

India-UK Research & Innovation Partnerships



British High Commission
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www.gov.uk/world/india



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Sir James Bevan KCMG

British High Commissioner to India

Foreword

India and the UK have a strong track record of collaborating in research and innovation. Research is our fastest growing area of bilateral cooperation. Over the last five years, our countries have committed close to £150 million to joint research programmes. We've also initiated a multimillion pound programme to support UK and Indian companies to carry out joint R&D projects.

We're working together because research has the power to change lives and drive economies. The best ideas don't recognise international borders and top scientists need access to cutting-edge facilities, wherever they're based. And from clean energy to food security, we're not just working together; we're focussing on the questions that really matter.

I know the UK-India research relationship will continue to flourish, and I invite you to be part of the story.

J. D. Bevan

>> Who indeed could afford to ignore science
today? At every turn we have to seek its aid <<

- Jawaharlal Nehru
First Prime Minister of India

In an increasingly globalised knowledge economy, the rapid expansion of scientific and research collaboration between the UK and India is helping us to find solutions to local and global problems, supporting innovation and driving economic growth. The UK and India are serious about science and research. That's why joint funding for research between the two countries has grown to £150m in the last five years.

This booklet aims to explain how and why the UK is working with India across a range of research disciplines. The UK is proud of its record in research. The UK has the most efficient research of all G8 countries – producing 14% of the world's most cited research papers with only 3% of the global research budget, four of the top ten universities in the world, and UK scientists have won 78 Nobel Prizes, more than any other country in Europe.

Research has the potential to transform societies and it thrives on an exchange of expertise and ideas. However, the best knowledge knows no borders and, increasingly, world-class research

and innovation are driven from outside the most developed economies. This is why our partnership with India is so important.

In order to formally set the priorities for the research partnership, the UK and Indian Science Ministers meet every two years at the UK-Indian Science and Innovation Council. The most recent council put the focus firmly on research that will impact society and help our governments, to deliver sustainable energy, to secure food and water supplies and to fight disease.

How we work together on these grand challenges is varied. It includes supporting the world-class institutions and researchers in our countries to collaborate; developing mechanisms for businesses in our countries to contribute, not just help shape and prioritise research; and ensuring the fruits of research are turned into real societal and economic benefits. As well as areas where our governments have a role, our institutions and innovative businesses are constantly finding new ways of working together.

Science and Innovation Network (SIN)

The SIN team encourage, promote and facilitate collaborations between academia, research establishments and businesses in the UK with Indian partners. They can help with a range of interactive platforms such as seminars, workshops, conferences, sponsored visits and researcher exchanges. The team also respond to emerging science and policy priorities by gathering information, providing analysis, reports and briefing sessions.

www.gov.uk/world/india
scienceandinnovation@fco.gov.uk

Research Councils UK (RCUK)

With a combined annual budget of over £3 billion per annum, the Research Councils are the leading public funders of research and postgraduate training in the UK.

RCUK India is based at the British High Commission, New Delhi and works towards facilitating high quality, high impact research partnership between the best researchers in the UK and India.

www.rcuk.ac.uk/india
rcukindia@rcuk.ac.uk

British Council India

The British Council is the UK's international organisation for educational opportunities and cultural relations. We build engagement and trust for the UK through the exchange of knowledge and ideas between people.

The focus of our work is to build relationships and facilitate research partnerships between academics, scientists and institutions in India and the UK.

www.britishcouncil.org.in
delhi.enquiry@in.britishcouncil.org

UK India Education and Research Initiative (UKIERI)

UKIERI has been implemented with the aim to bring forth a unique initiative that strengthens the bilateral relationship between India and the UK and set an example of best practice in international cooperation. The initiative is working towards developing programmes that meets the priorities and needs of both India and the UK and bring about a systemic change in the educational sector of both India and the UK. Both Indian and the UK governments have confirmed funding for UKIERI and the programme aims to now deliver systemic change by reaching out to larger numbers.

ukieri@in.britishcouncil.org
www.gov.uk/world/india

UK Trade & Investment (UKTI)

UKTI is the Government Department that helps UK-based companies succeed in the global economy. We also help Indian companies bring their high quality investment to the UK's economy - acknowledged as Europe's best place from which to succeed in global business. UKTI offers expertise and contacts through its extensive network of specialists in India.

www.ukti.gov.uk
uktidelhi@fco.gov.uk

Department of International Development (DFID)

DFID is one of the largest funders of international development research, working in developing countries and the UK to generate new knowledge and technologies that accelerate poverty reduction and put these to good use. DFID supports research on: growth, climate change, agriculture, health, governance and new development opportunities and challenges.

www.dfid.gov.uk/R4D
enquiry@dfid.gov.uk

South Asia Research Hub (SARH)

The SARH was established to support increasing awareness, collection and use of evidence by DFID country programmes; support capacity-building for research in the region; and support the development of DFID research programmes that address key regional priorities. The Hub provides technical support to country offices, the Asia Regional Team and their partners in the design and implementation of research and impact evaluations.

www.dfid.gov.uk/R4D
jm-aitken@dfid.gov.uk
k-sharma@dfid.gov.uk

Energy, Climate and Growth Unit (ECGU)

ECGU focuses on promoting low carbon technology and supporting international negotiations on a post-2012 framework on climate change. It supports research which (a) builds the scientific and economic evidence of the impacts that climate change will have on India's security and prosperity; and (b) supports innovative approaches to improving the climate resilience of the poorest and most vulnerable.

www.gov.uk/world/india
s-sippy@dfid.gov.uk
s-samuel@dfid.gov.uk

UK Intellectual Property Office (UKIPO)

The UK has successfully used its “Lambert Agreements” to provide model contracts and guidance for the management of Intellectual Property in research collaborations. We are working with Indian partners to adapt these models for the Indian context. Model agreements have been produced which provide a flexible tool that organisations may use to ensure that good intellectual property management enhances and does not impede research collaboration and commercialisation of outputs.

www.ipo.gov.uk

anshika.jha@fco.gov.uk

Knowledge Economy

The British High Commission’s knowledge economy officers work closely with all the organisations featured in this booklet to promote coherence and cross-cutting bilateral engagement on education, skills, healthcare, intellectual property, research and innovation. The officers work both in Delhi and in regional offices, and can represent the different partner organisations in places where they do not have their representation.

www.gov.uk/world/india
contact_edu@fco.gov.uk

All our teams in India work closely together and there are many areas where one team’s work complements another’s. To help you navigate this, and contact the right people, we’ve created the table below. If in doubt, or to discuss general opportunities, contact the SIN team.

Type of Support	Who to contact*
Funding research collaboration (jointly with Indian funders)	RCUK
Funding research for development	DFID-SARH
Research relevant to climate change	ECGU
Facilitating research visits between the UK & India	SIN
Finding research partners	SIN
Funding to initiate/facilitate partnerships	UKIERI
Business investment advice	UKTI

* - Knowledge Economy Officers represent these teams regionally, where they do not have their own offices, so can also be contacted where appropriate.

The following pages feature case studies involving the teams in India to highlight some of the work that has been done and the impact that this research has had.

KNOWLEDGE IS

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For world class education and training with more than 30 of the world's top 200 universities, choose the UK.

Jubilee Campus
University of Nottingham

www.ukti.gov.uk/greatbritain

Photography: Martine Hamilton Knight / Built Vision

ASHOKA RICE: SELECTING FOR SUCCESS

DFID research funding supported the development of two rice varieties which have achieved unprecedented levels of adoption in central India's uplands. Bangor University (UK) worked with India's Gramin Vikas Trust and Birsa Agricultural University on the project, with farmers involved in establishing breeding priorities and selecting processes. The result has been to provide valued flavour and cooking characteristics, early maturity, drought tolerance and improved yield in two varieties of rice. 95% of farmers who received seeds have continued to grow the varieties 4-6 years later from their own saved seed and high adoption levels were seen in neighbouring villages, indicating that rice had spread informally from farmer to farmer. Ashoka rice is now estimated to be grown over 400,000 hectares of land by nearly 3 million households across central India.

Organisations involved

DFID
India's Gramin Vikas Trust
Bangor University's Centre for Arid Zone Studies
Birsa Agricultural University



ANIMAL VACCINES

Helping UK project partners and Indian collaborators sign a £1m Wellcome Trust project has led to the start of the development of a new vaccine to help control haemorrhagic septicaemia, a deadly disease of cattle which is estimated to be responsible for approximately half of all cattle and buffalo deaths in India. The disease is a significant economic problem for farmers who tend to rely on these animals for meat, milk, draught power, manure and heat. The vaccine is anticipated to be more effective, easier to administer and give longer protection than other vaccines currently on the market. Three companies from both the countries have joined up with the research groups to get the new vaccine licensed and manufactured in India.

TECHNOLOGY IS

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London's Tech city is the largest and fastest growing tech-cluster in Europe

London
Flickr Geotag Map

www.ukti.gov.uk/greatbritain

CREATIVE INDUSTRIES

At RiffStream#Mumbai, over 10 UK SMEs and around 20 Indian SMEs and investors in the digital content and telecommunications industries showcased their businesses. Delegates enthusiastically discussed UK-India business opportunities, shared market insights, made introductions to local networks, and explored joint innovation possibilities for mobile content. The event was a huge success with one UK delegate saying it was an "incredible and worthwhile experience for all UK companies involved." Similar RiffStream# events on Smart Meters and MedTech have also been held. More recently, SIN supported the Unbox Fellowships, which were awarded to 15 Indian and UK creative practitioners and researchers to allow them to work together for a month.

Organisations involved

Creative Industries Knowledge Transfer Network (CIKTN)

SIN

AcceleratorIndia

British Council

Arts and Humanities Research Council (AHRC)

Unbox

INNOVATION IS

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78 Nobel Prizes in
Science and Technology

Touch Bionics
Livingston, Scotland

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INTELLECTUAL PROPERTY

The UK has successfully used its “Lambert Agreements” to provide model contracts and guidance for the management of Intellectual Property in research collaborations. We are working with Indian partners to adapt these models for the Indian context. Model agreements have been produced which provide a flexible tool that organisations may use to ensure that good intellectual property management enhances and does not impede research collaboration and commercialisation of outputs. These are available on the British High Commission’s website.

Organisations involved
UKIPO
SIN



SIGN LANGUAGE

For the first time, deaf students in India are now able to access university education in the sign language medium, and gain an academic qualification. The UK and India have been working together in the field of sign language and deaf studies to generate innovative methodology and technology in the area of multimedia distance education. Using outcomes of this research collaboration, a special university preparatory programme has been created. The UK-India dual-award BA programme in Applied Sign Language Studies now has 40 students from 7 countries. The impact of these teaching provisions cannot be underestimated, as this will create, for the first time, a group of university educated sign language users not only in India, but also in other countries.



FRUGAL FUTURES

A joint report was undertaken by NESTA to map India's research and innovation landscape. It provides a level of detail not previously available. As such, it is an important toolkit for UK and Indian stakeholders to assist in prioritising research themes, identifying suitable research partners or Centres of Excellence, and recognising Higher Education opportunities. A striking aspect of the report is the analysis of India's growing expertise in frugal innovation and lessons for the UK and rest of the world on emerging business and service models. An example of this, highlighted in the report, is GE's MAC 400 Electrogradiograph which costs \$8,500 less than its \$10,000 predecessor.



GREEN IS

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Britain is home to the world's largest wind turbine blade facility. For an international hub of green research and development, choose the UK.

*The Ecotech Centre
Swaffham, Norfolk*

www.ukti.gov.uk/greatbritain

CLIMATE CHANGE: IMPACT AND ADAPTATION

A joint project between the UK's Department of Energy and Climate Change and India's Ministry of Environment and Forest carried out a comprehensive assessment of climate change impacts at state and national levels in India. It has led to the production of an improved set of climate change scenarios up to 2050, focusing on sectors where significant change is identified. The programme includes studies on climate change impacts on sea level rise, water resources, agriculture, forests, human health, and the impacts of climate change on industry, energy & transport. It will provide a better understanding of the socio-economic impacts of extreme events and the vulnerability of different regions to climate variability in India.

Find out more at www.impactstoadaptation.org

Organisations involved

ECGU
MoEF
IIM-Ahmedabad
IITM-Pune
IIT-Delhi
Development Alternatives
InsPIRE Network for Environment



CHANGING WATER CYCLES

A UK-India joint collaboration consisting of five major projects is helping to identify the consequences of the changing water cycle for water related natural hazards such as floods and droughts, which can have huge impacts on people's lives. The scope of these projects ranges from understanding the dynamics of groundwater system, working on improving irrigation water management, and looking at rainfall patterns and how they affect the ecosystems. This research will help with improving predictions on future patterns of flood and drought, which gives farmers the knowledge to choose the most suitable crops for the year. It also aids the development of effective protection schemes, allowing people to safeguard their property and potentially save lives.

Organisations involved
RCUK
SIN

Natural Environment Research Council
Indian Ministry of Earth Sciences



SOLAR ENERGY

Solar energy has been identified by both the UK and India as an area of significance in providing solutions to the problem of meeting future energy needs. Two UK-India joint research projects are working on developing the next generation of environmentally-friendly energy technologies. The first project is looking at advancing the efficiency and production potential of excitonic solar cells, and will build on existing research in both the UK and India to develop cheaper and scalable solar cells. The second project focuses on reviewing the stability and performance of photovoltaics, and aims to remove known bottlenecks in materials supply and develop novel device designs that are significantly cheaper and more efficient than current solar cells.

Organisations involved

RCUK

SIN

Engineering and Physical Sciences Research Council
Department of Science and Technology

INNOVATION IS

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60 years ago, British researchers co-discovered the structure of the DNA. Today they continue to make world-changing discoveries. Unlock your global business potential with UK innovation.

DNA (deoxyribonucleic acid) molecule

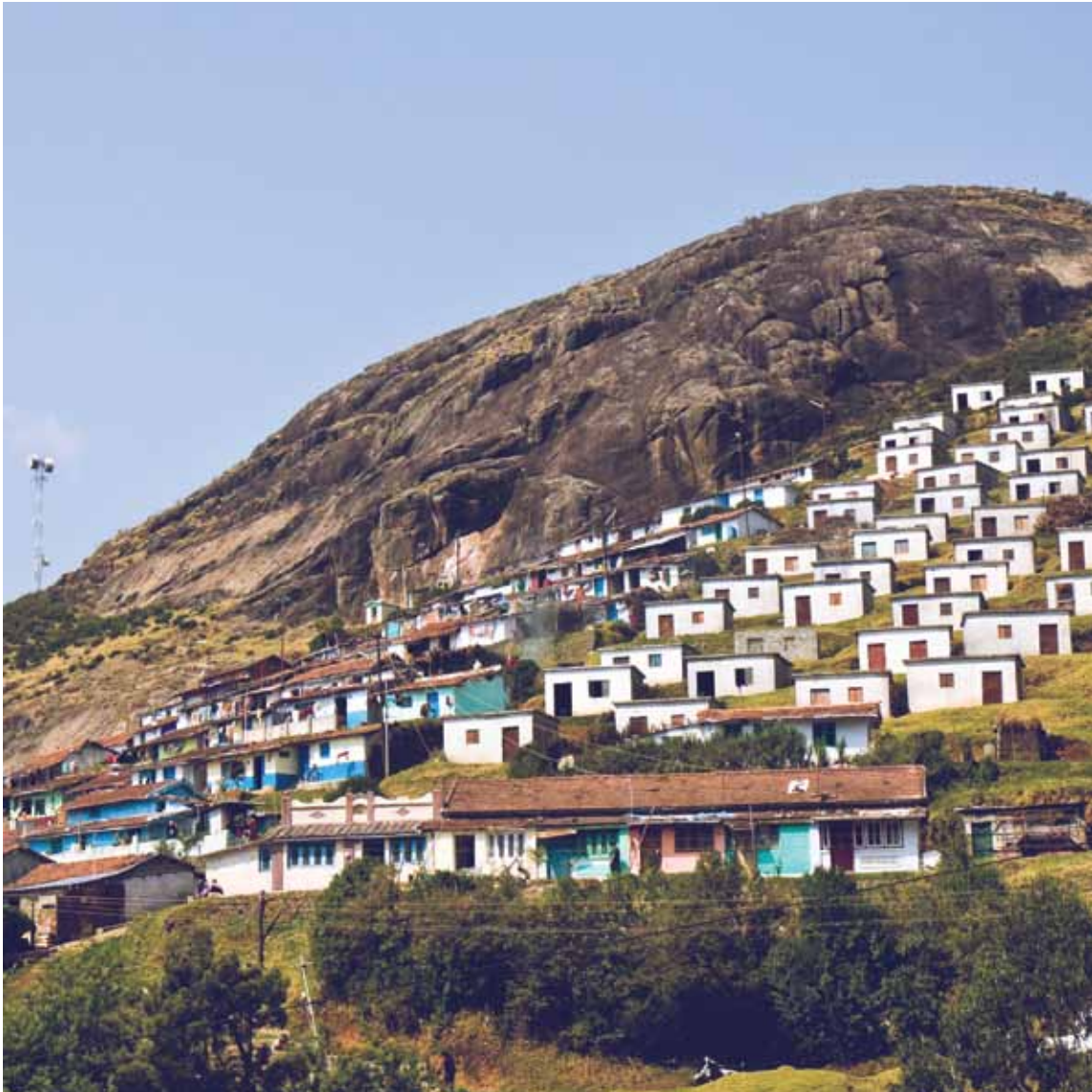
www.ukti.gov.uk/greatbritain

SUSTAINABLE FOOD PRODUCTION

A research initiative worth around £20m over a period of 5 years has been launched to leverage high quality biological and biotechnological research for sustainable crop production in South Asia and Sub-Saharan Africa. The research supported under this initiative has the potential to make a meaningful impact by alleviating constraints on crop production. The outcomes are expected to have a far reaching impact on the challenging issue of food security on a global scale and make a widespread contribution to the alleviation of hunger and poverty.

Organisations involved

SIN
RCUK
DFID
Biotechnology and Biological Sciences Research Council
Bill & Melinda Gates Foundation
Department of Biotechnology
Indian Council for Agricultural Research



BRIDGING THE URBAN-RURAL DIVIDE

A joint programme focusing on utilising transformative ICT for advances in health care and off-grid energy supply is helping to 'bridge the urban-rural divide'. Research supported under this programme is expected to be accessible, affordable and sustainable. An example of this is the project developing an integrated system of solar fuel cell, biomass and waste power generation to provide low-cost integrated renewable energy to rural areas. Other projects are exploring the potential of mobile technologies to help empower rural communities, such as developing a platform to support chronic disease management in rural areas of the UK and India.

Organisations involved
RCUK
SIN

Engineering and Physical Sciences Research Council
Department of Science and Technology



INDUSTRIOUS IN INDIA

Helping identify business opportunities in the aerospace sector by preparing a report on large research facilities in India has aided a UK aerospace major's continued interest and engagement with Indian aerospace companies and research institutes. This enabled them to tie-up with an India aerospace major to carry out maintenance, repair and operations work on large transport aircrafts in India.