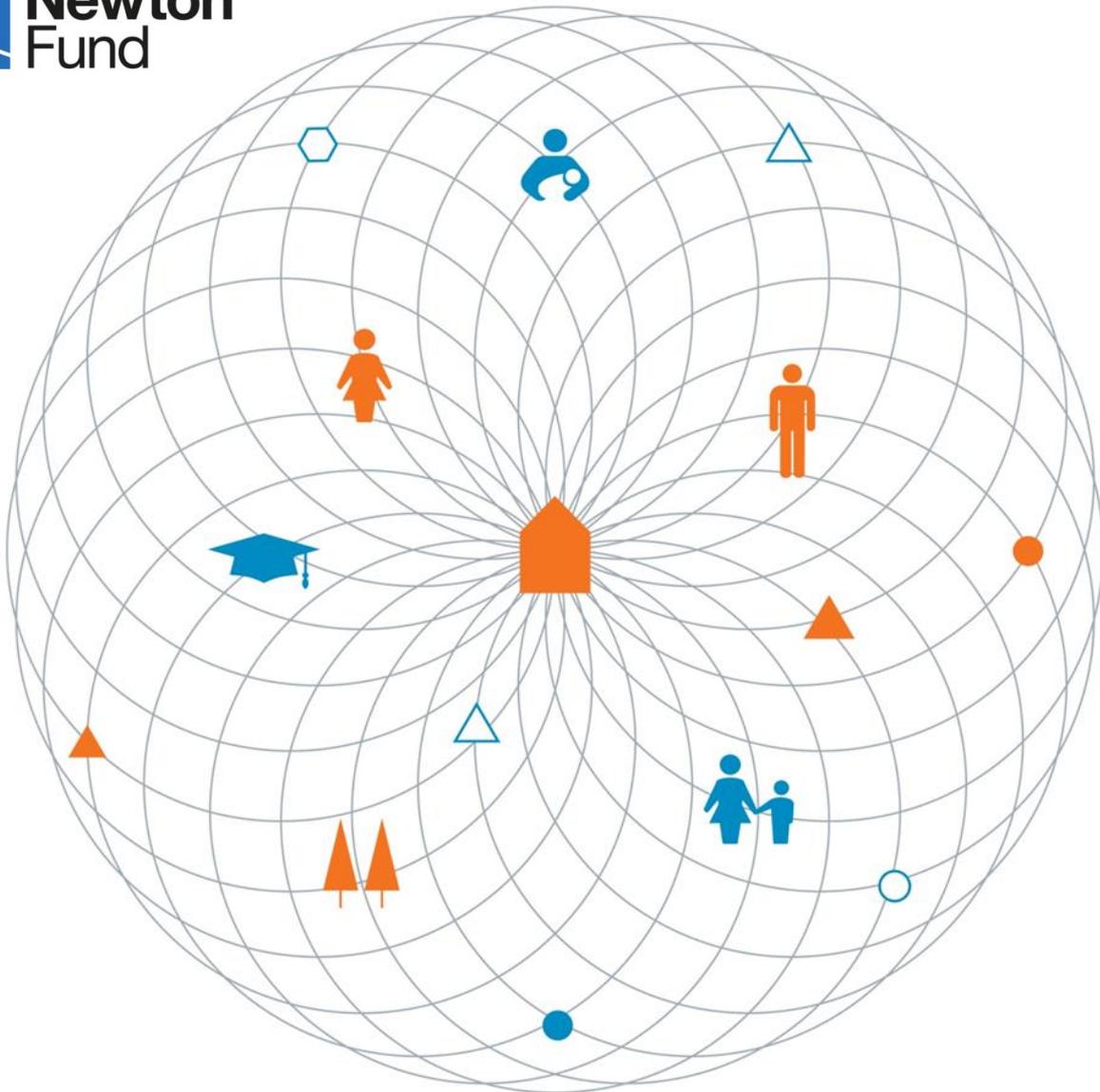


Thematic Impact Study Report – India

Newton Fund Evaluation

July 2018



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Newton Fund Evaluation

Department of Business, Energy and Industrial Strategy (BEIS)

Newton Fund Evaluation

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This document has been approved for submission by Coffey's Project Director, based on a review of satisfactory adherence to our policies on:

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1 Introduction

1.1 Purpose of this report

This report presents the findings for the thematic study of Newton Fund activities in India, with a focus on three activities in the country. Findings emerged from an in-depth review of documentation, in-country interviews, and UK-based consultations, as outlined in [Section 1.2](#) below. Findings from this and the other seven country studies will help inform our Mid-term Evaluation report.

As outlined in our Evaluation Strategy, thematic impact studies were carried out in eight countries: Brazil, China, Egypt, India, Malaysia, Mexico, the Philippines and South Africa. The focus on these countries allows for a breadth of coverage across Newton partner countries and regions of focus. It also allows for broad coverage in terms of the existing innovation capacity and infrastructure of Newton partner countries.

As part of our thematic studies, we conducted a comparative analysis of the factors (such as type of local funding agencies, size of universities, local research structures, among others) that contributed to the Fund's outcomes across different contexts. This helped us map the **pathways of change and capture early signs of the Newton Fund's impact**. By focusing on the factors which facilitate specific research activities, increase the quality of research outputs, enhance international collaboration and translate research into innovative practices, the thematic impact studies help us understand how sustainable solutions to economic development and poverty reduction have emerged so far from Newton Fund activities.

Case study selection

For each country, we shortlisted potential case studies based on three measures: size, pillar and sector. The selection of projects took thematic areas of focus into consideration, aiming to include priority areas for the Newton Fund in each country. We sought to achieve a spread of Newton Fund Delivery Partners and activity types across the countries in our sample. We also consulted the in-country teams (ICTs) to identify potential impact 'stories'. Following additional consultations with delivery partners and the Newton Fund Central Team, we selected **three cases per country** to be explored in more depth.

In India, the shortlisted activities were:

- One of BBSRC's virtual joint research centres for nitrogen efficiency;
- NERC's Sustaining water resources programme; and
- AHRC Community-led heritage regeneration.

This allowed for inclusion of three Research pillar actions (but with cross-pillar elements). Within those actions, the specific award-holders were selected to ensure as broad a geographical scope and diversity of partners as possible, within the timeframe of the thematic study. When selecting the award holders, we also considered the relevance of the specific project's research area to the Newton Fund's priorities in India.

1.2 Research approach

Research scope

The thematic studies involved wide ranging in-country consultations, with the inclusion of as many diverse interview respondents as possible within the timeframe of our fieldwork activities. This was combined with consultations with UK-based partners and researchers involved in the actions included in the study.

This thematic study explored:

- The **development of each activity** – examining its origins, how engagement with the Newton Fund occurred, and an overview of the process of securing Newton funding;
- The **relevance of each activity** to India's development needs and to Newton Fund and ODA goals;

- The **additionality of each activity**;
- The **results of each activity** in terms of the outputs, outcomes and impacts generated in terms of strengthening the science and knowledge base, innovation capacity and influencing policy in India and beyond; and
- The **success factors (and barriers) of each activity**, and examination of possible future benefits from each activity that might be expected to arise in the future.

We took into account that two of the activities included in this study are still ongoing, and that the impact of research projects can take years to unfold. Our research approach was adapted to reflect this, and includes evidence of early signs of impact or intentions to achieve impact where these have been identified.

Research methods and data collection approach

The thematic impact studies are central to our contribution analysis approach and involved an intensive period of in-country research by members of the evaluation team and local experts in the science and innovation sphere. Preparation for the in-country research included a document review of country-specific documents on India's research and development context. Documents reviewed include the evaluation India Baseline Report, Country Situation Note, and findings from the Process Evaluation. We also conducted a literature review of additional documentation on India's science and innovation landscape, and existing UK-India collaboration activities. Project-specific documentation, such as application forms, mid-term and final reports, were reviewed for each action included in the study, where provided by the delivery partner, local partners or researchers.

The document review was accompanied by **one week of intensive data collection in country** in February 2018, as well as data collection in the UK prior to and following the fieldwork. During the week-long in-country visit, three main categories of stakeholders were interviewed: i) in-country delivery partners (and Newton in-country team); ii) funders; and iii) research leads.

Our data collection both in-country and in the UK was complemented with an analysis of the pathway to impact for each action, which can be found in [Annex 2](#). Here, we analysed each project's trajectory to impact by placing it within the Newton Fund Theory of Change. This allowed us to visually represent the pathway to outputs, outcomes and impact of each activity, and highlight its (potential) contribution to broader Newton Fund goals.

Limitations of the research approach

The short timeframe for in-country research meant that we were only able to include three projects within our study. These are not representative of all Newton Fund activities as a whole. The timeframe also limited the number of stakeholders we could interview in India.

Research findings have been triangulated across different stakeholder groups and across various sources of documentation (project documents and online resources such as the RCUK Gateway to Research portal). However, the research team was not able to independently verify statements by all the different contributing stakeholders or to verify what was reported in documentation. Where findings could not be verified we have made this clear in the text.

Two of the projects included were still on-going at the time of data collection. Therefore, the report focuses on emerging signs of impact for both.

2 India

2.1 Context and evolution of the Fund in India

India

In May 2014, India elected a new Prime Minister, Narendra Modi. PM Modi set out his government’s vision for India with ten political priorities¹ starting with removing hurdles for economic growth and including some of the some specific areas which correlate with Newton-Bhabha Fund priorities (e.g. prioritising water and health). Initiatives instigated under Modi’s government have also included Clean and Green India², Make in India³, Digital India⁴, 100 Smart Cities⁵ and a national mission for Clean Ganga⁶ illustrating the importance of environment, technology and growth.

India – UK relations (bilateral relations)

As per the High Commission of India, the relationship between India and the UK is “a modern partnership bound by strong historical ties”⁷ and since 2004 has been considered a “strategic partnership”⁸. The Newton Fund partnership with India is known as the Newton-Bhabha Fund (NBF). It is described as a “partnership of equals” in the Newton-Bhabha Fund country strategy, reflecting the maturity of the relationship and in acknowledgement of the need to be sensitive to the communication of ODA spend in India.

As outlined on the High Commission of India’s website, there is bilateral collaboration in a spectrum of areas, from trade to arts and humanities. In fact, the Science and Technology sector is the fastest growing element of the bilateral relationship between UK and India. Joint investment in UK-India research has grown from less than £1 million in 2008 to over £200 million in 2018.⁹

At the UK India S&I Policy Dialogue in November 2013, a Task Force was formed to identify key interdisciplinary, Grand Societal Challenges for future UK-India engagement. These were identified as: Sustainable Cities and Urbanisation; Public Health and Well Being and the Energy-Water-Food Nexus. It also identified two underpinning capabilities: High Value Manufacturing and Big Data. These were the starting point for the Newton Fund’s country strategy for India (discussed below). Notably, they are not necessarily all typical ODA areas.

Science and innovation landscape / infrastructure in India

Until recently the Indian government routinely released **five-year plans** encompassing its national economic programme¹⁰. The twelfth five-year plan, covering 2012 – 2017, was split into three volumes: 1. Faster, More Inclusive and Sustainable Growth, 2. Economic Sectors and 3. Social Sectors.

Part of the plan focuses on capabilities in Science and Technology (S&T), especially in highlighting major challenges to address in health, agriculture, water, energy and environment. The plan aims to increase the number of full-time researchers / scientists, the volume of publication outputs and India’s patent portfolio. The plan highlights a specific focus to enrich the nation’s knowledge base, improve the development of human resource and interaction between

¹ 1. Removing hurdles for economic growth, 2. Reforms for investment, 3. Time-bound implementation of policy, 4. More freedom and empowerment for bureaucracy, encourage for innovation, 5. Providing people-orientated government and governance, 6. A system to resolve inter-ministerial issues, 7. Stability and sustainability of government policy, 8. Encourage transparency, 9. Prioritising water, road, education, health and infrastructure, 10. Reforms in infrastructure

² <http://www.cleangreen-india.com/>

³ <http://www.makeinindia.com/home>

⁴ <http://digitalindia.gov.in/>

⁵ <http://smartcities.gov.in/content/>

⁶ <http://nmcg.nic.in/>

⁷ <https://www.hcilondon.in/pages.php?id=19>

⁸ *ibid.*

⁹ *ibid.*

¹⁰ The five year planning process came to an end last year with the replacement of Planning Commission with “NITI Aayog” (see below).

universities. Notably, the plan aims to align S&T to developmental needs by evolving a strategy of Research and Development (R&D) programmes.¹¹

Another notable policy update within the twelfth five-year plan is the launch of the **National Research Development Corporation**. This includes both a programme for inspiring inventors and innovators and a programme for development of technologies for commercialisation. In addition, the Council of Scientific and Industrial Research announced ten initiatives during the twelfth plan.

The twelfth five-year plan marked the end of India's five-year planning process, which was led by the Planning Commission. The Planning Commission was replaced by NITI Aayog – the National Institute for Transforming India. At the core of NITI Aayog's creation are two hubs: Team India Hub and the Knowledge and Innovation Hub. The Team India Hub leads the engagement of states with the Central government, while the Knowledge and Innovation Hub builds NITI's think-tank capabilities.

The Ministry of Science and Technology released its latest Science, Technology and Innovation (STI) policy in 2013, the **key aims** of which include:

- Positioning India among the top five global scientific powers by 2020
- Creating careers in science
- Enhancing skills for the application of science
- Linking contributions of science, research and innovation with inclusive economic growth agenda, and
- Creating a robust national innovation system.

The key priorities of the policy include:

- Promoting Excellence and Relevance in R&D
- National Agenda and the STI System
- Ecosystem changes for STI

Newton-Bhabha Fund in India

To understand the NBF, a first contextual point to make is that the NBF did not start from zero in terms of relations and programme building. Some of the delivery partners were not only well established in country but working on initiatives which directly fed into the NBF and oftentimes were scaled up or followed through using the NBF. Most notably:

- The UK government (together with the **British Council**, among others) has promoted bilateral linkages in education and research through the UK-India Education and Research Initiative (UKIERI) since 2006. This initiative (which is now in its third iteration) is designed to foster links and develop synergies between institutions in both countries. The initiative is closely aligned with elements of the Newton Fund People pillar and involves some of the same partners from the Indian side who are involved in the NBF, including the signatory to the NBF MoU¹².
- Research Councils UK (**RCUK**) already had a local presence under the RCUK India brand which dates to 2008. Stakeholders stressed that the NBF has allowed for a significant acceleration of activity and the NBF makes up a sizable portion of the stock of work planned. The team is now six people and includes a dedicated Newton Fund Programme Manager.

In terms of the priorities for the NBF, the Grand Societal Challenges agreed through the S&I Task Force formed the basis of cooperation under the NBF. These priorities were formally endorsed by the UK-India Science and Innovation Council in 2014 during which the Science Ministers of the two countries signed the Newton-Bhabha MoU. Later,

¹¹ <http://planningcommission.nic.in/plans/planrel/fiveyr/welcome.html>

¹² UKIERI partners: Ministry of Human Resource Development, Department for Science and Technology (also signatory of the NBF MoU), Ministry of Skill Development and Entrepreneurship, University Grants Commission and All India Council for Technical Education

“understanding oceans” was added to the list of priority areas at the UK’s initiative at the Science and Innovation Council in 2016¹³. In practice, there was little collaboration on understanding oceans and little on the two underpinning capabilities. The reason that oceans are less covered is likely because demand for collaboration in this area was at an earlier stage during the last programme bidding round. While for the two underpinning capabilities the main issue is that (some) topics are not considered as directly relevant to ODA criteria as others.

Through the lifetime of the Newton-Bhabha Fund itself, £104 million has been committed from the UK side to activity in India (this will be matched in cash or in kind by the Indian government).¹⁴ This makes India the second largest partner in terms of funding under the Newton Fund (after China).

Key Programmes under Newton-Bhabha

The joint programmes within NBF cover a wide spectrum from capacity building programmes to funding research projects through to the translation of research into innovation. These include:

- **Newton International Fellowships:** support early stage post-doctoral researchers for two years at a UK research institution.
- **PhD Placements:** provide opportunity for the UK and Indian PhD scholars to spend a period of their study (2 to 6 months) in Indian and UK higher education institutions.
- **Newton Researcher Links Workshops:** provide a platform to stimulate initial links between, and support capacity building among, early career researchers in India and the UK.
- **Joint research calls and joint virtual centres:** provide an opportunity for Indian and UK experts to work together on research projects to address key global challenges. Partnerships exist in areas including anti-microbial resistance, air pollution and human health, sustainable cities and urbanization, clean energy, and women and child health.
- **Research and Innovation Bridges:** facilitate collaborations between UK and Indian businesses and research organisations proposing novel commercially-focussed solutions to socio-economic challenges.
- **Joint Industrial R&D calls:** support collaborative industrial R&D projects up to two years in duration, aimed at tackling grand societal challenges with a route to future commercial success.
- **Leaders in Innovation Fellowships:** offer intensive commercialisation and entrepreneurship training and coaching for innovative researchers.
- **Industry Academia Partnerships Programme:** is forging partnerships between higher education institutions and industry to build technology links and enhance the quality and relevance of engineering education.

Indian funding partners:

Through the Newton-Bhabha Fund a MoU was signed with the Ministry of Science and Technology¹⁵. The thirteen main Indian funding partners to date, some of which are new partners (i.e. there was no formal partnership before the Newton-Bhabha Fund), are:

- Department of Biotechnology (DBT)
- Department of Science and Technology (DST)
- Federation of Indian Chambers of Commerce and Industry (FICCI) **New**
- Global Innovation & Technology Alliance (GITA)
- Indian Council of Historical Research (ICHR) **New**

¹³ <http://www.newtonfund.ac.uk/about/about-partnering-countries/India/>

¹⁴ <http://www.newtonfund.ac.uk/nf/assets/File/NewtonPrize2017.pdf>

¹⁵ An addendum to the MoU is planned so that Ministry of Human Resources Development (MHRD) will be formally recognised as a partner.

- Indian Council of Medical Research (ICMR)
- Indian Council of Social Science Research (ICSSR)
- Indian Institute of Science Education and Research (IISER), Pune
- Ministry of Earth Sciences (MoES)
- Ministry of Electronics & Information Technology (MeitY) **New**
- National Institute of Urban Affairs (NIUA) **New**
- Science and Engineering Research Board (SERB) **New**

2.2 Emerging impacts of Newton-Bhabha Fund in India

There is a high-level commitment to collaboration from both the UK and Indian governments. The situation in India, with a number of pre-existing relationships and local offices, allowed the Newton-Bhabha Fund to make a running start. While there were pre-existing relationships and the appetite to work together, the Newton-Bhabha Fund has **opened doors for the UK**. Where previously it was difficult to realise potential and meet the demand, the NBF has sped up process, and has facilitated the pursuit of common goals through **a partnership model**. Indeed, all three projects covered as case studies demonstrate evidence that **funding is channelled to support thematic areas of agreed priority for both the UK and India** in line with the country strategy agreed for the Fund.

Taking the existing relationships and common areas of interest, the local perception of different stakeholders¹⁶ is that the Newton-Bhabha Fund has enabled **significant and rapid growth in partnership**, acting as an accelerator and ramping up the scale of investment in research such that the UK is most significant partner for at least one funder (DBT) covered by the case studies, and new partnerships have materialised, as was the case in one of the case studies (ICHR). More generally, the breadth of UK partnerships was considerably wider as a result of collaboration through the Fund.

The Newton-Bhabha Fund has **supported and encouraged more collaborative ways of working**: across funding institutions and delivery partners, and internationally (such as the virtual research centre model, which was new to the India partners). New models of multiple funders have been possible, such as through the India-UK co-funded Joint Global Research Programme (GRP) for women's and child health is demonstrating a new approach to development challenges, led by India's DBT, and the UK's DFID and MRC¹⁷.

Besides the case studies under review, there are **numerous examples of successful impact stories** (including Newton prize winners, such as the "CRADLE" project¹⁸, which was through GRP). What is important to highlight is the role of the Newton-Bhabha Fund in taking a number of projects the UK and India have been working on for years together but which were taken to the next stage through Newton Funding. The benefit of this additional funding is that the projects were able to realise their full potential. An example of this is the "APEX" project which received top up funding from the Newton-Bhabha Fund and allowed the benefits of the research of the earlier project to be realised¹⁹.

The Newton-Bhabha Fund has supported significant upscaling of **capacity building activity**, including through the British Council's activities which were not investigated as part of the case studies but a summary of reach figures (shared by the British Council) is provided in the box below. The extended reach of the British Council through the Newton Fund, as well as a focus on new areas, such as Women in Science, is attributed by the British Council to the Newton-Bhabha Fund.

¹⁶ This view was voiced by the ICT, and Indian partners (as well as UK partners based in India.)

¹⁷ which is engaging multilateral collaboration in UK, India, and Africa

¹⁸ <http://www.newtonfund.ac.uk/newtonprize/projects/better-monitoring-of-maternal-health-will-help-save-lives/>

¹⁹ <http://www.newtonfund.ac.uk/newtonprize/projects/creating-more-efficient-solar-energy/>

Reach as reported by British Council, early 2018

- PhD Placement – 867 scholars from India and 40 from UK applied for this opportunity out of which 200 Indian PhD Scholars and 30 UK scholars carried forward the placement and developed linkages across 167 Indian Universities and 50 UK Universities.
- Women in Science – 1154 women scientists from over 650 Indian Universities applied for the workshop training out of which 232 women scientists from 117 Universities attended.
- To date British Council India, through the Newton Fund, supported 15 Researcher Link workshops (RL) in topic areas including Clean water through advanced and affordable materials, Advanced Nanomaterials for Energy, Health and Sustainability, Urban Air Pollution in Indian and UK cities and Nano Bio-materials for Water Purification.
- RL workshops benefitted over 450 early career researchers from India and UK (India – 247 and UK – 214). Seven more workshops have been funded which will benefit more than 200 early career researchers by 2019.
- STEM Teacher Training workshop - 1,376 STEM teachers from more than 900 Indian Universities applied, out of which more than 1,000 participated and are disseminating it further to students and their peers.
- Media reach (more than 5 million) through newspaper and International Journals like American Chemical Society.

Subtler institutional catalytic impacts which demonstrate a shift in the way of working (such that India models itself more on the UK approach) were also shared. An example is the requirement for the inclusion of an impact statement in bids²⁰ which is attributable to the partnership model of the Newton-Bhabha Fund.

Although not covered by the case studies (due to the early stage of work in this area), activity in innovation space is seen as promising. A number of projects, developing leaders in innovation and “research and innovation bridges” are underway.

2.3 Remaining challenges

A challenge observed was whether and how to **disentangle Newton-Bhabha Fund additionality from significant pre-existing collaboration** where the Newton-Bhabha Fund was used to ramp up activity. In the cases investigated here, the previous work has been crucial, and the benefit is ongoing, but this nevertheless makes it more complicated to distil the benefit of the Newton-Bhabha Fund specifically.

Although the Newton Fund is branded as the Newton-Bhabha Fund in India, there is **no “Bhabha Fund” on the Indian side**. Indian funding partners have to allocate spend to Newton-Bhabha funding that they would otherwise have spent on other activities which means on a case-by-case basis funding is allocated. This can cause issues and lead to delays. Linked to this is the limited institutional (administrative) capacity of some Indian funding partners which can also lead to delays / jeopardise delivery when delivery is particularly time sensitive. Following from this point, there is actually a limited capacity within some Indian partners to run multiple programmes and they are actively trying to limit them in particular cases (not across the board). This is being actively managed by the in-country team.

A recurring challenge for the Indian partners is internal **bureaucracy**. The length of time it takes to get projects agreed and signed off was observed as an issue in all projects covered by the case studies. In these cases, it helps to have face to face contact to expedite risk but it also helps that there is a partnership element, and joint commitment, as this creates some additional leverage.

A significant on-going challenge which emerged during discussions in country was the **absence of a mechanism to leverage the results of the Fund**. Given the proportion of activity now flowing through the Newton Fund, there is concern for sustainability of the relationship post 2021 when no funding flows have been identified.

²⁰ (now required for proposals submitted to the ICSSR)

There are some challenges relating to **branding and awareness of the Newton-Bhabha Fund** which were directly observed during the field visit. Specifically, the Newton-Bhabha logo is not systematically used (not necessarily on purpose but because it is forgotten). This is especially difficult where many delivery partners have a strong(er) brand and local presence. Further, because the Newton-Bhabha Fund was used to support existing ideas, the in-country team often have to remind partners to use the Newton-Bhabha Fund branding.

There is a high-level of sensitivity to ODA in India (which predates the Newton-Bhabha Fund) and means that words like “aid”, “development” or similar are avoided. This is being carefully and sensitively managed in country already.

3 Joint Centres in Agricultural Nitrogen - Indo-UK Centre for Improvement of Nitrogen use Efficiency in Wheat (INEW)

3.1 Summary

Action title	Indo-UK Centre for Improvement of Nitrogen use Efficiency in Wheat (<i>INEW</i>) ²¹
Short description	Research project which brings together UK and Indian wheat researchers with programmes on wheat improvement to determine the genetic control of nitrogen use efficiency in wheat.
Objective(s)	Significant economic and environmental impacts will be achieved through the sustainable intensification of wheat production, which will reduce the use of nitrogen fertilisers by farmers, thus reducing crop production costs for farmers and the release of reactive nitrogen into the environment.
Pillar	Research (and People)
Action value (total budget allocated in country, in GBP)	GBP 1,346,096; Indian side (precise figure not known)
Start / end date (Status: on-going or complete)	Jan 2016 – Dec 2018; Status: on-going
DP UK and overseas	BBSRC; DBT
Award holders / grantee	Peter Shewry (Rothamsted Research); Karnam Venkatesh (IIWBR) The action involves scientists from five Universities and Institutes in the UK and from six in New Delhi, Haryana and the Punjab, which is the major wheat-producing area of India.

3.2 Description of the action

Brief description of action

This is a virtual joint centre which brings together researchers and 11 institutes in the UK and India to identify genes and molecular markers for wheat lines and populations which differ in their nitrogen use efficiency. It is one of four joint virtual research centres looking at nitrogen use.

In addition to supporting a closely integrated research programme in the UK and India, the Centre will also provide a legacy of shared facilities, technologies, genetic material and datasets that will facilitate longer term bilateral collaborations, and provide training in crop genetics and genomics and exchanges for early career scientists and students in both countries.

²¹ <http://qtr.rcuk.ac.uk/projects?ref=BB%2FN013360%2F1>

Pathway to impact

The action is an example of a project which bridges the Newton Fund Theory of Change, incorporating elements of the People, and Research pillars (through its applied research and inclusion of training modules). See Theory of Change in [Annex 2](#).

The research **inputs** focus the on creation of a “virtual joint centre” to compare wheat lines and populations which differ in their nitrogen use efficiency. These lines will be grown in field experiments in both countries and studied in detail using a range of biochemical and molecular genetic approaches. Over three years, the components of the project are spread over five work packages:

WP1: Five “Platforms”: Platform 1 (P1) - Germplasm Development; P2 – Genotyping; P3 Phenotyping and Screens; P4: Precision Nutrition; P5 Data management

WP2: Exemplar projects: Exploiting phenology and adaptation to improve the efficiency of nitrogen use in wheat: Exemplar 1 (E1): N Uptake Efficiency; E2 – N utilisation efficiency; E3 – N Partitioning; E4 – Genes and markers

WP3: Training

WP4: Communication

WP5: Data management and dissemination

The **outputs** anticipated include the identification of genes and molecular markers that can be exploited by wheat breeders globally and new strategies for improving the precision of nitrogen application can be delivered to farmers via well-established mechanisms in both countries. Researchers in both countries would also be upskilled as a result of the training delivered.

The **outcomes** expected are that both countries would be better equipped with knowledge and a research base in an area of relevance for food security and environmental sustainability. There is also the expectation that the participants and institutions involved will have greater international exposure through the project (and built-in training). There is also capacity building in a tangible sense through the legacy of equipment and technology acquired through the project.

In terms of **impact**, the project has a tangible link to increased preparedness and resilience to global challenges. The centre is expected to have significant societal impacts from improvements to food security, reduced environmental impacts via reduced use of reactive nitrogen from fertiliser applications, and economic impacts from reducing the use of nitrogen-based fertilisers and associated crop production costs for farmers. Similar mechanisms are expected to determine nitrogen use efficiency in other plant species the results should be of wider applicability to other crops and countries.

3.3 Analysis

3.3.1 Relevance

Activity targeting and contribution to ODA

The focus area of this BBSRC call in efficient nitrogen²² (which was already underway in Brazil and China) fits well within the Newton-Bhabha “Energy-Water-Food Nexus” priority area. The focus of the call was agreed collaboratively: *“When we were developing these virtual joint centres, the best thing about the Newton Fund was that they listened to what India wants and we were able to set up priorities within this collaboration”*. Soil improvement was one such priority.

In terms of its ODA relevance, there is a demonstrable and evident link with the content of this project and food security / climate change concerns. Wheat is the most important staple crop grown in the UK, and one of the two

²² <https://bbsrc.ukri.org/funding/filter/bbsrc-newton-fund-call-virtual-joint-centres-nitrogen/>

major crops grown in India²³. Nitrogen fertiliser is a key determinant of yield and the major cost of wheat production in both countries. Excessive use can result in pollution of groundwater and increased production of greenhouse gases. Breeders and farmers in the UK and India have worked hard to improve the efficiency of use of applied nitrogen, by improving the uptake and utilisation efficiency within the crop through genetic improvement, together with the precision of fertiliser application in the field. The need for further improvements were identified, to meet challenges of increasing crop production for an expanding global population and increasing climate uncertainty.

Additionality of Newton Fund activities

It was acknowledged that the theme was already of interest. The UK PI explained that BBSRC is funding work in this area where it has funding – this is a priority area and working with India also predates this action. The difference under the Newton Fund is that compared to previously there is now the requirement that action must be scoped as ODA, and the volume / scale of collaboration with India is considerably higher.

From the Indian side, having a project of this scale across multiple years would not be possible without the Newton Fund, because access to grants typically depends on yearly government plans, whereas the match fund requirement means there is a multi-annual commitment.

3.3.2 Effectiveness

Research collaborations

The collaboration was perceived as very positive. Working in a virtual research centre model is “new” to the Indian side. It allowed for a new way of working across organisations, making use of strong complementarity of institutional skills, capacity and areas of expertise.

There is evidence of complementarity of skills and capacity of institutions / researchers involved from UK and Indian side – which each side bringing different expertise (seeds, techniques, infrastructure, etc.) and this meant the whole was greater than the sum of its parts. For example, on the Indian side each partner brings different expertise to the project: IIWBR is coordinating and has the plotting field, while Punjab Agriculture University is conducting field screening of genotypes, National Bureau of Plant Genetic Resources (NBPGR) has a super computer facility for storing data and so on. A similar complementarity of skills and capabilities is evident on the UK side with five institutions involved. Further, the UK expertise (for example in protocol design) has enabled the Indian side to work more effectively in areas where their confidence or experience was less strong. Meanwhile, the UK benefits from, for example, testing germplasm in a different climate in India in various locations (Karnal, Ludhiana, Delhi).

For reasons beyond the control of the research organisations involved, there was a delay in the receipt of seeds on the India side (due to tight customs controls in India). This meant that the Indian side incurred a delay of six months and is behind the UK side in the field research. This is presumed to have implications for the collaboration, but interestingly was not raised as an issue by either side during the fieldwork.

New international partnerships

Although it is not first time BBSRC has collaborated with the Indian counterpart, DBT, the breadth of partnership (especially within India) is new. Feedback from the principal investigators shows that the value of international partnership is perceived to be strong, in particular, the scientific excellence of the UK brings benefits to the partners in India.

Benefits to UK researchers

Training courses and exchanges for students in the UK and India are included in the design of the action. There have been several five-day training courses already, which have each involved around 20 young scientists and post-graduate students from the different organisations. More specifically, the following courses have been run:

- Quantitative methods in plant breeding course (Ludhiana, 29th August - 2nd September 2016);

²³ Wheat is the major staple crop in both the UK, with 12-15 million tonnes being grown annually, and in India, where production is between 90 and 95 million tonnes a year.

- High throughput phenotyping and transferrable skills (Rothamsted and Nottingham, 7-9 June 2017);
- Wheat genetics and marker development (Bristol and Norwich JIC, 12-16 June 2017).

The benefits of these training courses cited by the UK PI include access to cross-cultural working. Building in opportunities for exchange/ training was an important way to bring the otherwise primarily virtual joint research centre to life and to build capacity among researchers from both sides (UK and India). The UK PI commented on the lower than anticipated appetite among UK researchers. A possible reason for this was issues with compatibility of timetables on the UK and Indian side and / or potentially concerns for how the timing would impact on career development.

3.3.3 Impact

Demonstrable impact

As explained by both PIs (on the UK and Indian side), this action will take some time before impacts are visible, even after the completion of the project, it is likely to be many years for an impact to be visible, as much as ten years (six years for research and then four years to get to market). However, the linkages between the research and NBF priorities and India's own development goals / impacts are well aligned and there was visible enthusiasm around the quality of data coming out of this project from the Indian funding partner, who stated "*this is one of the best projects so far*".

There were suggestions that the partnership is not sustainable without funding and that sustainability is not built into the design. There is a legacy of equipment and infrastructure foreseen but for collaborative research, more funding would be required. There were some suggestions that DBT will have to provide further funding on the Indian side to allow them to complete (to account for delays in receipt of seeds).

One concern voiced on the Indian side related to the institutional capacity of the Indian funding partner (in terms of HR and admin to get these research ventures up and running) and this creates a challenge for the delivery to match the ambitions.

Change in perceptions of UK in partner countries due to Newton Fund

According to the funding partner on the Indian side, DBT, the funding available through the Newton Fund has allowed India and the UK to take up latent opportunities for collaboration: "*The journey with the Newton Fund has been transformative... The only thing that was holding us back was that UK government was not committing funds for bilateral collaboration with India.*" Having dedicated funds for bilateral collaboration has changed the perception of the UK as a key partner. The UK is currently the largest bilateral funding partner for DBT and DBT has the largest portfolio within the Newton-Bhabha Fund in India, reflecting the fact that in India the government is committing a lot of funding to biotechnology.

Historically Indian scientists were already well connected with the UK but having funding available allows these connections to continue and grow. What is qualitatively different with the Newton-Bhabha Fund, and in the case of INEW, is the ability to define priorities together, and to be flexible. Further, the match funding model was reported to be the preferred way to work, administratively it's easy, with no funds moving from one country to other.

3.3.4 Complementarity and coordination

Catalytic and leadership effects

It is too early for the research project to have evidence of catalytic or leadership effects. However, we note that while the Indian institutions, which bring together different expertise in wheat growth, had (largely) not collaborated previously, there is now more will to do so. The breaking down of silos and collaboration, is an achievement given the typical competitiveness between Indian institutions. Two of the Indian institutions signed a new MoU as a result of the collaboration²⁴.

²⁴ NRCPB and IIWBR signed an MOU (long term commitment) because of the INEW project

The benefits of the new network have already led to the pursuit of more UK-India collaborative research²⁵. To date, these have not been successful, but the relationships are evidently in place for future collaborations as opportunities arise. A multiplier effect and networking effect is therefore expected.

The representative from the Indian funding partner, DBT, suggested that spin-offs from the Newton Fund are likely, but warned that these are not being monitored at all. An example given was the creation of farmer zones in India, which will use agro metrics (emerging from Newton-Bhabha Fund projects) and could be linked to the Kisan Hub²⁶ platform which is a tool for crop management (which NIAB, one of the INEW partners, is involved in).

3.4 Conclusions

- The project is well-aligned to Newton-Bhabha priorities, India's needs and ODA priorities in the energy, food, water nexus area. The fact that India's needs were so clearly built into the focus of the project was noted by the Indian partner and highly appreciated.
- Despite some administrative hiccups, this project is seen to be delivering high quality data, with a slight delay (six months) on the Indian side due to the delay in receipt of seeds.
- The project shows the benefits of collaborative research and complementarity of skills / expertise of UK and Indian partners. In addition, bringing together Indian research institutes with specialism in wheat is new and valued.
- Building in short training courses and staff exchange is an additional added value, although there are some logistical (timing) considerations which may have meant lower than expected interest from the UK side.
- It is too early to see impact, given the project is still underway. Even in the best-case scenario, the impact would not be visible for as much as ten years.
- The funding partner on India's side explained how this and other projects have pushed the UK to the number one bilateral funding partner. There is a thirst for knowledge and innovation and the Indian government is investing heavily in this area, which the Newton Fund is positioned to capitalise on and drive forward in partnership. There are concerns about how sustainable the collaboration is.

²⁵ Number of joint research applications made for other grants through connections developed in INEW: an application was made to Newton fund call targeted for Pulses crops- Dr Renu Panday and Alison Bently submitted a proposal for funding; there was a move from Dr Simon to collaborate with ICAR-IIWBR but the proposal was unsuccessful as the fund allocated was not agreed by the Indian HQ.

²⁶ <https://www.kisanhub.com/about/>

4 Sustaining Water Resources programme: Coupled human and natural systems environment for water management under uncertainty in the Indo-Gangetic Plain

4.1 Summary

Action title	Coupled Human And Natural Systems Environment for water management under uncertainty in the Indo-Gangetic Plain (CHANSE)
Short description	This project will provide information for improved decision-making on water allocation for agriculture, drinking water, ecosystems and other needs. The project will use the River Gandak sub-basin, which has been impacted by these issues, as a case-study catchment for process-understanding. Water management strategies and feedbacks of water allocation to local climate will be analysed at the IGP basin level.
Objective(s)	To improve mapping and quantification of dominant interactions and feedbacks between human activities and the hydro-meteorological system of the Indo-Gangetic Plain (IGP).
Pillar	Research (and Translation)
Action value (total budget allocated in country, in GBP)	£1,011,200; 30,000,000 INR (approx. £330,000)
Start / end date (Status: ongoing or complete)	April 2016 – March 2019 (ongoing)
DP UK and overseas	UK NERC & Indian Ministry of Earth Sciences
Award holders	Dr Ana Mijic, Imperial College London Dr Subimal Ghosh, Indian Institute of Technology Bombay Partners UNESCO and CEEW (local NGO) and total of 3 UK institutions and 4 Indian.

4.2 Description of the action

Brief description of action

The project was funded as part of NERC and India's Ministry of Earth Sciences Sustaining Water Resources (SWR) for Food, Energy and Ecological Services which aims to support interdisciplinary research focused on improving the understanding of water resources and its role in food, energy and ecosystem services in India.

This project brings together researchers from UK institutions (Imperial College London, University of Exeter and British Geological Survey) and Indian institutions (IISc Bangalore, IIT Bombay, IITM Pune, and ATREE Bangalore),

in partnership with international (UNESCO) and local (CEEW) non-governmental organisations, to support water management in the Indo-Gangetic Plain (IGP).

The overarching aim of the research is to improve mapping and quantification of dominant interactions and feedbacks between human activities and the hydro-meteorological system of the IGP. This project is expected to provide information for improved decision-making on water allocation for agriculture, drinking water, ecosystems and other needs.

Pathway to impact

As shown in the Theory of Change in [Annex 3](#), this project combines elements of the research and translation pillars. It not only aims to improve research capacity and generate new knowledge, but also intends to influence policymaking and practice in the water resource management field. It is expected that results will have an impact on policy by providing water management planning for water, food and ecological security in the case study area.

In terms of **inputs**, combining the expertise and strengths of the institutions and partners involved, the project's planned activities are to:

- (i) estimate surface and groundwater availability under current and future short-term weather predictions and anthropogenic activities within the IGP using a land surface-groundwater modelling setup;
- (ii) investigate the propagation, in space and time, of interactions of water uses and needs within the natural system by integrating novel consumer and ecological flow demand modules;
- (iii) provide regional predictions of decadal, seasonal and sub-seasonal monsoon rainfall and flood forecasting for the IGP to inform development of alternative water management strategies;
- (iv) translate the improved understanding of human and natural systems into IGP's water management planning for water, food and ecological security.

The **expected output** stemming from this collaboration is new science to support decision-making on water allocation to secure food, water and ecosystem services in the case study area. More specifically: new datasets (irrigation and urban water drivers; ecological flow and water use threshold); modelling tools (sociological-hydrological system and water management strategies); and improved estimations (surface water and groundwater fluxes and short-term weather predictions and recycled precipitation).

This collaboration has a clear policy-influence focus. Its main **expected outcomes** are to improve both knowledge and understanding of life-cycle water management, including the human dimension. The funding partner on the Indian side, has a mandate to serve the public. In line with that institutional mission, this project aimed to benefit users beyond the academic field by:

- enabling an understanding of the major drivers in water scarcity and capability to assess impacts on water resources,
- providing information for improved decision-making on conjunction water use of surface and ground water and water allocation,
- providing an insight into problems affecting local community and opportunities for small-scale interventions,
- improving integrated regional assessments of water demand and availability for better planning for water security.

In terms of the **planned impact**, this project is ambitious in its design and focuses on the need to develop new science that considers the dynamic interface between environment and society and plans to have impacts beyond

scientific research. The project targets local communities²⁷, the private sector²⁸, four government departments²⁹ and local and international NGOs³⁰ to maximise impacts at different levels. Ultimately, the plan is that the CHANSE framework will provide stakeholders with information that improve their decision-making on the use of surface and ground water and water allocation. It will also provide policy-makers with improved integrated regional assessments of water demand and availability enabling better planning for water security at governmental level.

4.3 Analysis

4.3.1 Relevance

Activity targeting and contribution to ODA

This project built on a previous joint UK/India-funded research involving the same funding partners (2012 – 2015), which developed a series of relevant datasets, tools and models. While working on the first project on Changing Water Cycle³¹, MoES and NERC organised a scoping workshop in India and invited stakeholders (from the UK and India) in which the PI's from all India-UK Changing Water Cycle projects shared their experience. Possible future topics were discussed and sustainable water emerged as a priority. Based on that event, the Sustaining Water Resources (SWR) call was published highlighting the topics for three regional projects³². The researchers involved in CHANSE interacted during the workshop and formed a group which was put in the proposal.

This project, with its focus on water security, is aligned with India's (and the Newton-Bhabha Fund) priorities. Rapid development (demographic and economic change) is increasing stress on India's water resources (rivers, lakes and groundwater) resulting in declining water quantity and quality. Demands on India's water resources are predicted to continue to grow and to be exacerbated by climate change, land-use change, population growth and urbanisation. To enable adequate planning and management, a good understanding of the amount, movement, storage, quality and usage of water in any given basin, and how each of these is likely to change in future is needed. The SWR projects bring the human and environmental elements together for the novel environmental science needed to understand the wide range of basin processes that affect water security, sustainable basin-wide water management, economic development and social welfare.

Additionality

The project under review was funded by the Newton-Bhabha Fund but built on existing relations, and collaborative, match-funded activity predating the Newton Fund. It is worth noting that according to the Indian funding partner, the decision to focus spending on this research area and in the collaborative / systematic model pursued required a commitment to allocate funding to drive forward research in this area (which can be attributed to the Newton-Bhabha

²⁷ Primarily farmers along the Gandak floodplain, who will directly benefit through improved agricultural planning ensuring food security. Other local actors include conservationists (e.g. WWF, Earthwatch), fresh-water ecologists, and the fishing community, who would benefit indirectly as government action is more prudent / evidence-based in relation to dam water control.

²⁸ The information generated will be transferred to two water and agricultural management institutes: the Tata Institute of Social Science (TISS) and the Water and Land Management Institute (WALMI) at Bihar. TISS is involved in on-site water and agricultural management and the products generated from the project will be of direct use to them. WALMI, an autonomous body under the Water Resources Department of the Government of Bihar targets existing irrigation systems affected by water-related problems. These stakeholders will gain access to information that can inform their decision-making (and lead to sustainable decisions).

²⁹ Water Resources Department, Govt. of Bihar (issues related to utilization of water resources, irrigation, and flood control); National Water Development Agency (involved in augmentation of water availability in the existing Gandak Canal System); Public Health & Engineering Department, Govt. of Bihar (which provides improved portable water supply and sanitation facilities, towards improvement in public health); Department of Environment & Forest, Govt. of Bihar (involved in conservation of aquatic wildlife in the Gandak)

³⁰ Non-profit international and local organisations: Two NGOs (UNESCO IHP and CEEW) will support the interaction with local communities (data gathering) and thereby gain an insight into the problems affecting the local community regarding water usage, as well as opportunities for relatively small interventions that may achieve large improvements in local outcomes.

³¹ <http://www.nerc.ac.uk/research/funded/programmes/cwc/cwc-brochure/> (The NERC Changing Water Cycle research programme has provided new understanding of the changes taking place in the components of the water cycle, in the UK, India, Europe and across the globe. NERC has invested £10 million in this research programme, involving 12 projects, with teams based in more than 30 institutions. Other collaborators have also supported the programme, including matched resources for the five South Asia focused projects funded by the Ministry of Earth Sciences of India.)

³² The SWR funds three regional projects. The focus of the case study is water management in the Indo-Gangetic Plain (IGP) while the other projects which are being executed simultaneously focus on water management in Peninsular India and Himalayan region. A website "India-UK Water Centre" provides a unified point of reference and information on the three projects, activities are broadcast and there is a forum to share activity reports: <http://www.iukwc.org/projects>

Fund priorities and funding allocation from the UK side). In other words, some additionality in the form of impetus exists.

In the context of the CHANSE project, it is worth going into a little more detail about how different the system is for the Indian counterpart and linked to this the importance of the present international partnership – CHANSE - in directing funds to work in the focus area. There is no “Bhabha Fund” in India – meaning the funding for this project has to come out of the Ministry spending pot (and does so at the expense of other work). And, the process of award research grants leaves the financial allocation to the end: the research topic is approved by one team of people and the financial sign-off by a different team. The financials of the project are only looked at once an award is made. The commitment to this project has meant that funds have been channelled to this research area where they otherwise would not have been. But there have been challenges for the researchers on the Indian side – funding has been delayed and it has been reduced and this is because of a lack of ring-fencing of funds and the process for award which includes a financial assessment and award second to the research area. The strategic importance of this project meant that the Indian partner found a way to fund the action while the final details were being agreed (and therefore avoid a delay to the project).

4.3.2 Effectiveness

Research collaborations

This multi-layered, multi-disciplinary project is now in its second year of implementation (the project kick off was hosted by IIT Bombay in September 2016). The first part of the project is focused on data collection (with the first trips undertaken in February and March 2017 involving UK and Indian project participants and the next major data collection trips were planned for 2018)³³. The next phase of the project involves analysis of the information around a series of science research questions to – eventually - create modelling tools. As explained by the Indian and UK PIs, this project is the first of its kind to deal with these topics in India and in an innovative way. Using first-hand data, combined with data already available in the literature to develop new models for water management, taking into account local activity and needs in a holistic way (i.e. the human and environment needs) is expected to directly support the local and wider community.

To be able to systematically collect, compile and analyse the findings to develop new targeted tools extensive collaboration is taking place between all members – all of whom bring complementary skills to the project. Again, this is an example of a complex project where the sum is greater than the parts. To give two examples, from the UK-side, the University of Exeter was brought in due to their expertise in modelling techniques, while from the Indian-side ATREE Bangalore has the relevant expertise in Ecology in India. According to both the UK and Indian PIs, the work is well-structured (with annual meetings to bring together the different organisations and identify any data gaps or issues in a timely manner).

In terms of research outputs, publications are in preparation on water demand, ecological flow, the interactions between urban and rural water demand and the impacts of climate. Two articles have already been published³⁴.

New international partnerships

The collaboration under CHANSE is new, in the sense that it is bringing together partners who have not previously worked together. For the lead institution in India, the scale of the project and the number of (international) partners involved means it is high profile. In terms of other collaborations, neither institution has yet set up new partnerships or received additional funding as a result of this project.

Regarding the sustainability of the partnership: because the action is part of a wider programme, and network, there is potentially greater institutional support to ensure sustainability of the partnership but no concrete plans yet (it is possibly too early).

³³ In addition, Indian partners will conduct separate trips to collect water samples, download sensor data and conduct ecological surveys

³⁴ Pathak, A, Ghosh, S, Kumar, P and Murtugudde, R (2017), Role of Oceanic and Terrestrial Atmospheric Moisture Sources in Intraseasonal Variability of Indian Summer Monsoon Rainfall, Scientific Reports (Nature Publishing Group) [In Press] and Barik, B., Ghosh, S., Sahana, A.S., Pathak, A. and Sekhar, M., 2017. Water–food–energy nexus with changing agricultural scenarios in India during recent decades. Hydrology and Earth System Sciences, 21(6), p.3041.

Benefits to UK researchers

There was some evidence of the capacity and skills of UK researchers being improved by involvement in the project. For example, the UK PI provided qualitative feedback on access to research resources, network / research group, and the potential for follow on grants from GCRF.

Further, in terms of UK science and innovation base opportunities which have emerged because of the activity: the sustainable water resources programme is part of a broader research group (the UK-India Water Centre) which allows for networking and more systematic collaboration.

4.3.3 Impact

Demonstrable impact

It is too early to be able to assess actual impact, however the links to likely impacts on the local economic development and welfare for the region are fundamental to the design of the activity. Much will depend on the clarity of the results emerging from the research (and even then, will take a minimum of two years to be followed through). As explained by the Indian funding partner, they would look for results which point clearly to policies which can be implemented, and then naturally this will be more likely to be implemented. After a recently held formal review of progress, MoES explained the expectation is for clear (and therefore implementable) results.

While this focus on ensuring an applied understanding of and solutions for the IGP means the link with regional impact is strong, it does mean that the transferability of the findings is not planned for. Through the three projects looking at sustainable water resources, the bigger picture is better understood but it is unclear precisely how they come together for wider impacts.

4.4 Conclusions

- This multidisciplinary project is well aligned to India's socioeconomic priorities as well as UK ODA and Newton objectives. The project looks in an integrated and systematic way at water management challenges in the Indo-Gangetic Plain. It also brings together research institutes, and partners, who have not previously worked together.
- The Newton Fund allowed provided the impetus and the money for the project to take place.
- The lack of a dedicated "Bhabha Fund" on the Indian side, combined with a precarious funding system (whereby grants are agreed before finances are agreed) led to delays in the receipt of funding. This did not impact the project because the lead partner on the Indian side – who consider this project a strategic priority - plugged the funding gap while the details were ironed out.
- The research is only halfway through and the main elements undertaken to date have been data collection, while the pulling together, modelling and application will be the next phase of work. Publications are anticipated and two papers have already been published.
- The specificity of the research and its applied nature mean that it will have limited transferability but, on the other hand, is designed to be practicable in the region being researched. Further, it is embedded in a wider network and institutional framework, which may enable the leveraging of results and further research.

5 Community-led heritage regeneration

5.1 Summary

Action title	<i>Community-led re-generation project</i>
Short description	The project explores a model of urban conservation which is both community led and community driven. It maps and seeks to address the issues pertaining to the neglected historic gardens along the river front and attempts to bring the river, the river edge and its associated natural and cultural ecologies back into the lives of the larger population of Agra.
Objective(s)	To demonstrate to the local authorities and the communities themselves the benefits of innovative and viable approaches to regeneration can deliver, as well as test, the efficacy of participatory research.
Pillar	Research (and People)
Action value (total budget allocated in country, in GBP)	GBP £24,519; INR 300,000 (equivalent to approx. £3,250)
Start / end date (Status: ongoing or complete)	Dec 15 - Jul 16 (complete)
DP UK and overseas	AHRC and Indian Council of Historical Research (ICHR)
Award holders / grantee	Dr Orbasli (Oxford Brookes); Priyaleen Singh (School of Planning and Architecture, Delhi)

5.2 Description of the action

Brief description of action

This research network application proposed an “action-research” methodology³⁵. The research involved two University partners, Oxford Brookes University and the School of Planning and Architecture, Delhi to develop methodologies for and actively engage in 'community-led heritage regeneration' in collaboration with local NGO, Center for Urban and Regional Excellence (CURE), public sector authorities and experts with the participation of local communities.

Through a pilot project, focusing on the Mughal river front gardens of Agra, and the communities residing along the riverfront, the project aimed to explore a model of urban conservation which is both community led and community driven. Additionally, in mapping and addressing the issues affecting the neglected historic gardens along the river front it attempts to bring the river, the river edge and its associated natural and cultural ecologies back into the lives of the larger population of Agra.

³⁵ Action research refer to an approach in which the action researcher and a client (or beneficiary) collaborate in the diagnosis of the problem and in the development of a solution based on the diagnosis.

Pathway to impact

This pilot study does not fit strictly into the Research Pillar but crosses over into the People Pillar through active involvement of students from the UK and Indian universities and thereby upskilling them in applied research which is both sensitive to and confronts development needs. (See Theory of Change in [Annex 4](#)).

In terms of the **inputs**: This project involved the participation of postgraduate students who were brought in as co-researchers. Public sector authorities and local communities provided direct input in the process, with sector experts providing guidance and feedback through a series of peer review workshops. The four stages of activity were as follows:

1. Research
 - Theoretical framework
 - Identification of methodologies
 - Collaborative model
2. Fieldwork
 - Rapid urban assessments
 - Stakeholder engagement
3. Production
 - Students prepare sample project using research based design
 - Peer and expert review
4. Dissemination
 - Community (testing project)
 - Local decision

In terms of the expected **outputs**, the goals of the project were as follows:

- Identify alternative historic narratives of place, local values, tangible and intangible heritage;
- Use these as a basis for modest interventions and regeneration schemes that improve the lived-in environment and the shared public spaces that frame them;
- Combine and use improvements to deliver socio-economic benefits to the locality, including through tourism;
- Establish how heritage preservation can have city-wide impacts including the integrity of the city, improved quality of life for residents and its appeal to visitors; and
- Develop appropriate methodologies for and actively engage in 'community-led heritage regeneration'.

The **outcomes** of the collaborative approach meant those involved would gain exposure to working internationally in a new context or with colleagues from abroad. This should lead to improved capacity to deliver high quality research in India and the UK. This has the potential to lead to long-term linkages between the partner institutions and researchers.

In terms of **impact**, while the impact will mostly remain more at the researcher and potentially institutional capacity level, as well as on the literature in this specific field of development research. It should, in the longer term, if the research is used lead to impacts in terms of improved quality of life and socio-economic benefits to locals.

5.3 Analysis

5.3.1 Relevance

Activity targeting and contribution to ODA

The subject for this project came from a networking workshop event (funded by AHRC and ICHR) which identified themes for further investigation. This gave way to a call for four small research grants in four thematic areas³⁶. This action is one of four small grants awarded through the AHRC and ICHR joint call “Rapid Urbanisation and Cultural Heritage programme.”³⁷

This case study focuses on an action-research project by two University partners, Oxford Brookes University in the UK and the School of Planning and Architecture, Delhi in India in collaboration with local NGO, Center for Urban and Regional Excellence (CURE).

The call addresses one of the Newton-Bhabha Fund’s main thematic foci: rapid urbanisation. The project is aligned with ODA goals in its approach which combines the discourses of heritage-led regeneration with development studies.

The pilot study itself specifically aimed to focus on the non-elite, with an overarching question: ‘Can communities take a leading role in using heritage as a means of regeneration?’ The waterfront and former gardens are now (largely) a degraded environment with tight-knit neighbourhoods of informal settlements. And, the benefits of tourism in the area barely reach the community³⁸. The choice of location allowed the researchers to explore how heritage-based regeneration approaches can be reconciled with slum improvement practices.

Additionality

In terms of additionality, while the two lead researchers of this project were already acquaintances from their university studies, the UK PI reported: “Put simply, the fund gave us an opportunity to carry out vital collaborative research in India that we would have struggled to do otherwise”. Indeed, as explained above, the networking workshop that was a precursor to the call brought these researchers together and created the momentum and funding channel to collaborate. There are no other similar funding sources that would have allowed the researchers to do this pilot project.

5.3.2 Effectiveness

Research collaborations

This pilot study was effective at achieving the research objectives set out in the proposal. It was also a successful (new) collaboration between Oxford Brookes and the SPA in Delhi.

The involvement of CURE - acting as an interface between the local community and the research team was cited as a critical success factor for the collaboration by both PIs. CURE set up meetings and interviews with community members whilst further on-site engagement took place as a natural extension of the data gathering process. Information relating to the local community was provided by CURE the NGO partner in the project acting as informant.

The activity supported innovative research both in terms of the content and process in an under-researched area which has clear thematic relevance in India and an ODA focus. As explained by the UK PI, academically, the project covered new ground: bridging the discourses of heritage-led regeneration with development studies and participatory planning; and understanding of the Indian urban context and specifically the development context of Agra. The

³⁶ see here: <http://www.ahrc.ac.uk/documents/guides/ahrc-and-ichr-research-networking-awards-cultural-heritage-and-rapid-urbanisation-in-india/>

³⁷ The other three were as follows: [The Historic City of Ajmer-Pushkar: mapping layers of history, use and meaning for sustainable planning and conservation](#); [Learning from the Utopian City: An international network on alternative histories of India's urban futures](#); [Reflecting on the river: rapid urbanisation and representations of Indian cultural heritage](#)

³⁸ The final report detailed: “Easy connectivity to Delhi and Jaipur means that visitors can take in Agra on a day trip and the average stay is only 1.5 nights for international tourists and 1.7 nights for domestic tourists. As a result, the economic gains of tourism are only being enjoyed by a select few, with few trickle-down benefits.”

complementary skills of the UK PI (in architecture and development studies) and the Indian PI (in architecture and historical landscape) allowed for a bridging of disciplines to look at complex problems from a new angle.

There were no follow-on actions leading from this collaboration and a major reason for this was the issues around funding and delays on the Indian side which would make both parties wary of a small grant structured in this way. The funding proved a huge challenge on the Indian side. The receipt of funds from Indian partner was seriously delayed and jeopardised the delivery (the Indian PI only received funding after AHRC brought this funding delay to ICHR's attention just ahead of final workshop, private / personal funding had to be used in the meantime). While this was probably linked to the short timespan for delivery it has had a lasting impact on the willingness of both parties to collaborate in future, both of whom would be wary of the risk in receiving funding.

Capacity-building for individuals

The involvement of students in the delivery of the action provided an opportunity for capacity building for individuals. Some capacity-building and strengthening of international networks for the participants was evident.

The design of the project incorporated two visits to India for the UK students. The first visit was mostly to scope and the second was for the presentation of findings. The visits allowed the students to work together and exchange ideas. The value of the partnership from the perspective of the students was the opportunity for hands on experience, and, as explained by the Indian PI provided exposure: *“Our students got a sense of how conservation is done in Europe, challenges being different with regard to conservation in India and Europe.”* The UK PI also provided anecdotal evidence that the experience had shaped the career thinking of students, who may not have been considering development as a career but gained exposure to this area.

New international partnerships

The partnership between AHRC and ICHR was new. A MoU was signed in November 2014 for a period of three years. The success of this partnership has meant there is a follow on call under the same programme³⁹, and the set-up is the same but the funding window and time period is larger (it is still through the Newton-Bhabha Fund).

Benefits to UK researchers

As per the project final report and interviews with principal investigators on the UK and Indian side, the project was reported to have benefited UK researchers in terms of “lasting impacts on the students who by participating in an international live project became part of the research team, gained both field research skills and negotiation skills working alongside colleagues from different cultural backgrounds”⁴⁰. But also, in a more subtle way, “it gave them an early career opportunity to directly engage with the issues of rapid urbanisation and its implications for much less fortunate communities”⁴¹ which was suggested to have impacted on their career choices.

For the UK principal investigator, the main goal was the theoretical aspect (indeed the place mattered less than the approach). According to her, the project was reported to have opened opportunities for more research and contributed to realising the potential for a longer term multi-partner research on community-centred heritage regeneration.

5.3.3 Impact

Demonstrable link to development improvements

In the short-term the collaboration resulted in publicity to the SPA and the dissemination workshop was featured in local newspapers.

Since the conclusion of the project in June 2016, there has been growing interest from the urban authorities with the support of the World Bank to consider improvements to the riverfront areas. What implications this will have on the local communities, land value increases or even heritage protection is yet to be seen.

³⁹ <http://www.ahrc.ac.uk/documents/calls/final-call-guidance-cultural-heritage-and-rapid-urbanisation-in-india/>

⁴⁰ Project final report

⁴¹ Ibid.

There are also some (very early) signs that the local authority in Agra may work with the Delhi SPA to investigate potential improvements, but this remains to be seen. The renewed interest in the issue stems from extensive media coverage of the impact of pollution on the Taj Mahal, which is turning the white marble yellow and green and has resulted in a Supreme Court ruling for action to protect the monument.

5.3.4 Complementarity and coordination

This project was relatively small scale but has led to the continuation of the collaboration between AHRC and ICHR. For the Indian funding partner, ICHR, the partnership was described as adding value from a technical perspective, which was referred to as “sharp edge” critical approach to reviewing proposals, and has provided an example to the ICHR of the “promptness” by which things can be achieved. Although the extent to which this results in institutional changes in the way of work is yet to be seen, the potential for institutional learning was valued.

5.4 Conclusions

- This was a creative project bringing academic expertise into the real world to look for solutions to the socio-economic challenges which are socially responsible. Publications are expected but there is nothing to reference yet.
- It was a small-scale pilot study with modest ambitions which were realised and which may or may not have larger impacts. As commented by all involved, these impacts will take a while to materialise.
- The involvement of a local NGO gave access to their network, which was a strength of the design.
- Integrating the study into the curriculum in both home institutions of the PIs allowed for a series of community-led heritage regeneration projects and provided practical learning opportunities to students – in the UK and in India. The student projects, were intended not just as an output but also as a research tool through which ideas and recommendations become tangible elements for discussion tested with local inhabitants, NGO partners and local decision makers.
- The main challenge in this project was that funding from Indian side was delayed which could have led to the final workshop being cancelled. This exposed the vulnerability of short time spans and small-scale projects which rely on timely payments.

6 Conclusions

India has a long history of scientific cooperation with the UK but less so in the field of innovation. When the Newton Fund was launched 2014, the British Council, Royal Society, RCUK and SIN already had strong long-standing partnerships and relationships with many government departments and organisations in India. This meant the Newton-Bhabha Fund was able to get up and running quickly, especially in the capacity building and research collaboration space. But it has also been successful in developing a host of completely new partnerships with many Indian institutions. For example, as a result of the Newton-Bhabha Fund collaborative work in the innovation space is beginning to grow.

Linked to this, the additionality of the Newton-Bhabha Fund has often been in building on significant pre-existing collaboration but using the Newton-Bhabha Fund to scale up and drive forward activity to the next stages. In two cases investigated here, the previous work was crucial in laying the foundations for subsequent, more ambitious work. The benefit of the Newton-Bhabha Fund has been in providing a (relatively) flexible framework for driving collaborations in applied research forward or extending the reach of UK-Indian partnerships.

Further, the Newton-Bhabha Fund stands out from other international funding sources in terms of the collaborative approach, the length of projects supported, and its multidisciplinary approach. Researchers both in the UK and India felt that their project could not have happened in the absence of the Newton Fund, either in terms of the scale of funding or the impetus achieved.

Although it is still quite early days for the two larger projects investigated, there is already evidence of the Newton Fund supporting high-quality research with the potential for high impact in multidisciplinary areas in the long term. In both cases, the Newton-Bhabha Fund has provided funds to take research forward in areas of identified mutual benefit and interest in a collaborative way (i.e. making use of a combination of scientific excellence of UK institutions and Indian institutions and the specificities of the Indian climate).

The activities investigated show the Newton-Bhabha Fund projects can bridge the pillar-specific activities and objectives, with elements of the People Pillar supporting otherwise strictly Research Pillar projects. For example, a large number of research pillar activities have capacity building elements through the involvement of students/young researchers. This supports the development of networks and relationships, as well as capacity building for those involved. The partnerships created have been both between the UK and Indian institutions and between UK partners and between Indian partners as well. There are examples of new partnerships being explored based on relationships built through participation in Newton-Bhabha activities. This suggests multiplier effects are likely.

There were some serious administrative delays in the release of funds in two of the three case studies, which reflect the different approach to awarding funding in India where the technical and financial elements are completely decoupled, as well as inflexibility in dealing with short-term projects and the absence of a “Bhabha Fund” on the Indian side (which means that Indian funding partners have to allocate spend to Newton-Bhabha funding that they would otherwise have spent on other activities which means funding is allocated on a case-by-case basis). In one case the delay was close to jeopardising the delivery but intervention from the UK delivery partner came in time. In the third case study, there was an administrative delay caused by Indian customs control which means that the Indian side of research is six months behind the UK. This raises questions about how collaborative the research is but was not considered a problem by the UK or Indian partners.

There were concerns about the limited institutional (administrative) capacity of some Indian funding partners which can also lead to delays / jeopardise delivery when delivery is particularly time sensitive. Following from this point, there is actually a limited capacity within some Indian partners to run multiple programmes and they are actively trying to limit them in particular cases (not across the board). The in-country team has oversight and is actively managing this risk.

There is clearly a great deal of ambition and desire to collaborate, but looking beyond 2021 there is no known funding to leverage or to continue the valuable partnerships developed. This will increasingly become a problem unless the issue of cliff edge in funding is addressed and mechanisms to leverage benefits are put in place.

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Research Participants

Phone Interviews – Coffey International, London

David Kenyon, Asia Regional Director, BEIS (07/12/2017)

Michael Booth, BBSRC (30/11/2017)

Michelle Manning, NERC, - by email

Gemma Evans, AHRC (10/11/2017)

Ana Mijic, Imperial College London (17/01/2018)

Peter Shewry, Rothamstead (10/01/2018)

Aylin Orbasli, Oxford Brookes (29/01/2018)

Field Research

New Dehli, 19 February – 22 February

Rita Sharma, Newton-Bhabha Fund, British High Commission

Tamil Chandru, Newton-Bhabha Fund, British High Commission

Aditi Sharma, Newton-Bhabha Fund, British High Commission

Purti Kohli, Senior Programme Manager, British Council

Malyaj Varmani, Assistant Director, British Council

Manjula Rao, Director, Education, British Council

Sarah Mooney, Head of SIN, India, FCO

Nupur Barau, Head of DfID's South Asia Research Hub (SARH)

Dr Shailja Gupta, Director International Cooperation, Department of Biotechnology

Dr Om Jee, Assistant Director Research, Indian Council of Historical Research

Dr Vijay Kumar, Scientist F, Ministry of Earth Sciences

Dr Parvinder Maini, Ministry of Earth Sciences

Daniel Shah, Director, RCUK India

Prof Priyaleen Singh, School of Planning and Architecture, Delhi

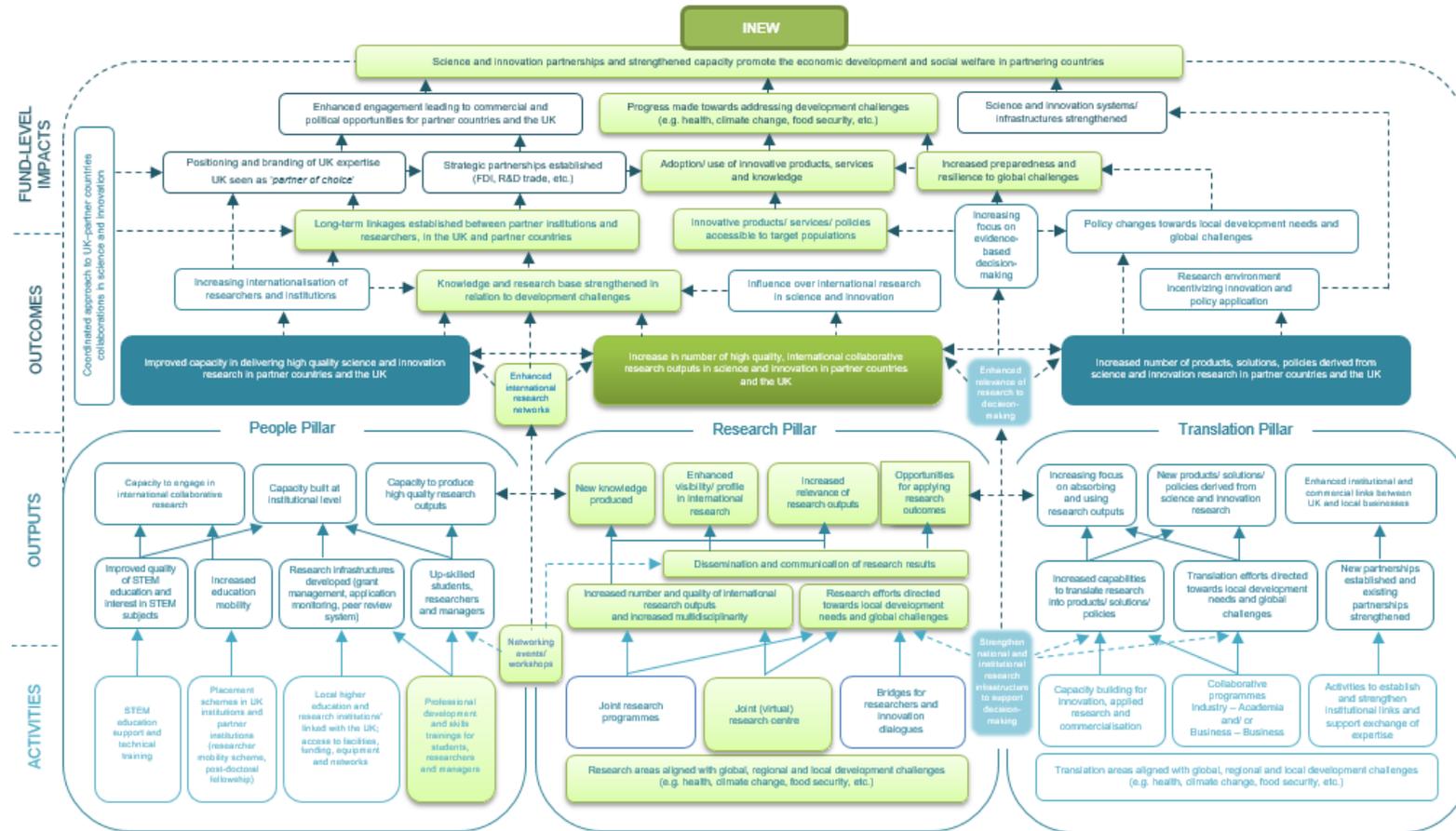
Karnal, 20 February

Karnam Venkatesh, PI for INEW, IIWBR

Mumbai, 23 February

Subimal Ghosh, PI for CHANSE, IIT Bombay

Annex 2 – Theory of change (INEW)



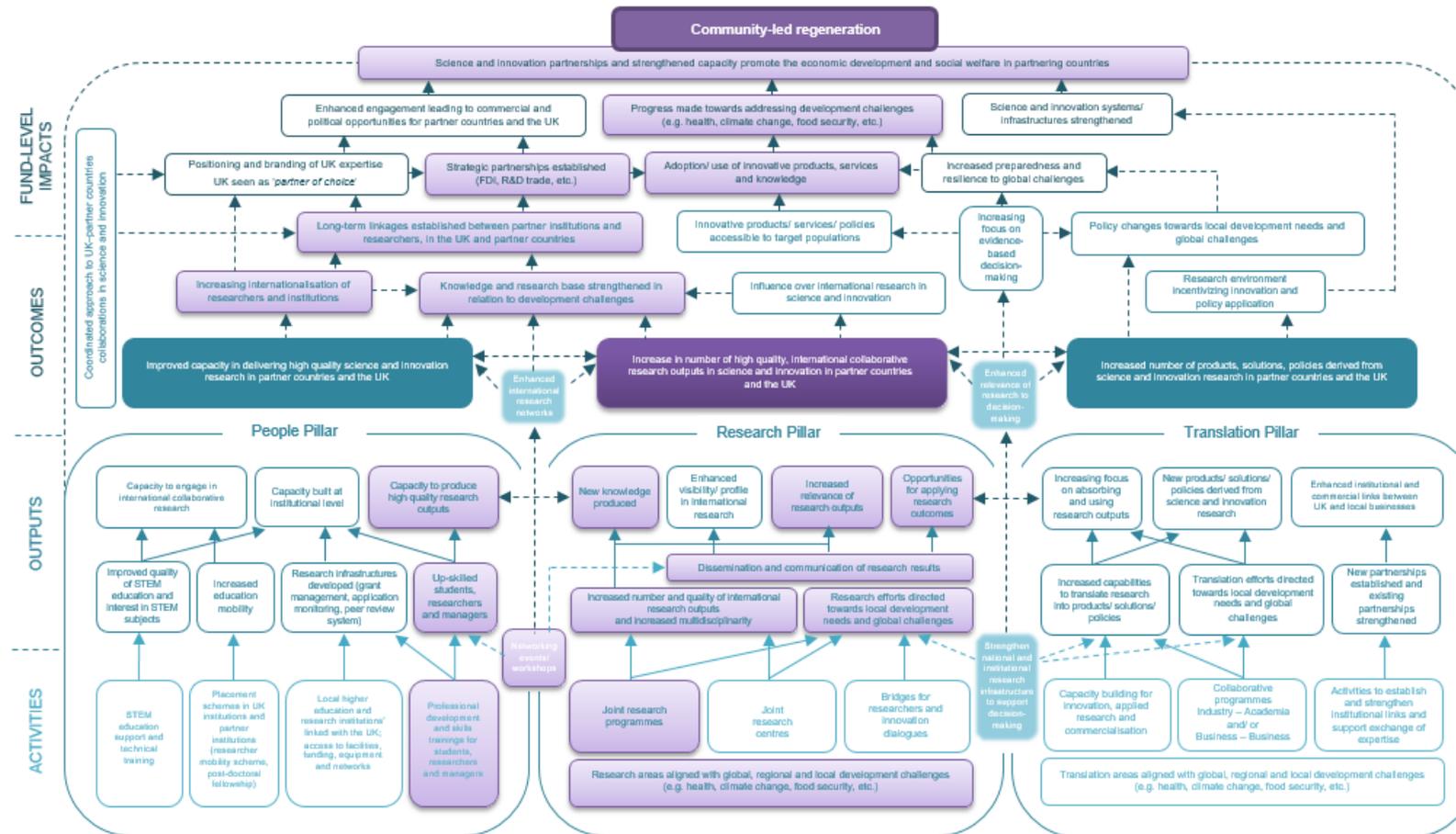
CAPTION

- ➔ Strong evidence supporting linkages
- ➡ Weak/ no evidence supporting linkages
- A Assumptions

LIST OF ASSUMPTIONS

- A Researchers (UK and non-UK) are aware of opportunities for partnerships and capacity building schemes
- A Funding adequately covers infrastructure needs for science and innovation activities in partner institutions
- A UK HE institutions have the capacity to provide high standard opportunities to mobile students and researchers
- A Students, researchers and managers with enhanced capacity transfer knowledge in their home HE institutions
- A New collaboration channels are sustained during and after the Newton Fund
- A Partner countries, private foundations, multi-lateral organisations and corporate partners have the capacity to bring in sustainable funding to support the partnerships established by the Newton Fund
- A Education and R&D exports are not affected by regulatory measures (in the UK or partner countries)
- A Increasing levels of collaboration with partner countries strengthens UK's international research position
- A High quality science and innovation research translates into practical solutions to enhance economic development and welfare

Annex 4 – Theory of change (Community-led regeneration)



CAPTION
 → Strong evidence supporting linkages
 - - - Weak/ no evidence supporting linkages
 A Assumptions

- LIST OF ASSUMPTIONS**
- A Researchers (UK and non-UK) are aware of opportunities for partnerships and capacity building schemes
 - A Funding adequately covers infrastructure needs for science and innovation activities in partner institutions
 - A UK HE institutions have the capacity to provide high standard opportunities to mobile students and researchers
 - A Students, researchers and managers with enhanced capacity transfer knowledge in their home HE institutions
 - A New collaboration channels are sustained during and after the Newton Fund
 - A Partner countries, private foundations, multi-lateral organisations and corporate partners have the capacity to bring in sustainable funding to support the partnerships established by the Newton Fund
 - A Education and R&D exports are not affected by regulatory measures (in the UK or partner countries)
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 - A High quality science and innovation research translates into practical solutions to enhance economic development and welfare