mutilation and cyber violence.

The UK has been at the forefront of research into GBV, rooted in the formation of two major research centres in the late 1980s: Bristol University's Centre for Gender and Violence Research (CGVR) and London Metropolitan University's Child and Woman Abuse Studies Unit (CWASU).

In recent years, UK research has been instrumental in understanding the extent of GBV, investigating prevention methods, and studying emerging forms of violence.

Getting the measure of the problem

Researcher in Focus: Cathy Zimmerman, a founder of the Gender Violence and Health Centre (GVHC), LSHTM

- 2000-2005 Conducted earliest research into the physical, sexual and mental health effects of human trafficking across Europe.
- Co-authored widely used World Health Organization (WHO) publication, *Ethical and Safety Recommendations for Interviewing Trafficked Women*.
- Health provider training materials developed with colleagues for the International Organization for Migration (IOM) – Caring for Trafficked Persons –used in 155 countries.

The GVHC has since led efforts assessing the global extent of GBV. In 2013, collaborating with WHO and South African Medical Research Council, they conducted first systematic study of the prevalence of violence against women globally – source of the widely cited statistic that one in three women has experienced GBV.

Finding what works to prevent violence

UK researchers have led research to investigate what works to prevent violence and improve lives. This informed one of four key pillars of the Council of Europe Convention on preventing and combating violence against women and domestic violence (the Istanbul Convention).

Describing the changing face of violence

- **Several initiatives have reviewed and are building evidence for methods of GBV prevention:**
- **Project Mirabal** - Major collaborative research project (Centre for Research into Violence and Abuse (CRiVA), Durham University), examining programmes aimed at preventing reoffending domestic violence perpetrators. Results showed that such programmes are effective at ending violence and improve family relationships and parenting skills.
- **What Works to Prevent Violence against Women and Girls** - DFID-funded research consortium, identifying interventions with impact: a recent project in the Democratic Republic of the Congo was found to reduce violence against women by 58%.

New conceptions of what constitutes violence against women are emerging. For example:

- Cyber violence is now recognised as a form of GBV. Christine Barter, University of Central Lancashire, studied violence and abuse in teenage relationships across five European countries. This led to a 2010 government TV campaign, reaching nearly 3 million teenagers, encouraging them to challenge abuse in relationships.
- Violence against older women is often ignored. Hannah Bows, CRiVA, has been researching domestic violence, sexual violence and homicide involving this group.
- Nicola Sharp-Jeffs, CWASU, researched extent and impact of financial abuse in intimate-partner relationships, used as a form of coercive control.

All major research centres have a significant influence on the development of policies and practice globally. UK researchers maintain close relationships with charities and activists working on domestic violence and rape, as a bridge between research and action and raising voices of abused women and children globally.