Department for Business, Energy & Industrial Strategy

GCRF Global Challenges Research Fund

Newton Fund

DEVELOPMENT OF KEY PERFORMANCE INDICATORS

Official Development Assistance (ODA) for research and innovation

Final Report

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Authors: Chris Barnett, Billy Bryan, Rose Pinnington, Julian Barr, Paul Simmonds, Peter Kolarz and Melanie Punton

itad

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This report has been prepared by Dr Chris Barnett (Partner, Technical Excellence at Itad), Dr Billy Bryan (Consultant, Technopolis), Rose Pinnington (Independent Consultant, Itad), Julian Barr (Non-Executive Director, Itad), Paul Simmonds (Managing Director, Technopolis), Melanie Punton (Senior Consultant, Itad) and Dr Peter Kolarz (Senior Consultant, Technopolis). The report was edited and proofread by Chris Steel and Barbara Cheney. We are particularly appreciative of the support from Sheila Honey (BEIS), Saima Tarapdar (BEIS), Victoria Saul (BEIS), Heidi Peterson (UKRI, BEIS) and Rebecca Tanner (UKRI).

Disclaimer

The views expressed in this report are those of the evaluators. They do not represent those of the Department for Business, Energy and Industrial Strategy (BEIS) or of any of the individuals and organisations referred to in the report.

Any enquiries regarding this publication should be sent to us at:
enquiries@beis.gov.uk **[replace with team email address if available]**

Contents

Acronyms and abbreviations

BEIS	Department for Business, Energy and Industrial Strategy
COHRED	Council on Health Research for Development
Co-I	Co-Investigator
DAC	Development Assistance Committee of the OECD
DFID	Department for International Development
DP	Delivery Partner
GCRF	Global Challenges Research Fund
GDP	Gross Domestic Product
GtR	Gateway to Research
HEFC	Higher Education Funding Council
HEI	Higher Education Institutions
HEP	Higher Education Partnerships Programme
ICAI	Independent Commission for Aid Impact
ICF	International Climate Finance
IDS	Institute of Development Studies
KPI	Key Performance Indicator
LMIC	Low- and Middle-Income Country
NFC	National Funding Council
ODA	Official Development Assistance
NF	Newton Fund
PI	Principal Investigator
QR	Quality-related Research
R4D	Research for Development

R&I	Research and Innovation
RC	Research Council
REF	Research Excellence Framework
SDGs	Sustainable Development Goals
TA	Technical Assistance
ToC	Theory of Change
UK	United Kingdom
UKCDS	UK Collaborative on Development Science
UKRI	UK Research and Innovation
UKSA	UK Space Agency
VfM	Value for Money

Executive summary

The Department for Business, Energy and Industrial Strategy (BEIS) spends part of the overseas aid budget on research and innovation through two major initiatives: The Newton Fund (£735 million, 2015–21), and the Global Challenges Research Fund, or GCRF (£1.5 billion, 2016-2021). Both funds aim to leverage the UK's world-class research and innovation capacity to pioneer new ways to support economic development, social welfare and long-term sustainable and equitable growth in low- and middle-income countries.

The funds are delivered through a number of delivery partners, including UK Research and Innovation (UKRI) – which brings together the seven research councils with Innovate UK and Research England – the national academies, the devolved Higher Education Funding Councils, the British Council, the Met Office and the UK Space Agency (UKSA).

Several recent reviews of the Newton Fund and GCRF have highlighted the need to focus more attention on the use of evidence to track performance, improve impact and deliver value for money. As part of these improvements, this study was commissioned to develop a set of Key Performance Indicators (KPIs).

Developing indicators in this field is challenging, particularly to assess the impact of research on economic development, social welfare and environmental sustainability. The complexity and length of time it often takes for research to have a societal benefit is well-known, with some impacts taking decades after a long sequence of research and innovation outputs. This complexity is further amplified by the sheer diversity of GCRF and Newton Fund award holders, delivery partners, research topics and geographical coverage, which in effect means that impacts are often dispersed across very different contexts and not readily aggregated.

To fully capture development impact of these funds, we instead suggest a combination of evidence-based solutions that go beyond simply reporting indicators. This includes:

- **Undertaking additional primary data collection (surveys) to** better capture outcome and impact-level changes – particularly from the perspective of Co-Investigators and partners from low- and middle-income countries.
- **Increasing the strategic focus and portfolio management** of the funds so that multiple awards are more concentrated around prioritised research and development areas, and so that impact becomes more than the sum of the parts.
- **Undertaking other evaluative and research studies** to complement the tracking of indicators. This is important to more thoroughly understand how GCRF and the Newton Funds contribute to impact, especially relative to other initiatives and contextual factors when a counterfactual is not possible.

For regular monitoring, we suggest KPIs that **focus primarily on the output-to-outcome relationship** and shorter-term outcomes. An initial long list of 75 GCRF, 38 Newton Fund and 26 cross-fund indicators were produced in the Interim Report. Through consultations with BEIS and the delivery partners, the list was then reduced to 26 indicators, which includes 18 cross-fund and four indicators each that are specific to GCRF and the Newton Fund.

In moving forwards with the rollout and continual monitoring of these KPIs, we suggest that:

1 BEIS and the delivery partners consider in more detail how best to capture the perspectives of research and other partners in low- and middle-income countries. This is an important complement to the perspectives of principal investigators that are largely based in the UK. We suggest that some of the KPIs are populated from data from a formal survey of co-investigators and partners

2 Explore options for the additional data collection necessary to developed impact-orientated KPIs. This might include: investing in an ICF-style methodology with a dedicated secretariat; opting for an indicator set that focuses only at the outcome level (leaving the longer-term impacts to be covered by evaluations); and/or, exploring more innovative ways from data science to better 'mine' the current qualitative reporting. As a minimum, we suggest three highly-targeted surveys of award holders from low- and middle-income countries; UK-based principal investigators; and, a post-event survey.

3 Align the greater strategic focus of the funds to the KPI system. For example, the KPIs for capturing longer-term change should be aligned to the systems used by the GCRF Challenge Leaders to track and review performance and impacts across their portfolios.

4 Decide on the extent of process/activity-level monitoring that is necessary for portfolio management and accountability. For instance, adding a KPI to track the proportion of ODA funding spent with partners overseas, given recent ICAI remarks on 'tied aid'. It is however important that there are not too many process/activity indicators, as this may obscure the key measures of performance (outputs, outcomes, impacts).

5 Develop plans for piloting and roll-out for data collation and reporting, in consultation with the delivery partners. Inevitably, the metrics will change over time, based on the experience of using them to report on a regular basis and inform decisions. As the rollout progresses, there will also be challenges with data collection and consistency which were unknown at the start, plus policy priorities will change and some KPIs may become redundant over time. The implementation of the KPIs therefore needs to be regularly reviewed and adjusted so to remain relevant going forwards.

1 Introduction

BEIS spends Official Development Assistance[1] (ODA) on research and innovation through the Newton Fund, the Global Challenges Research Fund (GCRF), and ODA spend from the core science and research budget. The Newton Fund is a £735 million investment (2015–21) that supports economic development and social welfare, developing research and innovation capacity for long-term sustainable and equitable growth. The GCRF is a £1.5 billion fund to ensure that the UK's world-leading research takes a major role in pioneering new ways to tackle global problems faced by low- and middle-income countries (LMICs). Both funds aim to maximise the practical impact of research and innovation to improve the lives and opportunities of the global poor – and in doing so will strengthen the UK's research and innovation system, supporting our wider prosperity and global influence. The funds are delivered through numerous Delivery Partners (DPs) including UK Research and Innovation (UKRI) – which brings together the seven research councils with Innovate UK and Research England – the national academies, the devolved higher education funding councils (HEFC), the British Council, the Met Office and the UK Space Agency (UKSA).

ODA is accompanied by a high degree of scrutiny. Alongside the usual means of scrutiny (such as departmental reporting to HM Treasury, and the National Audit Office studies), the Independent Commission for Aid Impact (ICAI) provides scrutiny specifically for the ODA spend. ICAI reports to Parliament through the House of Commons International Development Committee. Several ICAI reviews have highlighted the need to focus more attention on monitoring, evaluation and learning.[2] BEIS and its DPs have been learning from the on-going delivery of the GCRF and Newton Fund, and in doing so, seek to strengthen the approach to assessing performance, impact and value for money. The development of Key Performance Indicators (KPIs) to measure the impact of research and innovation is particularly challenging, as further discussed in section 2.3.

This study was commissioned following the GCRF Foundation Evaluation Stage,[3] and is designed to draw upon its detailed work on the GCRF Theory of Change (ToC) and the process evaluation of DP datasets. The development of KPIs draws extensively on this earlier work, first producing a long list of KPIs that mirror the GCRF ToC, then comparing these with the draft Newton KPIs and the ODA-level ToC to produce an initial set of cross-fund indicators. These were reduced in consultation with BEIS and DPs to end up with the final set of KPIs presented in this

[1] ODA is defined under Section 1 of the International Development Act 2002 as activities needed to demonstrate that they are aiming to contribute to a reduction in poverty, and aim to further sustainable development (development that is likely to generate lasting benefits for the population of the country to which it is provided).

[2] In September 2017, ICAI published a review of GCRF recommending that '*BEIS should develop a results framework for assessing the overall performance, impact and value for money of the GCRF*'. In June 2019, ICAI's review of the Newton Fund made a related recommendation, '*to improve its approach to monitoring, evaluation and learning at the Fund level*'.

[3] Barr *et al.* (2019) *GCRF Evaluation Foundation Stage: Final Report*, report for BEIS, June 2019, Itad and Technopolis, UK.

report (section 6). The aim is to provide useful measures of performance across BEIS' ODA-funded research and innovation.

The report is structured as follows: Section 2 explains how ODA-funded research aims to contribute to poverty reduction and sustainable development. Section 3 sets out the methodology used to develop the KPIs, and Section 4 reviews the data sources available to populate these indicators. Section 5 is the main body of the report, which sets out the initial (long) list of KPIs. This has been reviewed and refined to a shorter list of indicators for the GCRF, the Newton Fund and cross-fund KPIs, which are set out in Section 6. Finally, Section 7 provides the suggested next steps, including how to take forward the roll-out of indicator-based measurement and reporting across both funds.

This scoping work covers the period from April to December 2019. The KPIs will be further refined by BEIS in consultation with DPs going forwards.

2 Theories of Change for the GCRF and the Newton Fund

The GCRF and the Newton Fund are different in their aims and ways of working, as represented by their respective ToCs. The approach taken for developing the initial KPIs has been to focus on the GCRF ToC first, enabling us to build upon the detailed earlier process evaluation (under the evaluation foundation stage).[4] This process evaluation included an assessment of the GCRF metadata from DPs and award holders, and this has been central to ensuring the KPI development is cognisant of the available data sources (see section 4). By starting with the detailed GCRF ToC in this way, the aim has been to reduce the risk of creating KPIs that are too generic to be useful or insufficiently grounded in the available datasets. Drawing on both the GCRF and Newton Fund ToCs,[5] we have selected a subset of **cross-fund KPIs** that have broad applicability across both the funds. This has been mapped across the ODA Theory of Change (see section 6),[6] which sits above the specific GCRF and Newton Fund ones.

2.1 Overview of GCRF Theory of Change

In this section we outline the main features of the GCRF ToC. A more complete narrative can be found in the *GCRF Evaluation Foundation Stage: Final Report* (pages B1 to B16). The GCRF ToC maps high-level pathways between GCRF's research and technologies (its activities and outputs), and the positive development impacts it seeks to influence. The ToC recognises that research and innovation contribute to development outcomes through complex interactions of multiple stakeholders in varied innovation, policy and practice systems – and differentiates between a sphere where GCRF has direct influence, and a subsequent indirect sphere where other complex dynamics come into play to either enable or inhibit progress.

The ToC begins with a description of GCRF's research and innovation **interventions and outputs**. The principal interventions being implemented by GCRF are:

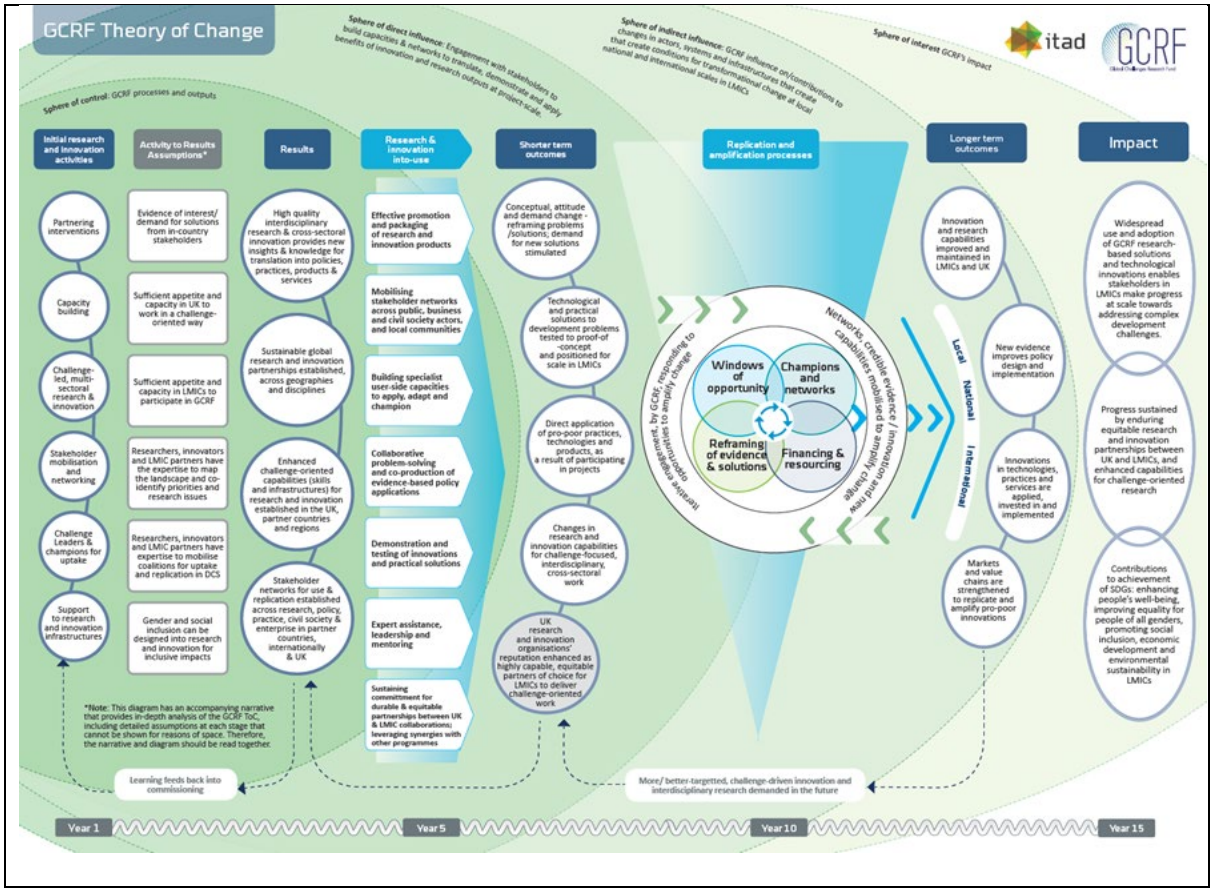
- Challenge-led, multisectoral research and innovation: including bi/trilateral DP programmes, interdisciplinary hubs and rapid response studies.
- Capacity-building interventions: including fellowships and studentships, and capacity development activities to build research and innovation skills in LMICs.

[4] Barr *et al.* (2019) *op cit.*
[5] Note: The Newton Fund KPIs were produced by Coffey prior to this assignment, as part of a separate Newton Fund evaluation contract. Subsequently, Itad and Technopolis were commissioned to fill the gap in GCRF-specific KPIs. Once this work was completed, we then worked with Coffey under this assignment to refresh the Newton Fund indicators and produce cross-fund KPIs.
[6] Page 5 of the BEIS Annual Report 2017–2018 of the Newton Fund and Global Challenges Research Fund.

- Partnering interventions: including Global Engagement events, brokering research and innovation partnerships between UK and LMIC institutions.
- Stakeholder mobilisation and networking, engaging stakeholders in government, business, research, innovation, civil society and communities.
- Challenge Leaders and champions for uptake: including establishing Challenge Leaders, to cluster GCRF projects working on similar issues and geographies.
- Support to research and innovation infrastructure: including support to technical systems, market development, policy and the regulatory environment.

GCRF programmes and projects also undertake intensive 'research-into-use' processes with stakeholders to enable translation into new policy frameworks, new products, processes and services, as well as supporting new capabilities and infrastructures.

Figure 1: Illustration of the GCRF Theory of Change



Source: Barr et al. (2019).

If this 'research-into-use' works as intended, the ToC anticipates that this will lead to a set of **intermediate outcomes**. Intermediate outcomes encompass changes in knowledge, attitudes and skills, as well as small-scale changes in policies, practices and behaviours among stakeholders **directly** engaged by GCRF projects and programmes. This might for instance include:

1 *Conceptual and attitudinal changes* around development challenges and potential solutions – including increased demand for solutions – all informed by evidence.

2 *Technological and practical solutions* to development problems tested to proof-of-concept and positioned for scale in LMICs.

3 *Direct applications* of practices, technologies, products and services that improve people's lives as a result of participating in the project.

4 *Changes in research and innovation capabilities* (individual skills, networks, infrastructures) for challenge-focused innovation and research.

5 The *global* reputation of UK Research and Innovation organisations is enhanced as highly capable, equitable partners of choice for LMICs.

For most GCRF projects, these are considered early-stage changes at this level and localised within the immediate settings and networks. This is a key point, as it means that while such changes are more directly attributable to GCRF award holders and their partners, it is unlikely to be of the scale necessary to result in development impact. For this reason, the ToC proposes that such impacts will start to ripple out through broader stakeholder groups that catalyse further change, either through replication in other settings and/or scaled to benefit larger numbers. Many factors influence this **process of replication and amplification** within different policy, practice and market settings.

The ToC then anticipates that **higher-level outcomes** will emerge at different scales and diverse settings – local, (sub) national and international. These include:

- New evidence improves policy design and implementation.
- Innovation and research capabilities (skills, systems, infrastructures) are improved and maintained in LMICs.
- Innovations in technologies, practices and services are applied, invested in and implemented on a wide scale to improve people's lives in different settings/scales.
- Markets and value chains are strengthened to replicate and amplify pro-poor innovations, products, technologies and services.

Taken together, this contributes to GCRF's **overall impact**: Tangible, development impacts are achieved through the direct use and widespread adoption of GCRF-supported policy, practice and technology innovations by development stakeholders. This helps establish new capabilities and systems for challenge-oriented, interdisciplinary research and innovation in both the UK and LMICs – sustained by enduring and equitable research and innovation partnerships.

In summary, through catalysing a new wave of interdisciplinary research and innovation, GCRF aims to make progress towards the Sustainable Development Goals (SDGs). And while it is ambitious to expect individual research projects to have impact on the SDGs in the short term, it is at the larger, systems level that GCRF expects a cumulative impact over its 15-year timeline (2017–32). It is therefore not simply an aggregation of many hundreds of GCRF award holders, but

importantly, requires a more strategic coalescence of several research and innovation projects and partnerships (such as anticipated through processes like those led by the GCRF Challenge Leaders).[7]

2.2 Overview of the Newton Fund Theory of Change

The Newton Fund aims to '*promote the economic development and welfare of either the 15 partner countries or, through working with the partner country, to address the problems of poor people around the world. It will do so by increasing their scientific capacity and unlocking further funding to support poverty alleviation*' (Coffey 2016). Activities under the Fund have been grouped under three categories (known as pillars), under which funding schemes are approved. Each has a different objective, although synergies are expected between the different pillars:

- **People pillar**: Activities under this pillar are focused on developing human capital in order to create the appropriate skills and competencies base to enable further partnerships to be established between the UK and partner countries. Four different types of activities have been identified during the ToC development process: (1) STEM education support and technical training; (2) *placement schemes in UK institutions and partner institutions* (researcher mobility scheme, post-doctoral fellowship), such as the Newton International Fellowship Scheme, Newton Research Collaboration Programme, Newton Mobility Grants and Researcher Links Travel Grants; (3) *local higher education and research institutions* linked with the UK; including access to facilities, funding, equipment and networks, such as Researcher Links; and (4) *professional development and skills trainings* for students, researchers and managers.

- **Research pillar**: The aim of this pillar is to identify and address specific challenges faced in the partner countries, or in other parts of the world where UK-partner country collaborative research can make a difference on a regional or global scale. Activities under this pillar are expected to generate new knowledge and possible solutions to local, regional and global challenges. They also enable the building of participant researchers and institutions' capacities as they gain new skills, are exposed to different ways of working, and enhance their familiarity with international research standards. Three different approaches to activity under the Research pillar have been identified: (1) *Joint research programmes*, such as Rice Research Initiative, Marine Development Feasibility studies and Earthquake Without Frontiers; (2) *Joint research centres*, such as the UK–China Joint Centre on Probiotic Bacteria and the Centre for Research on Avian Diseases; and (3) Bridges for researchers and innovation dialogues.

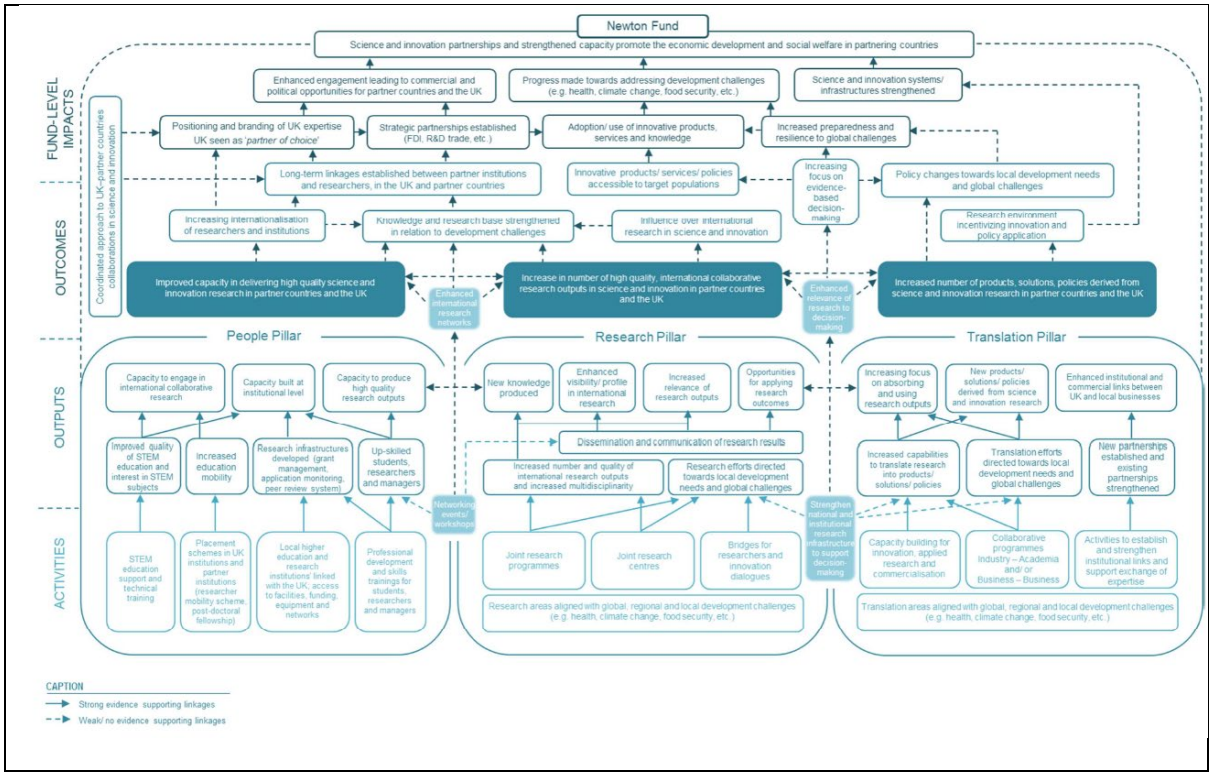
- **Translation pillar**: This pillar aims to support and bring together the local expertise of researchers in partner countries and in the UK through the development of collaborations between academia and industry or business-to-business to ensure that innovative research has a route to the policy arena or

[7] The GCRF Challenge Leaders provide strong, intellectual and strategic leadership with the aim of maximising the portfolios' overall research excellence and real-world impact. Source: www.ukri.org/research/global-challenges-research-fund/gcrf-challenge-leaders/

the market (via commercialisation). There are three main types of activities: (1) *Capacity building for innovation, applied research and commercialisation*, such as the Leaders in Innovation Fellowships Programme; (2) *Collaborative programmes*, Industry–Academia and Business–Business, such as the Higher Education Partnerships Programme (HEP), collaborative industrial R&D and institutional links; and (3) *Activities to establish and strengthen institutional links* and support exchange of expertise.

Some activities are designed to bridge the pillars to encourage synergies or they might be seen as precursors to other work, as per the Theory of Change, below.

Figure 2: Illustration of the Newton Fund Theory of Change



Source: Coffey (2016).

It is expected that through these activities and outputs, the Newton Fund will support the **creation of a knowledge and research base** in relation to development challenges. This will likely arise from the people and research pillars, from enhanced international research networks, but also from an increased internationalisation of researchers and institutions (skills, ways of working, enhanced familiarity with international research standards); and from the newly gained influence of partner countries over international research in science and innovation.

It is anticipated that new products, solutions and policies derived from science and innovation research in partner countries and the UK will lead to:

- Evidence-based policy changes towards local development needs and global challenges.
- Access and adoption/use of innovative products, services and knowledge by relevant populations when and where needed.

- Increased preparedness and resilience to global challenges (eventually), as well as promoting economic development and social welfare in partnering countries.

Through these processes, one final outcome of the Newton Fund is strengthened science and innovation systems and infrastructures in partner countries, thereby creating research environments incentivising innovation and policy application.

2.3 The challenge of impact-level KPIs

Most interventions typically focus on the output-to-outcome relationships through their regular monitoring and reporting, with more evaluative and in-depth work aiming to assess impact-level changes. The recent ICAI review[8] of the GCRF recommended that BEIS should develop '*a results framework for assessing the overall performance, impact and value for money of the GCRF portfolio'*. Within this recommendation, it is suggested that BEIS develop indicators to enable it to measure overall impact. One example is International Climate Finance (ICF) that has created impact-level indicators, although this has required a significant amount of resources with a dedicated secretariat to produce the methodology, data analysis and the reporting of numbers. It is unclear at the time of writing, how far impact measurement for will be resourced by BEIS and DPs as part of regular monitoring – or captured through periodic evaluation and research studies that are additional to the Newton Fund evaluation run by Coffey and the forthcoming GCRF evaluation.

From a technical perspective, it is also challenging to develop impact indicators for the GCRF and the Newton Fund that are similar to ICF (and other funds) for a number of reasons, including:

- **The complexity of factors and the time it takes for research to have a societal benefit**. While there are exceptions, research generally takes decades for R&D processes to lead to technological and other advances that are more widely adopted (see Box 1 for an example). Any contribution of the GCRF and the Newton Fund to the SDGs is likely to be the consequence of a long process of replication and scaling-up – influenced partly by their respective projects but also sometimes surprisingly through the complex interplay of different stakeholders operating within a particular innovation system and policy context.

- **The diversity of GCRF and Newton Fund award holders, DPs, research topics and geographical coverage**. For example, the GCRF portfolio is diverse and diffuse making it harder to capture impact.[9] The grants cut across many different disciplines: with impact indicators spanning 17 SDGs (not only the more orthodox sectors like health, education, agriculture, etc), plus over 1,410 awards operating in many different countries, regions and local contexts. The uniqueness of any single research area (such as in the podoconiosis example in Box 1) is multiplied many times by the country of the

[8] ICAI (2017). *Global Challenges Research Fund. A rapid review*. ICAI, London. The report states (page ii): "…given the breadth of the SDGs agenda, the result is a scattered portfolio of research projects, rather than a concentration of effort on pressing global development challenges".
[9] ICAI (2017), *op. cit.*

research (Ethiopia in this case) and target audience (i.e. patients vulnerable to a specific foot disease). In time, it is hoped that the 12 Challenge Areas will provide this greater focus on collective impact.

A separate report considers the full extent of this challenge, including a comparison of KPI use by other ODA-funded research for development.[10]

Box 1. Example of the research-to-development impact

In a rapid review of Research Excellence Framework (REF) cases (not GCRF- or Newton Fund-specific), we noted some examples of research that had contributed to a wider developmental impact. For example,[11] researchers at the University of Sussex and partners helped generate the evidence base for a simple foot-hygiene treatment and prevention for podoconiosis (a non-infectious disease that results in swelling of the lower legs). This included numerous publications over many years. While the prevention and treatment is said to have reached at least 60,000 Ethiopian patients, this was only after researchers worked with the private sector to secure the donation of several hundred thousand pairs of shoes for disease prevention; translated the research results through assisting the development of a national podoconiosis forum in Ethiopia; and the creation of Footwork, the International Podoconiosis Initiative. The exact time frame over which this was achieved is unclear, although the listed award holders span 11 years (2007–18).

It is worth noting that many of the ICF indicators actually capture outputs and output-to-outcome changes, rather than development impacts per se. There is a difference between what evaluators define very precisely as 'impact' at the far end of the ToC, and everyday use of 'impact' to refer to any change that can be associated with an intervention. So, for example, ICF indicator 2 measures the '*number of people with improved access to clean energy…*'. While this captures **access**, it does not go as far as measuring the **impact** on people's lives as a consequence of this improved accessibility. Similarly, ICF indicator 9 is defined as the '*number of low carbon technologies supported (units installed) through ICF suppor*t'… however, this does not capture the impact on the carbon footprint as a result of such technology. Such societal and environmental impacts are of course captured by other ICF indicators.

In short, impact indicators for the GCRF and the Newton Fund are a considerable technical and practical challenge, and the solution to the ICAI-posed challenge is likely to require a combination of:

1. **A mix of outcome and impact indicators** focusing more on the output-to-outcome relationship and shorter-term changes for regular monitoring – but balancing this with sufficient capture of longer-term change (at scale). Suggested KPIs are outlined in section 5 (GCRF) and section 6 (Newton Fund and cross-fund), but will require further consultation to reach a more concise list.

[10] Pinnington, R. and Barnett, C. (forthcoming). *Key Performance Indicators in R4D Funds – a review of donor practice*, Draft report for BEIS, Itad and Technopolis: Brighton, UK.
[11] University of Sussex (2014) *Guiding Treatment and Leading Advocacy for Podoconiosis, a Common but Highly Neglected Tropical Disease*. REF 2014 Impact Case Study. Source: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=41523

2. **Greater investment in data mining and additional data collection**, including surveys as set out in section 5.1. Current routine data collection is unlikely to provide sufficient data alone.

3. **Greater strategic focus and portfolio management** (such as through the GCRF Challenge Leaders) to create fewer concentrations of impact in clearly prioritised research and development areas. By concentrating investment in this way, impact is likely to be more detectable because it is less diffuse.

4. **Complementary evaluative and research work** to fully understand the contribution of the GCRF and the Newton Fund to impact (alongside other factors), and the qualitative aspects of change. The final list of KPIs can provide a platform for future evaluation work of both funds – as distinct from their use for routine monitoring. For example, a KPI based on the '*number of research projects co-investigated by UK and LMIC partners*' provides a signal of improving (or worsening) trends for annual reporting purposes. The same indicator (say analysed by challenge area, geography, etc.) also provides the basis to decide where to explore more evaluative questions: such as qualitative aspects about how 'equitable' these partnerships are, say, using the Council on Health Research for Development's (COHRED's) Research Fairness Initiative Framework.

3 Approach to developing KPIs

This section sets out the methodology for developing the KPIs, based on the BEIS Specification (Terms of Reference, Annex 1) and our proposed approach. For this assignment, a central challenge in developing KPIs is creating indicators that are both straightforward to collect (and, importantly, to use) while simultaneously capturing the essence of success – which ultimately is a contribution to the SDGs. KPIs can be deceptively simple and yet be underpinned by significant data collection and methodological challenges. In the research and innovation space, this is amplified by the complexity of external factors and decades are sometimes required for change to occur (from the initial research through to a tangible impact on social inclusion, economic growth and environmental sustainability). Our approach has been to find a pragmatic mix of what is easy to collect (e.g. numbers of LMIC research partners, number of training events, etc.), with what is desirable to know (e.g. the quality and equity of relationships between UK and LMIC partners, the extent of challenge-oriented capabilities, etc.). To do this we have followed six main steps (updated from the proposal):

- **Step 1: Agree principles and quality criteria.** We have agreed a set of quality criteria against which to judge the eventual KPIs. There are many pre-existing quality criteria for indicators, such as QQT, SMART and SPICED.[12] Ours is largely based on the SMART criteria, modified with existing BEIS thinking[13] and adapted for this assignment. The criteria are set out in section 3.1.

- **Step 2: Review data sources and KPIs in other funds.** The KPIs draw on good practice from other ODA funds, with lessons extracted from the ICF, the Prosperity Fund and other funds (as detailed in section 3.2). We are also able to draw on the foundation stage of the GCRF evaluation, and particularly the process evaluation component that reviewed the relevant datasets (as detailed in section 4).

- **Step 3. Develop initial KPI set.** A kick-off call was held with BEIS, followed by an internal team workshop held on 5 April. This workshop focused on refining our approach to developing the KPIs – including adding a bronze/silver/gold rating to help with prioritising the KPIs, plus a spreadsheet format for collating detail on each indicator (rationale, link to ToC, data sources, etc.). In the intervening weeks a long list of indicators was developed, followed by a subsequent team workshop on 24 May to review and further refine and reduce the list.

- **Step 4. Stakeholder consultations.** As part of step 3 above and 5 below, further work was undertaken to consult with the Newton Fund (the evaluation contractors), UKRI, Research England and other relevant stakeholders (as detailed in section 3.3). At this stage, this initial consultation is mainly to

[12] **QQT** = Quantitative, Qualitative, Timebound. **SMART** = Specific, Measurable, Achievable, Relevant, Timebound (although there are different variants for some of these letters). **SPICED** = Subjective, Participatory, Interpreted, Cross-checked, Empowering, Diverse and Disaggregated.
[13] 'BEIS ODA KPIs' presentation, 22 August 2018.

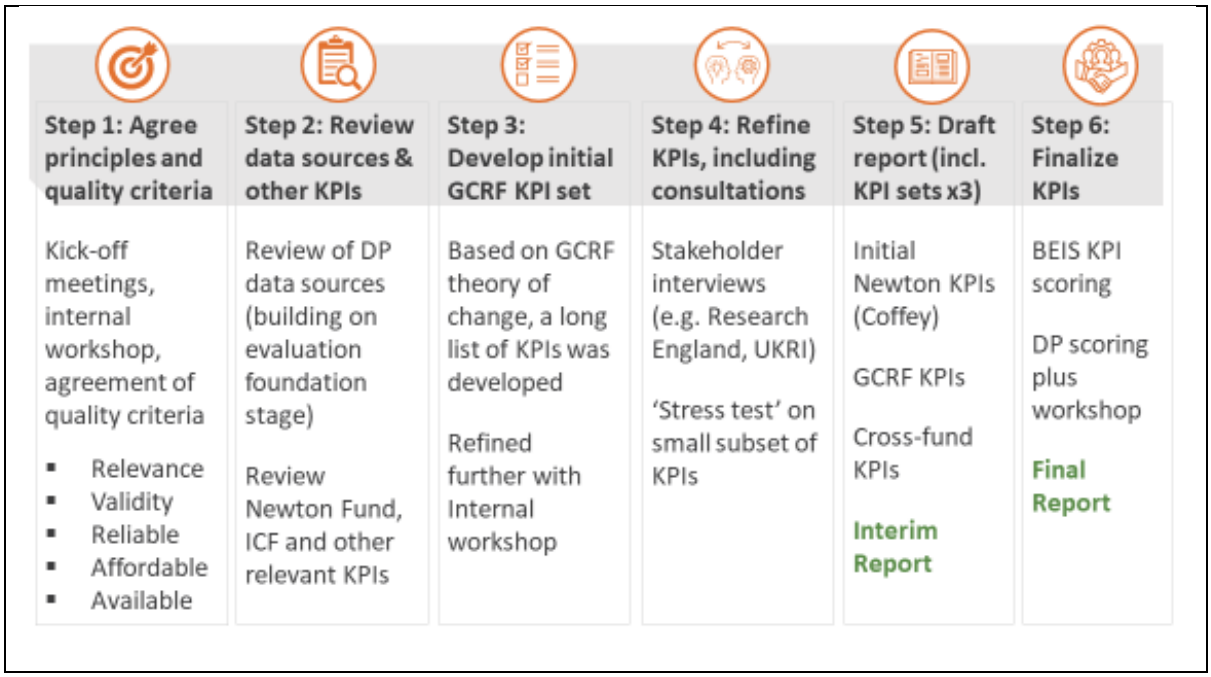
sense-check the relevance and feasibility of some of the KPIs. Further work was then undertaken to address particular gaps and refine the KPIs.

- **Step 5. Draft KPI report.** The Interim Report set out a long list of GCRF, Newton Fund and cross-fund KPIs with suggestions for next steps. The report was presented to BEIS, and the long lists of indicators used as the basis for subsequent consultation.

- **Step 6: Finalise KPIs.** Led by BEIS, the indicator set has been scored by BEIS staff for feasibility and usefulness, with the shortlist of KPIs then scored by DPs. These were reviewed in a workshop with representatives from DPs. The final set of indicators is presented in this report.

The following sections provide additional detail on the quality criteria (step 1), the review of KPIs for other ODA funds (step 2) and the stakeholder consultation (steps 4 to 6). This is summarised in Figure 3, below.

Figure 3: Summary of approach to developing the KPIs



Source: Presentation to BEIS on 11 July 2019.

3.1 KPI quality criteria

The purpose of developing KPI quality criteria is twofold: (1) as a methodological tool to ensure all KPIs put forward would be robust enough to measure elements in the ToC; and (2) to transparently show the merits of each KPI, informing their use. Using these as principles, we developed a simple scoring system with five criteria upon which to judge to what extent each KPI was:

1. **Relevant:** Are the indicators useful? Do they align with and complement overall departmental objectives?

2. **Validity:** Do the indicators measure what they are intended to measure (e.g. are they valid measures of the outputs and outcomes)?
3. **Reliable:** Are the indicators reliable (i.e. would the data recorded be the same if collected repeatedly under the same conditions at the same point in time)?
4. **Affordable:** Is the cost reasonable and clearly budgeted for?
5. **Available:** Is it likely that the required data will be provided in a timely manner?

Each KPI was assigned a one to five score on each criterion. We created a simple quality rating based on final scores: Insufficient (5 to 10), Bronze (10 to 15), Silver (16 to 20) and gold (21 to 25).

The final grade provides a quick summation of a KPI's quality, but those attaining the same rating can have very different merits. The example below shows two KPIs measuring the same element of the ToC. Although both are rated silver, the first is geared far more towards what information is simple to source and is inexpensive to collect. The second aims to collect data that does not exist in DPs' current systems and would require additional costs to source but would provide an excellent measure of the ToC element.

Table 1: Example KPIs with comparative scoring

KPI name	ToC element	Relevance	Validity	Reliability	Affordabilit	Availability	Rating
Proportion of total projects per DP addressing each challenge area and value of those projects (internal data)	2.4 Researchers, innovators and LMIC partners have the expertise to map the landscape and co-identify priorities and research issues	3	2	4	5	5	19
Instances of co-creation of GCRF proposals as a proportion of total applications with illustrative case studies (survey)	2.4 Researchers, innovators and LMIC partners have the expertise to map the landscape and co-identify priorities and research issues	5	5	3	2	2	17

Note: KPI names simplified for this illustration.

3.2 Drawing from existing KPI practice

The KPIs were developed based on an initial consideration of best practice, drawing on the team's expertise and selected examples from the literature.[14] At the end of

[14] This included an internal review of 11 relevant Research Excellence Framework (REF) cases.

the process, the shortlist of KPIs was compared with a more comprehensive search and review of other funder practice (summarised in section 6.2).[15] The focus of the KPIs is on shorter-term outcomes through to the impact level, including:

1. Research uptake and replication processes
2. Challenge-oriented research and innovation capabilities
3. Equitable research partnerships
4. Innovation systems and environments
5. Development outcomes and impacts

In order to maximise **alignment with the Newton Fund**, a number of the indicators are based on the Fund's monitoring system.[16] The Newton Fund provides particularly relevant indicators for research-into-use, and shorter-term outcomes. Other useful sources of best practice for indicators at this level (1 and 2 above) included DFID's research uptake guidance (2013) and a workshop at the Institute of Development Studies (IDS) on the use of indicators for knowledge management and brokering in international development (Mansfield and Grunewald 2013).

For best practice in the area of **equitable partnerships**, several resources were consulted, including research from the UK Collaborative on Development Science[17] (UKCDS 2017) and COHRED's Research Fairness Initiative. While straightforward quantitative indicators (e.g. 'number of research outputs co-produced with partners in the global south') go some way towards capturing equitability, much more depth on the nature of this relationship is desirable. Our review concluded that more detailed analysis will require assessments of the quality of GCRF research partnerships, and this is most likely through the evaluation stage.

For **longer-term outcomes and impacts**, two different types of indicators were initially reviewed: those that measure innovation systems, including in-country research capabilities; and, those that could be used to measure the GCRF's global development impact. This included indicators for the SDGs, the ICF KPIs, the Prosperity Fund and specific innovation indicators such as the Global Innovation Index. These resources provided various options for measuring change in the innovation system (e.g. number of researchers, and R&D expenditure). For the most part, they were either too narrowly defined for GCRF's purposes, or focused on general shifts in wider system of research and innovation – which are unlikely to be attributable to GCRF funding.

As a result, other options were explored for indicating longer-term outcomes and impact. The 2014 REF case studies were reviewed and it was concluded that they could be used as a data source for counting the number of cases of specific outcomes in the GCRF ToC (e.g. change in policy or practice). They could also be

[15] Pinnington, R. and Barnett, C. 2019. Key Performance Indicators in R4D Funds – a review of donor practice, report for the Department for Business, Energy and Industrial Strategy, unpublished, Itad and Technopolis, UK.
[16] These were created by as part of the Newton Fund's evaluation design, but not implemented. Source: Coffey (2016) Newton Fund Evaluation Strategy Report, July 2016, UK.
[17] UKCDS is now the UK Collaboration on Development Research (UKCDR).

used as a data source for more in-depth qualitative case studies at this level (see section 4, data sources, for further detail).

3.3 Initial stakeholder consultation

We consulted those who had direct experience with the monitoring and evaluation of GCRF/Newton Fund programmes within DPs, as well as those outside of these funds who had expertise in the use of KPIs for international development. These consultations helped inform the development of the indicator set (long list).

Table 2: List of individuals consulted

Name	Role	Organisation	Reason
Dr Nelly Wung	Senior policy advisor and person responsible for the monitoring and evaluation of quality-related (QR) GCRF	Research England	To understand what information is collected from HEIs on their QR GCRF spend and what KPIs would be suitable to build around that data
Heidi Peterson	Senior evidence and evaluation manager	UKRI	To coordinate our KPIs within wider monitoring activities within UKRI
Rebecca Tanner	GCRF data manager/ODA research data analyst	UKRI	To test drive a sample of KPIs using real UKRI data and to consult on data availability
Dr Robert Felstead	Senior policy manager – International Development Team	UKRI	To understand what is reported by GCRF Challenge Leaders
Athene Gadsby	International partnership programme manager	UK Space Agency	To verify what GCRF-related data the Agency collect from award holders
Minna Lehtinen	Research communications and impact manager	University of Oxford	Best practices for KPI development
Dr Jude Fransman	Research fellow	The Open University	Best practices for KPI development
Dr Rachel Hayman	Research learning and communications director	INTRAC	Best practices for KPI development
Dr Isabel Vogel	Independent consultant	N/a	Best practices for KPI development

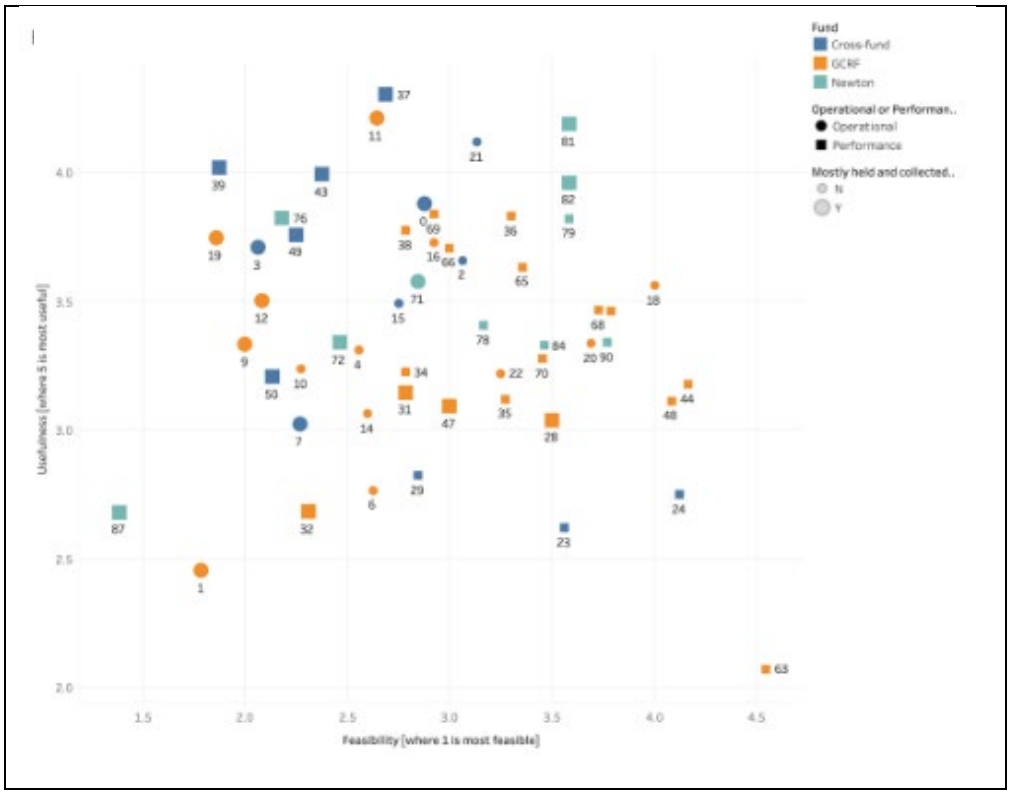
Jamie Fotheringham	Lead, Newton Evaluation	Coffey	Exchanges on refresh of Newton Fund KPIs. Follow-up (pending) to review cross-fund KPIs

3.4 Shortlisting process to finalise KPIs

The Interim Report presented 91 potential indicators for the funds, mapped against the respective ToCs for the GCRF and the Newton Fund. The challenge is to select a practicable and manageable list of indicators that achieves an appropriate breadth and balance across the funds. The following process was undertaken to arrive at the draft list:

- **BEIS undertook an initial shortlisting to 54 KPIs**, removing indicators that were not of interest or attributable to the funds. BEIS also removed indicators that were less appropriate to be investigated as an annual indicator but that will be rigorously investigated through independent evaluations.
- **DPs and In-Country Teams scored the 54 indicators** for usefulness at the fund level, usefulness to the DP, plus feasibility. These scores were aggregated and the 14 lowest scoring were removed. See Figure 4.
- **BEIS and DPs held a workshop to shorten the list down to the final 26 indicators**. During this workshop three additional indicators were added (5, 23 and 26).

Figure 4: BEIS and Delivery Partner ODA KPI scoring



Source: BEIS presentation, October 2019.

4 Potential data sources for KPIs

This section reviews the available data that DPs report for their ODA investments and the activities of their GCRF and Newton Fund award holders. It was important that the indicator set built on existing systems of data collection and reporting – even if additional work is eventually needed to fulfil all KPI requirements. We know from conducting the process evaluation and other work on the Newton Fund that DPs hold data on the characteristics of award holders (process data), almost all of which is collected at the application stage. This includes information on who is involved on the grant, the value of the grant and, in broad terms, what the project aims to achieve. They also hold data at the programme level, including the number of successful and unsuccessful applications and total funding committed.

DPs collect additional output, outcome and impact data through various other means beyond the input/process-related data. Table 3 summarises the primary impact data sources DPs have access to for their ODA-funded projects.[18] These are further discussed in the sections that follow.

Table 3: Data sources of Delivery Partners

UKRI/Research Councils/Innovate UK	National academies	UK Space Agency, Met Office and British Council	National funding councils
Researchfish/Gateway to Research	FlexiGrant (formerly e-GAP, changeover occurred during GCRF and Newton Fund)	Own grants management systems	HEI strategies and annual monitoring data
Other sources: REF case studies, external evaluations, internal/external reviews, ad hoc monitoring (e.g. case studies, events feedback), national/international level indicator data.			

The GCRF and Newton Fund use the activity tracker as the main reporting tool. This is a database used by the ODA Research Management Team and BEIS to track activities undertaken across the funds. It contains financial breakdown of all activities, brief and full descriptions of the activities, details of matched funding/effort, and numbers of applications/awards.[19] This is a central source of information for BEIS to use when reporting KPIs at the ODA level. However, this may yet change with the upcoming 'Reporting Transformation Project'. The intention is to use this project to develop a system that streamlines data collection across both funds, which would be a positive development and useful for collecting data against KPIs. The

[18] We also conducted scoping interviews with Heidi Peterson and Rebecca Tanner at UKRI and Dr Nelly Wung at Research England to verify what cross-fund reporting data is available and how KPIs could be built around them.
[19] Information from the Newton Fund Process Evaluation Report.

details of this are still being finalised but BEIS should be mindful about how this may facilitate the KPI reporting.

The following sections provide details on the key potential data sources for the KPIs:

- Research output tracking systems.
- National Funding Councils.
- UK Space Agency, Met Office and British Council.
- Other data sources.

4.1 Research output tracking systems

We use the term 'research output tracking systems' to specifically characterise Researchfish and FlexiGrant as they operate in comparable ways and produce broadly similar data on outputs, outcomes and impacts. These are used by UKRI DPs and the national academies. Researchers in receipt of grants from these funders, whether ODA or non-ODA are required to report any outputs, outcomes and impacts on an annual basis through a self-reported form. Only the principal investigator (PI) on the grant is asked to report through Researchfish, though they can invite others to do so on their behalf or in addition to their own submission.

For Researchfish, the outcome categories reported per grant are *publications, key findings, an impact summary, collaborations, further funding, dissemination activities, research database and models, research materials, artistic and creative products, intellectual property, policy influence, spin-outs, software and technical products, and other products*. These categories break down further into specific outputs with tailored questions as to what they are and how they came about. For example, if a researcher reports conducting a workshop, they are asked who the primary audience was and what reach the event had. This provides the quantitative data from these systems. Researchers are also asked to report the impact of their stated output or outcome. This is almost always reported in a free text format and represents the qualitative impact data that is available in the system.

e-GAP/FlexiGrant is a different system to Researchfish, which is also used to manage applications to award holders, select reviewers, conduct interviews, manage the portfolio and monitor projects. Nevertheless, many of the fields are largely the same as the above but with some slight differences in terminology. There are also some notable additions: membership of a high-level committee (and location), consultancies, use of case study and commercialisation activity. For the purpose of this KPIs project, the system can be considered to capture the same data as Researchfish and thus will be categorised and drawn from in the same way.

A note on Innovate UK

Innovate UK have been involved in the Newton Fund as a DP since its inception in 2014 and it joined as a GCRF DP in late 2019. Although there are Innovate UK-funded projects on Gateway to Research (GtR), they are only Newton Fund projects (with only basic information and no results data) since their first GCRF call had not

awarded projects at the time of writing. The only material difference to mention here is that Innovate UK's results data includes far more innovation metrics than research councils given the type of activities they fund. This allows us to include them in the main KPI list, but it may be that some KPIs are slightly modified or added to capture their wealth of innovation data, much of which is not collected by other DPs with some exceptions (e.g. RAEng, Met Office).

This comprehensive set of process and results data is collected through their bespoke system for the programmes they administer:[20]

- **Data provided on award:** At the grant-making stage, each participating organisation (both leads and collaborators) provides further information including date of incorporation; total number of staff (full-time equivalent); postcode where the majority of work will be carried out; annual net profit; whether they are working or have worked with a range of listed collaborators (e.g. Knowledge Transfer Networks or Catapults); whether they have previously received grant funding; and number of registered patents. Each project was also required to provide project start and end dates; funding detail (total grant funding committed, type and purpose); cost breakdown between partners; whether the project relates to any other project funded by Innovate UK (with project number if relevant); and expected impacts (from a multiple-choice list).
- **Financial monitoring:** This quarterly monitoring includes a commentary and risk rating on project spend, including data on whether the project has under- or over-spent and by what proportion of its budget. Innovate UK use project claims to inform financial reporting against profile and the level of activity dedicated to their Newton Fund activities (reported to BEIS).
- **Project close-out report:** Following the completion of projects, project completion forms are completed by the Monitoring Officer, the lead participant and all collaborating partners, but not the overseas partners. These provide an assessment of outcomes for the project. These forms also provide an opportunity for project participants and monitoring officers to give their views on the wider benefits of the project, what would have taken place otherwise (including any activity displaced by it), and lessons learned. There are a range of outputs, outcomes and impacts collected (e.g. new products, services and/or processes).

4.1.1 Data quality and reliability

The quality of the research output tracking systems data depends heavily on the individual reporting it and their understanding of the questions posed to them about each output/outcome. A brief assessment of GtR (where Researchfish submissions are publicly available) shows that there is great variability between how impact is described between award holders. There is little to no detail in some submissions, which would severely limit DPs' ability to report impact against KPIs.

[20] These are the arrangements for the Newton Fund, though it is likely this will be followed for GCRF. These related to CR&D and BEDP schemes. Data is collected by the respective contractors for programmes not administered by Innovate UK: GIPP and GIPA.

We have included outcome KPIs that ask for random and purposive samples of cases rather than proportions of the total ODA grants addressing a specific ToC element to avoid unfairly counting those cases on a grand scale where there is not sufficient data. We are aware that ODA guidance[21] has been supplied to all individuals in receipt of ODA research and innovation grants. This instructs individuals to take into account the ODA relevance of any outcomes, the specific Development Assistance Committee (DAC) list countries that are benefiting, highlights progress towards the economic development of those countries and (for the Newton Fund only) secondary benefits to non-DAC list countries. This guidance may improve reporting quality and clarity when it comes to ODA funds, which will improve reliability for the KPIs in turn.

There is also the issue of PIs being the only ones invited to submit on Researchfish, although they are able to invite others to do so. In-country partners are also not able to submit this kind of information in the case of Innovate UK's Newton Fund programmes. As such, one cannot know what proportion of content is reported by LMIC partners, if it is reported at all. This is an important point as **there is currently no other data source or process that captures output, outcome or impact data from the perspective of the LMIC partners.**

4.2 National Funding Councils

The National Funding Councils (NFCs) collect detailed proposals for the spending of quality-related (QR) GCRF per academic year from higher education institutions (HEIs) as part of their three-year strategies. This funding can support any ODA-eligible activity even though it is labelled QR GCRF. The strategies are generally submitted in a question and answer format with an accompanying full breakdown of proposed spend. For Research England, the data fields in that breakdown consist of: name of the project, the type of activity, the amount of QR GCRF funding allocated to that project, what other funding has been used for the project (Research Council or other), DAC nations targeted, and what benefits/impacts have been realised in those DAC nations. This is submitted electronically as an Excel sheet and is later manually sorted into categories (e.g. into typologies of activities, such as funding workshops or hiring GCRF managers).

HEIs are required to self-report their progress against their own strategies. The actual process for this self-reporting is still under development but is likely to include a top-level judgement such as 'on track to achieving the goals of our strategy' with accompanying justification against each strategic objective.

This three-year strategy process covers academic years 2018/19, 2019/20 and 2020/21. The academic year 2018/19 is the first year the monitoring of strategies will be conducted by Research England. 2017/18 monitoring was not in relation to the strategies though the NFCs did monitor HEIs in a reduced form to check ODA compliance to ensure previous funding was compliant.[22]

[21] UKRI Guidance for Outcomes Reporting of Official Development Assistance Projects on Researchfish®.
[22] Full details on the previous QR GCRF monitoring arrangements as well as the current arrangements can be found in the GCRF Foundation Evaluation Report.

4.2.1 Data quality and reliability

A key limitation of this data is that the benefits and impacts are described solely by the UK partners as LMIC partners are not consulted directly. However, their accounts may be included within the UK evidence submitted, though this is not required.

Any self-reported data suffers from being biased and, particularly in the case of impact reporting, potentially overstated. This problem is not unique to this data source. The data itself recurs annually for those HEIs that have approved strategies meaning that it is less susceptible to fluctuations in the amount of data available per year. HEIs are committed to three years of reporting per strategy round.

4.3 UK Space Agency, Met Office and the British Council

The **UKSA** (GCRF only) contracted Caribou Digital to conduct all of the monitoring and evaluation of their GCRF spend. In fact, projects under UKSA's International Partnership Programme had to allocate a proportion of their grants to the monitoring and evaluation of their projects, as well as develop their own logframes and Theories of Change under the guidance of Caribou Digital.

Information per project is reported via a logframe, which captures outputs, outcomes and impacts. Each project has KPIs and annual targets; for example, '*Percentage of surveyed market actors (who do not receive facilitation through the project) who report positive perceptions of relevant business models supported by the project (cumulative)*', which includes targeted percentages per year compared against a baseline. UKSA conduct cost-effectiveness analyses on each project and each project must also complete a survey that allows UKSA to produce an economic report for the UK.

These datasets are very useful for outcome-level KPIs and are unique across DPs, resembling DFID monitoring per project, which is a positive step for ODA projects. These outcomes and impacts are then escalated to the programme level. Despite these positive aspects, it will be difficult to ensure that UKSA projects fit into a KPI framework that must cater to the lowest common denominator for data.

The **Met Office** (Newton Fund only) delivers on the Newton Fund's translation pillar and will continue to have a growing role as the Fund moves more towards this pillar in the coming years. The Met Office's current five Weather and Climate Science for Service Partnerships (WCSSPs) capture progress through a series of 'pathways to impact' agreed between the Met Office and collaborators (typically Met services or climate institutions based in China, India, South Africa, Brazil and Southeast Asia). Progress is gauged against agreed milestones and deliverables (such as the release of joint scientific papers, development of new models, prototype services, etc.). This is supplemented by in-depth case studies where more interesting/significant change/impact occurs. An Intellectual Property Rights register keeps track of innovations, such as new ways of utilising data, new model outputs or new services.

The **British Council** (Newton Fund only) use surveys to collect baseline and follow-up data from individual award holders. These are issued centrally by the British Council and produce high-quality results data due to the depth of detail they ask of participants. Surveys are also routinely sent to workshop[23] participants to understand both their satisfaction with the events and to monitor what outcomes have resulted from their involvement. Researchfish reports are used to collate the reported outputs of participants' projects, including what further funding has been captured, but these do not currently appear on GtR. We are aware that project-level data does exist centrally (with the grants management team in the UK), but are not clear as to what that specifically looks like.

From our experience of working with the British Council, final reports from researchers are generally very detailed and report on various technical outputs of the funding. The post-workshop feedback surveys and outcome assessment reports are useful as they ask for specific elements that track up to Fund-level outcomes (e.g. further funding leveraged, further collaborations established). As such, it is likely that the KPI list as it stands accommodates the British Council's programmes. However, it may need to reflect some of the Council's more innovation-focused activities (e.g. tech transfer in the Professional, Development and Engagement programme in Latin America), grouped with other DPs who fund innovation activities.

4.4 Other data sources

There are several other data sources of relevance to GCRF and ODA-funded research. These include:

Research Excellence Framework (REF) case studies. REF case studies offer another source of KPI data for the longer-term and impact levels of the ODA ToC. An internal rapid review of REF 2014 case studies (undertaken as part of the GCRF foundation stage) showed that research demonstrating longer-term outcomes and impacts often, although not always, commenced many years previously. This indicates that the 2021 REF is likely to be too early to find rich evidence for the longer-term/impact level of the ToC. The REF 2028 may be a more viable data source, with impact tracking beginning at least two years before the end of the seven-year cycle. The case studies reviewed were showcased on the REF website as good examples, so are not necessarily representative of the general quality. However, relevant information for addressing longer-term outcome KPIs is likely to be contained within high-quality REF case studies in future.

To extract relevant data, REF case studies relating to ODA-funded research could be downloaded and manually coded, according to outcome and impact components of the ToC; for example, 'Stakeholders mobilise public and/or private investment to further develop innovations' (GCRF ToC). This would enable the counting of examples (number of cases) of ODA grants demonstrating change in relation to a specific outcome or impact from the ToC; for instance, cases of change in policy or practice linked to ODA-funded research. Qualitative analysis could also be conducted to explore and synthesise the nature and magnitude of the changes, which could feed into the evaluation. The rapid review suggested the importance of

[23] These are workshops funded by the British Council and will involve researchers, policymakers and other stakeholders in-country.

developing clear definitions to distinguish between long-term outcome-level change, and impact-level change (i.e. drawing on scale, scope, magnitude). Otherwise there are likely to be major overlaps that will make the coding difficult.

These positive aspects of the REF case studies are somewhat overshadowed by the practical limitations of their use for addressing KPIs. The awkward timing of REF exercises already mentioned and the fact that they are pre-selected as the best of the best research means that using them to address KPIs may be biased and only useful once every seven years. They may also not reflect the kind of work funded by the UKSA and Innovate UK as they tend to fund many more non-research organisations that are less likely to contribute to a REF case study.

Internal/external reviews. We became aware of several DP (and cross-DP) lessons learning exercises related specifically to the GCRF as part of the evaluation process of it, including one between several Research Councils. This kind of activity is crucial for taking stock and improving future programming. The same can be said for external initiatives, which provide an important impartial evaluation of processes of and impacts from a programme. We are aware that some DPs have commissioned evaluations for their ODA programmes. These reviews produce datasets that are closely aligned with what the KPIs aim to measure as they synthesise activity, outputs, outcomes and impacts. There is also the evaluation of the Newton Fund that is ongoing, plus a forthcoming evaluation of GCRF.

A key limitation of developing a KPI around these reviews is that they are neither regular in their timing nor their scope, meaning an all-encompassing KPI would be inappropriate to recommend, as would their use as a data source beyond supplemental evidence. However, meta-analyses of those internal and external reviews could provide excellent ODA-level findings on overall process and impact elements, conducted as part of a full evaluation.

Ad hoc monitoring. DPs conduct discrete monitoring and evaluation activities as part of their ongoing commitments to demonstrate accountability to government and to showcase the excellence of work they fund. This will often include case studies of funded projects that have achieved remarkable impact. Though biased towards the more successful projects, they still provide readily available data for addressing the KPIs. For example, the UKRI GCRF team collect selected case studies from GCRF award holders that are purposefully positive.[24]

There are also cross-DP activities. An example of this is the GCRF DP events tracker on which DPs record their upcoming events to make other DPs aware that there is, for example, a networking event on clean energy solutions that their respective communities might be interested in attending. Data could easily be pulled from this to record against the KPI on partnership events and could be built upon to include a standardised stakeholder feedback form to satisfy additional KPIs.

National/international-level indicators. Multilateral organisations, such as the World Bank, annually produce national and international-level indicators aiming to measure a wide range of topics including health, education and economic performance (e.g. World Development Indicators).[25] These vary from quantitative

[24] GCRF case study template provided by Heidi Peterson – UKRI/BEIS.
[25] https://databank.worldbank.org/data/source/world-development-indicators#

(e.g. GDP growth percentage) to qualitative assessments (e.g. Civicus' monitor on the state of civil society freedoms).[26] The key advantage of these indicators is that they are produced annually at no cost to DPs and provide development-related data on LMICs that could not be otherwise collected without significant resource.

The crucial disadvantage of using these indicators to report against ODA KPIs is that the data produced is in no way linked to ODA activities and would raise significant concerns about attribution. The availability of data is a concern as many countries do not report data under all indicators each year or not at all for some indicators. Reliability is also an issue as the same indicator can be reported differently depending on which provider is checked.

4.5 Implications for KPI development

There is a clear challenge of developing KPIs across DPs given their various ways of collecting and compiling data on outputs, outcomes and impacts. We have identified common areas where comparable data for these domains is available in our review of the available data sources and have consequently developed KPIs that aim to accommodate all DP systems. This does mean that relevant DP-specific data sources, such as Innovate UK's capture of revenue generated by new businesses created from ODA projects, cannot be directly used for a KPI, although it could be used as supplementary data.

There are four key implications from this review of available data sources and their quality that we have taken into account while developing the ODA KPIs:

- There is a **lack of structure and opportunity for LMIC partner reporting of outputs, outcomes and impacts.** This is a crucial problem to solve given the emphasis rightfully placed on LMIC representation in the ToC. In the next section, we propose the addition of a survey of LMIC partners.
- There are **temporal aspects** to ODA data that must be taken into account when looking at KPI results for specific years. For example, in almost all cases only UK PIs have been eligible to apply for GCRF grants up until only very recently. This means that it would not be feasible to reliably calculate a success rate for LMIC partners, as PIs or co-investigators (Co-Is), since they could not apply without a UK PI for the first years of the fund. This KPI will become more reliable as programmes open up to awarding directly to LMIC PIs in the coming years, though the figures will not be directly comparable to previous years. There is also the simple issue that some data is simply not available for previous financial years, such as attendee lists for events, which will hinder comparison.
- **Inconsistencies in reporting** of the same data between DPs will need to be taken into account. For example, we heard from UKRI that five of the seven Research Councils report success rates differently. Another example is that on UKRI GCRF grants, overseas organisations are not classed as 'university'

[26] https://monitor.civicus.org

and ‘business’ but are instead tagged as ‘other’ by default. This is also a case of how the current system is not equipped for this ODA monitoring.

- **Research output tracking systems** are a major source of useful ODA-related data that can usefully address KPIs using quantitative and qualitative evidence. Despite their usefulness, these systems are not currently set up to collect ODA-related impact data.

5 The initial list of KPIs

This section presents the initial list of KPIs, presented to BEIS in the Interim Report. This is a preliminary (long list) indicator set, that was further refined and reduced in consultation BEIS and DPs. The section begins with a summary of the proposed data collection sources/methods, highlighting that the KPIs will require a mix of pre-existing data sources (as outlined in section 4) and new data collection routines. The remainder of the section then provides a brief discussion of process indicators followed by summaries of KPIs by the eight ToC columns (from outputs to impacts). Each KPI is presented in a simplified form, with the full list including detailed descriptions being provided in Annex 5.

This section is primarily focused on the GCRF ToC, as this was the first step in the process of developing the indicators. The rationale for this is twofold. Firstly, the need to start from the specifics of the fund level (GCRF, Newton Fund) and then review the common (cross-fund) indicators. Secondly, we were able to build upon the detailed work of the GCRF foundation stage, thereby ensuring that the indicators were grounded in the feasibility of existing data and reporting processes. This long list was then discussed with Coffey, the independent evaluators of the Newton Fund, drawing on Newton Fund KPIs developed in 2016 and the Newton Fund ToC.

5.1 Methods of KPI data collection

Taking the findings of the previous section into account, we have developed KPIs that draw on a number of different data collection methods. The five main types are briefly explained in Table 4, below.

Table 4: Methods of data collection

Type of data collection	Description	Total KPIs using this type of data collection	Example
1. Counting	Calculating proportions, totals or subsets of quantitative data available through grant reporting and other statistics	37	KPI#3: Number and value of fellowship and training programmes and corresponding grants funded under GCRF
2. In-depth qualitative methods	Using sampled case studies or text mining in cases where statistics are not available	2	KPI#8: Narrative impact account from Challenge Leaders

3. Mixed methods	Combining numbers of outputs with qualitative insights using case studies	17	KPI#28: Proportions of 'impacts and benefits to LMICs' categorised under each impact type per NFC and case studies
4. Existing national/ international indicators	Relevant data collected by national and multinational organisations that complement KPI measurement	6	KPI#63: Researchers in R&D (per million people) per LMIC
5. Stakeholder surveys	Large-scale surveys to UK PIs and LMIC partners, and events feedback surveys to stakeholders	13	KPI#38: Instances and case studies where innovations and practical solutions have been tested and demonstrated in real-world LMIC settings

In Table 4 the final method of 'stakeholder surveys' is proposing a new method, which warrants additional explanation. Taking into account the gaps in and quality of the data sources, we propose centrally led stakeholder surveys by BEIS/UKRI. The details of these surveys will need to be worked out by BEIS in cooperation with DPs. The surveys should also be carefully planned in order to minimise the burden on award holders. We suggest three surveys, all of which would be administered, analysed and reported on by respective DPs:

- **LMIC award holders (PIs and Co-Is):** An annual (or biennial) survey of LMIC award holders is suggested to address this current 'blind spot'. It would focus heavily on measures of equitable partnerships, capacity building and sustainable development. LMIC award holders are well placed to comment on impact because of their close proximity to in-country stakeholders.
- **UK award holders (PIs):** Though this group is by far the most consulted on outputs, outcomes and impacts, there are still key ODA-related aspects that are insufficiently captured. For example, levels of co-creation in projects and instances of ODA-derived practices, technologies and products being applied in situ. We suggest a highly targeted survey instrument, as only questions that cannot be answered by existing sources and tools should be included here to reduce the already high survey burden of award holders. NB: We considered ways to strengthen the Researchfish data collection process, but concluded this may not be easy or quick to bring about because of the focus on ODA issues that are only relevant to a subset of Researchfish partners (plus the national academies are also missing from this dataset).
- **Post-event survey:** Many events, including workshops, trainings, showcases and demonstrations, take place as part of ODA projects and programmes. Although these are captured through research output tracking systems, they are reported only through PIs who are almost always from the UK. This survey will aim to ensure that ODA stakeholders, particularly from LMICs, are heard in terms of what impact those events have had on them in the short

term. This would be sent to attendees of ODA project events, both to garner feedback and collect evidence of impact.

UK-based PIs and LMIC partners will provide the information for KPIs they are best placed to comment on. For example, LMIC PIs/partners and UK PIs may be asked questions to gather information for KPIs 2, 12, 16, 23 and 26. However, this will mean that the LMIC partner survey will ask for more detail given their proximity to new practices, whereas the UK PI survey will be somewhat shorter (as their output tracking information already exists, and there is no need to duplicate).

The vast majority of the proposed indicators rely on counting (42) and mixed methods or extracting qualitative insights from cases (19). These draw on existing data sources. Additional data collection would be needed in extracting indicators from existing national/international datasets (7) and the implementation of stakeholder surveys (12). See Table 4, above.

The rest of this section takes each of the GCRF ToC elements in turn and presents the initial set of KPIs with a brief overview and discussion.

5.2 Process indicators

There are no process elements presented as part of the GCRF and Newton Fund ToCs, although a vast amount of this type of data is routinely collected by DPs. We worked closely with this data and those who kindly provided it during the GCRF foundation evaluation and in other assignments for DPs in the Newton Fund. The process data can be split into three basic categories (the full list of fields as provided can be found in Annex 3):

- **Programmes**: Information on the type of programme, success rate, total budget and spend, DP owner and DP participants.
- **Projects**: Includes characteristics (e.g. title, award amount, challenge area/beneficiary country targeted) and more detailed information such as abstracts and impact statements.
- **Participants**: Award holders' personal (name, gender, location) and professional characteristics (disciplinary area, role on the grant).
- **Other**: DPs hold other information on their ODA spending, whether that be total ODA spending within their accounts or information on events run as part of either fund. For example, we received information from some DPs on panel members in the process evaluation.

This data can and does provide useful monitoring information for BEIS, particularly the **portfolio characteristics of ODA spend**. Very simple KPIs against these data sources could be set to monitor the portfolio against targets or ranges predetermined by BEIS and DPs. For example, it may be that BEIS wish to increase investment into programmes addressing specific challenge areas in response to a recent global trend. A KPI that monitors the number of projects and funding going to that challenge area in comparison to others would inform that decision. Plus, given ICAI's remarks

on the Newton Fund appearing to be 'tied aid in spirit', it might be useful to track the proportion of total ODA funding that is being spent with partners overseas.

Some of the data sources above inform the KPIs in this report but many do not correspond to the ToC. **We recommend that BEIS develop process KPIs, primarily around monitoring portfolio-level changes, and other key areas, such as LMIC representation on selection panels.** This data should be reported alongside the data for the KPIs in the remainder of this section.

5.3 Inputs (initial research and innovation activities)

This section of the ToC focuses on the key partnering and capacity-building interventions led by DPs, the UKRI GCRF team and Challenge Leaders. The KPIs focus on measuring both the incidence of these activities and whether they have achieved their objectives. For example, KPI#1 aims to measure the incidence of partnering interventions through quantifying events and audiences, while KPI#2 measures the actual rate of partnering and what kind of partnerships are being created. The KPIs measuring GCRF ToC elements 1.2 to 1.4 and 1.6 are mainly counting the number of programmatic interventions that aim to develop capacity, facilitate challenge-led and multisectoral working; to bring stakeholders together, and to develop research and innovation (R&I) infrastructure/resources. These are specific, based upon the type of programme (e.g. workshop programmes to address 1.4) and the number of grants funded to deliver that intervention, and ask for some detail of their objective and/or reach (e.g. sector/audience targeted).

Challenge Leaders are an exceptional aspect of the GCRF and its ToC in that they have their own tailored ToC based upon their original job descriptions and their performance is separately reviewed by UKRI through employee appraisal. The process used to assess them aims, among other things, to assess to what extent Challenge Leaders have achieved the objectives they themselves set at various points during their tenure. The KPI presented here is aligned to their current assessment practices and will simply report a synthesis of their performance to avoid duplicating/adding to assessment practices.

Table 5: Proposed KPIs for inputs

#	Indicator	GCRF ToC element	Rating
1	**Total number of events, and attendees per event**, organised specifically to establish links, brief, showcase or otherwise raise awareness about the GCRF for previous financial years and current financial year per DP (including UKRI/BEIS level). Broken down by location (country) and type of event	1.1 Partnering interventions	Silver
2	**Number of new instances of brokered institutional links** attributed to involvement of the GCRF for previous financial years and current financial year per DP. Broken down by country and	1.1 Partnering interventions	Silver

#	Indicator	GCRF ToC element	Rating
	types of institutional link (e.g. research/innovation, commercial, advisory)		
3	**Number and value of fellowship and training programmes and corresponding grants** funded under the GCRF for previous financial years and current financial year per DP. Broken down by type of programme. Including average and median grant values per programme and overall	1.2 Capacity building	Silver
4	**Number of GCRF-funded studentships** for previous financial years and current financial year per DP. Broken down by level (research master's, doctorate), type (industrial doctorate, staff candidate) and LMIC/non-LMIC	1.2 Capacity building	Silver
5	**Number and proportion of GCRF programmes with two or more DPs** broken down by GCRF/non-GCRF DPs for previous financial years and current financial year. Non-GCRF DPs broken down by country of operation (e.g. DFID–UK) and sector of operation (e.g. agriculture)	1.3 Challenge-led, multisectoral research and innovation	Silver
6	**Number and value of interdisciplinary hub and rapid response programmes and grants** for previous financial years and current financial year per DP (double count for joint funded). Broken down by type of programme	1.3 Challenge-led, multisectoral research and innovation	Silver
7	**Number of workshop/symposium programmes and corresponding grants funded under the GCRF, number of attendees and types of attendees reached** from those grants for previous financial years and current financial year per DP. Broken down by type (research-user, researcher, industry, government) and country	1.4 Stakeholder mobilisation and networking	Silver
8	**Whether Challenge Leaders are achieving their objectives** and adding value to the GCRF portfolio within their three strands of activity annually. Broken down by challenge portfolio	1.5 Challenge Leaders and champions for uptake	Silver
9	**Number of programmes and corresponding grants that are designed specifically to build capacity through infrastructure/resource development** for previous financial years and	1.6 Support to research and innovation infrastructures	Silver

#	Indicator	GCRF ToC element	Rating
	current financial year. Broken down by type (facilities, data infrastructure)		
10	**Number of programmes and corresponding grants that are designed specifically to build capacity through market development, policy and regulatory advocacy** for previous financial years and current financial year. Broken down by type (market development, policy)	1.6 Support to research and innovation infrastructures	Bronze

5.4 Activity-to-results assumptions

This section of the ToC measures to what extent certain conditions continue to exist that pave the way towards achieving the intended results (outputs) of the GCRF. As such, most of the proposed indicators resemble process indicators. These include the KPIs reporting on the number of LMIC organisations on grants, joint funding and challenge areas targeted to characterise the GCRF portfolio and its propensity to lead to certain results.

Demand for, and capacity to work on, challenge-led solution-based work is characterised here by participation on grants (success rates), at events and engagement with GCRF content online, which draws from both process and output data. Co-creation and co-design are key assumptions here that might lead to co-production at the output level. The elements are explored in these KPIs both through the co-creation of ODA fund proposals and at the national level with co-funding.

Gender and social inclusion are first addressed by simply characterising the breakdown of those who are and are not included as key contributors to ODA-funded activity, i.e. grant staff. This is further explored by assessing the extent to which aspects of gender and social inclusion are addressed within project impact statements. Gender and poverty audits, as part of a full evaluation of ODA funds, would need to capture whether those statements did actually produce such inclusive impacts. It is not clear how gender and social inclusion might otherwise be assessed in these KPIs given the lack of output, outcome and impact data that systematically covers these issues.

Table 6: Proposed KPIs for activity-to-results assumptions

#	Indicator	GCRF ToC element	Rating
11	**Number of LMIC organisations listed on grants and proportion of funding going to those organisations** for previous financial years and current financial year per DP. Broken down by type of organisation (private, public, third sector) and country	2.1 Evidence of interest/demand for solutions from in-country stakeholders	Silver

#	Indicator	GCRF ToC element	Rating
12	**Number and proportion of LMIC attendees at DP-led events** for previous financial years and current financial year per DP (including UKRI/BEIS level) and per event. Broken down by type of audience (private sector, HEIs, government, etc.) and participant organisation location	2.1 Evidence of interest/demand for solutions from in-country stakeholders	Silver
13	**Mentions of GCRF (in news and social media), unique authors, top trending topics, top news stories** for previous financial years and current financial year. Reach as a total, over time and from which countries	2.1 Evidence of interest/demand for solutions from in-country stakeholders	Bronze
14	**Proportions of challenge-oriented activity types funded using GCRF QR per NFC**. For the current and previous academic years (not possible before 2018/19 as no strategies were in place) broken down by sector (need to confirm whether this means discipline or not)	2.2 Sufficient appetite and capacity in UK to work in a challenge-oriented way	Silver
15	**Success rates (as a percentage with numbers of UK applicants and awardees) for programmes and calls** broken down per DP by the applicants' type of organisation, genders, ethnicities, target country, SDG/challenge area targeted, discipline, and type of programme (e.g. fellowship, research centre). Non-competitive awards are not included	2.2 Sufficient appetite and capacity in UK to work in a challenge-oriented way	Gold
16	**Success rates (as a percentage with numbers of LMIC applicants and awardees) for programmes and calls broken down per DP** by the applicants' type of organisation, genders, ethnicities, country, SDG/challenge area targeted, discipline, and type of programme (e.g. fellowship, research centre). Non-competitive awards are not included	2.3 Sufficient appetite and capacity in LMICs to participate in GCRF	Gold
17	**Joint funding in £ figures for co-funding, in-kind, matched resource and mixed funding** by DP for previous financial years and current financial year split by country, level (institutional, national) and funding sources (public, private, charity)	2.3 Sufficient appetite and capacity in LMICs to participate in GCRF	Silver
18	**Instances of co-creation of GCRF proposals as a proportion of total**	2.4 Researchers, innovators and	Silver

#	Indicator	GCRF ToC element	Rating
	applications for previous financial years and current financial year. Broken down by type of level of involvement (e.g. co-wrote methodology) and co-creation activities (e.g. pre-proposal visits, feedback sought)	LMIC partners have the expertise to map the landscape and co-identify priorities and research issues	
19	**Proportion of total projects per DP addressing each challenge area and value of those projects** for previous financial years and current financial year. If projects address multiple areas, each project will be counted multiple times (e.g. one project targeting four areas will be counted four times). This will not work for financial commitment if the latter route is taken	2.4 Researchers, innovators and LMIC partners have the expertise to map the landscape and co-identify priorities and research issues	Silver
20	**Number of productive collaborations made between LMIC partners attributed GCRF-funded activity** for previous financial years and current financial year per DP. Broken down by sector (public (research using), public (civil), private, third) and location (to ensure they are LMIC) based upon participant characteristics held internally	2.5 Researchers, innovators and LMIC partners have expertise to mobilise coalitions for uptake and replication in DCS	Silver
21	**Average gender and ethnicity composition of GCRF UK lead (likely the PI) and LMIC lead (likely the Co-I) and project teams** for previous financial years and current financial year per DP. Broken down by LMIC/non-LMIC and successful/unsuccessful	2.6 Gender and social inclusion can be designed into research and innovation for inclusive impacts	Silver
22	**Proportion of pathways to impact statements that address issues of gender and social equity/inclusion** for previous financial years and current financial year per DP with accompanying case studies	2.6 Gender and social inclusion can be designed into research and innovation for inclusive impacts	Silver

5.5 Results (output level)

The results section of the GCRF ToC, as with the output row of the Newton Fund ToC, has elements that are more readily addressed by the available data sources, which mostly focus on output data (e.g. Researchfish). As such, this and the following two sections rely heavily on those centralised research output tracking systems.

One measure of quality and one of interdisciplinarity has been proposed to address ToC element 3.1 – both by using bibliometrics. The first focuses on the proportion of the most highly cited papers produced globally as an output quality measure. We acknowledge that assessing research quality is a difficult task and that this KPI does not provide a complete picture. However, the combination of research excellence assessments by selection panels, this KPI, plus the eventual research quality assessment by the full evaluations of both funds, will comprehensively cover the issue of research quality.

Interdisciplinarity is a key principle of the GCRF and is another challenging element to measure. The KPI proposed assesses diversity of integrated knowledge as represented in the sub-fields of a publication's cited references, taking into account the number of distinct sub-fields, the balance of those sub-fields' representation and the intellectual distance between them. This is in contrast to multidisciplinary co-authorships, which simply count the number of author disciplines rather than the content of the publication.

Bibliometrics can also map the extent to which collaboration networks have sustained and grown as a result of the funds, both in terms of R&I organisations and geographies. This can be used together with the simple checking of repeated DP-funded partnerships that are recorded in DP databases and with a survey item to award holders to capture non-DP funding.

Secondments, next destinations, collaborations and engagement activities are all reported through research output tracking systems and lend themselves well to the challenge-oriented capabilities and stakeholder networks for use of ToC elements. These measure *quantity* rather than *quality* but also report contextual elements such as the types of audience reached, geography and sectors where new collaborations were made.

Table 7: Proposed KPIs for results

#	Indicator	GCRF ToC element	Rating
23	**Proportion of GCRF publications classed in the top 10%, 1%, 0.1% and 0.01% of the most highly cited papers in the world** for previous financial years and current financial year per DP. All field/year normalised using full and fractional counting methods	3.1 High-quality interdisciplinary research and cross-sectoral innovation provides new insights and knowledge for translation into policies, practices, products and services	Silver
24	**The interdisciplinarity of GCRF research outputs by categorical analysis of lists of cited references for articles published** in previous financial years and current financial year per DP	3.1 High-quality interdisciplinary research and cross-sectoral innovation provides new insights and knowledge for translation into policies, practices, products and services	Silver

#	Indicator	GCRF ToC element	Rating
25	**Collaboration networks that illustrate new and repeat scientific collaboration patterns between countries, organisations or researchers funded by the GCRF** for articles published in previous financial years and current financial year per DP. Broken down by new and repeat networks, and expanding networks, countries and disciplines	3.2 Sustainable global research and innovation partnerships established across geographies and disciplines	Silver
26	**Number of instances where two or more GCRF grant holders and team members are also named on subsequent grants awarded** for previous financial years and current financial year per DP. Broken down by funder	3.2 Sustainable global research and innovation partnerships established across geographies and disciplines	Silver
27	**Total and unique instances of LMIC participant secondments per project** for previous financial years and current financial year per DP. Broken down by country and sector	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	Silver
28	**Proportions of 'impacts and benefits' categorised under each impact type per NFC** for the current and previous academic years (not possible before 2018/19 as no strategies were in place) and case studies on the impacts and benefits to LMICs from the reported institutional case studies and free text 'impacts and benefits' section	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	Silver
29	**Total number of students gaining doctoral degrees from participation in GCRF-funded research** for previous financial years and current financial year per DP. Broken down by country (LMIC/non-LMIC) and next destination of the student (country)	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	Silver
30	**Total and unique reports of upwardly mobile next destination per project** for previous financial years and current financial year per DP. By role on the grant, sector (public, private, etc.),	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK,	Bronze

#	Indicator	GCRF ToC element	Rating
	industrial sector (e.g. energy), scale of progression (e.g. post-doc to reader) and new location	partner countries and regions	
31	**Number of new collaborations (i.e. reported as starting in any year later than the year the grant started)** for previous financial years and current financial year per DP. Broken down by sector (public (research using), public (civil), private, third), SIC code and location. Excluding those that are 'changes to existing' collaborations	3.4 Stakeholder networks for use and replication established across research, policy, practice, civil society and enterprise in partner countries, internationally and UK	Silver
32	**Total and unique instances of engagement activity** per project for previous financial years and current financial year per DP. Broken down by form of engagement, whether it was part of the official scheme, geographical reach, primary audience, years in which engagement occurred	3.4 Stakeholder networks for use and replication established across research, policy, practice, civil society and enterprise in partner countries, internationally and UK	Bronze

5.6 Research-into-use KPIs

The KPIs in this section aim to measure the extent to which translation into new policy frameworks, new products, processes and services, as well as supporting new capabilities and infrastructures, has occurred. Almost all of these elements are well covered by data collected within research output tracking systems. These cover the ToC elements on collaborations, evidence-informed policy applications, and innovative and practical solutions that deal with physical outputs, such as new technologies. The KPIs, however, go beyond simple counting and aim to capture instances where these outputs have actually been used in LMICs and their respective impact.

The capability to engage and use outputs are the main concerns in this section. As such, there are several KPIs that recommend a survey of LMIC stakeholders to accurately identify instances where ODA activity has made a difference from their perspective. For example, LMIC stakeholders are better placed to report on the actual impact of a new solution as opposed to the UK partner who has a second-hand perspective – although the latter are usually the ones to report on such matters.

There are several KPIs that use a survey or annual commentaries to report on aspects of the ToC where secondary sources do not exist or would require the triangulation of several sources. These cover elements such as equitable

partnerships and specialist capability building where bespoke ODA-related data is required but does not exist in an off-the-shelf format.

Table 8: Proposed KPIs for research-into-use

#	Indicator	GCRF ToC element	Rating
33	**Average publication alt-metric score for GCRF-funded research** for previous financial years and current financial year per DP. Broken down by location and type of attention (patent, news articles, policy document)	4.1 Effective promotion and packaging of research and innovation products	Silver
34	**Number of user stakeholders involved in new collaborations** (by type – industry, civil society, etc.)	4.2 Mobilising stakeholder networks across public, business and civil society stakeholders, and local communities	Silver
35	**Annual report per DP on user-side capacity building** drawing upon 'counting' measures such as engagement activities, trainings and qualitative data in impact summaries	4.3 Building specialist user-side capacities to apply, adapt and champion	Silver
36	**Instances and case studies of enhanced specialist capacity for LMIC stakeholders** (by type: apply, adapt, champion) for previous financial years and current financial year per DP	4.3 Building specialist user-side capacities to apply, adapt and champion	Silver
37	**Total and unique instances of policy influence per project** for previous financial years and current financial year per DP with illustrative case studies. Broken down by form (e.g. participation in advisory committee, training of practitioners), geographical extent of policy influence (e.g. national, local), sectors of relevance (e.g. energy) and impact category (e.g. improved educational and skill level of the workforce) and impact narrative (free text)	4.4 Collaborative problem solving and co-production of evidence-based policy applications	Silver
38	**Instances and case studies where innovations and practical solutions have been tested and demonstrated in real-world LMIC settings** for previous financial years and current financial year	4.5 Demonstration and testing of innovations and practical solutions	Silver

#	Indicator	GCRF ToC element	Rating
	per DP. Broken down by type of innovation (product, clinical intervention, etc.)		
39	**Total and unique reporting of physical outputs per project** for previous financial years and current financial year per DP with case studies. Broken down by type, provided to others (yes/no), impact (qualitative)	4.5 Demonstration and testing of innovations and practical solutions	Silver
40	**Instances and case studies of expert assistance, leadership and mentoring enacted by GCRF-funded researchers** for previous financial years and current financial year per DP. Broken down by type of expert assistance, leadership and mentoring	4.6 Expert assistance, leadership and mentoring	Silver
41	**Number of technical assistance (TA) engagement activities by type (working group, presentation, workshops) and by geography** (national, regional, international/UK or LMIC)	4.6 Expert assistance, leadership and mentoring	Silver
42	**Stakeholder assessments of the quality of GCRF TA engagements**	4.6 Expert assistance, leadership and mentoring	Silver
43	**Total and unique amounts of further funding** for previous financial years and current financial year per DP. As an absolute value and relative to the grant value (%). Broken down by source (sector and country), duration of further funding and GCRF/non-GCRF	4.7 Sustaining commitment for durable and equitable partnerships between UK and LMIC collaborations; leveraging synergies with other programmes	Silver
44	**Annual report per DP on equitable partnerships** drawing upon 'counting' measures such as engagement activities, trainings and qualitative data in impact summaries	4.7 Sustaining commitment for durable and equitable partnerships between UK and LMIC collaborations; leveraging synergies with other programmes	Bronze
45	**Proportion of LMIC survey respondents indicating equitable GCRF partnerships** for previous financial years and current	4.7 Sustaining commitment for durable and equitable partnerships between	Silver

#	Indicator	GCRF ToC element	Rating
	financial year per DP. Broken down per programme and LMIC respondent country	UK and LMIC collaborations; leveraging synergies with other programmes	

5.7 Shorter-term outcome KPIs

The shorter-term outcome section of the ToC has the highest number of KPIs (12) compared to the number of ToC elements within it (5). The intermediate outcomes that result from research-into-use strategies are still squarely within the GCRF's sphere of influence and these KPIs aim to reflect that by using data sources that allow for outcomes to be attributed to GCRF.

The first KPIs assess the less tangible changes on attitudes to problems and solutions both with a KPI aiming to detect trends in collaborations and one asking the question to user stakeholders directly. Actual use and application of ODA-developed solutions is assessed by these KPIs through counting the instances of use both in terms of product (e.g. co-produced IP and spin-outs) and in further characterising that use using a stakeholder survey to better understand what a 'use' looks like.

The final two ToC elements are addressed by KPIs that look at the institutional and national level of capability and reputation. These are where attribution to ODA funds are more difficult to prove, particularly in terms of reputation or propensity to work with the UK. Increases in publication networks and R&I jobs created are more tangible short-term outcomes that aim to distinguish differences in capability attributable to ODA funds, though both the organisational local and national levels must be looked at simultaneously to ensure this attribution (i.e. have capabilities changed because of 'X' amount of ODA collaborations in one group of organisations versus those who increased capability through non-ODA funds?).

Table 9: Proposed KPIs for short-term outcomes

#	Indicator	GCRF ToC element	Rating
46	**Number/per cent of user stakeholders (e.g. government policy adviser, business, civil society) who are able to give examples of incremental innovations** (applying existing knowledge in new ways, or an improvement to an existing way of working based on new knowledge) via a stakeholder survey	5.1 Conceptual, attitude and demand change – reframing problems/solutions; demand for new solutions stimulated	Bronze
47	**Number of new university–industry collaborations reported on**	5.1 Conceptual, attitude and demand change – reframing problems/solutions;	Silver

#	Indicator	GCRF ToC element	Rating
	Researchfish in GCRF-funded academic institutions	demand for new solutions stimulated	
48	**Number of mentions of where GCRF research is used by industry/community/government stakeholders** for previous financial years and current financial year per DP. Broken down by type of impact and location of impact	5.2 Technological and practical solutions to development problems tested to proof-of-concept and positioned for scale in LMICs	Silver
49	**Total and unique instances of IP per project** for previous financial years and current financial year per DP. Broken down by licensing (licence agreement has been reached or not, or are confidential), status (under examination, granted and withdrawn/terminated), patent family (new family, existing family, other), technology area (e.g. textiles, physics)	5.2 Technological and practical solutions to development problems tested to proof-of-concept and positioned for scale in LMICs	Bronze
50	**Total and unique instances of co-owned spin-out companies per project** for previous financial years and current financial year per DP. Broken down by status (percentage active, dormant), industry sector (e.g. electronics), SIC code. Case studies developed by type of impact and location of impact	5.3 Direct application of pro-poor practices, technologies and products as a result of participating in projects	Bronze
51	**Instances and case studies of GCRF-derived practices, technologies and products being applied in situ** for previous financial years and current financial year per DP. Broken down by type (practices, technologies and products)	5.3 Direct application of pro-poor practices, technologies and products as a result of participating in projects	Silver
52	**Proportion of LMIC institutions that have increased their publication networks post-GCRF activity** for previous financial years and current financial year per DP. Broken down by LMIC of the institutions	5.4 Changes in research and innovation capabilities for challenge-focused, interdisciplinary, cross-sectoral work	Silver
53	**Narrative impact broken down by sectors in which impacts have been achieved (public, private, third/voluntary sectors and elsewhere)**	5.4 Changes in research and innovation capabilities for challenge-focused,	Silver

#	Indicator	GCRF ToC element	Rating
	and sub-sectors (e.g. energy) for previous financial years and current financial year per DP. Case studies per programme	interdisciplinary, cross-sectoral work	
54	**Total and unique instances of R&I jobs created in LMICs as a result of GCRF activity** captured through survey for previous financial years and current financial year per DP attributable to GCRF activity. Broken down by sector and location	5.4 Changes in research and innovation capabilities for challenge-focused, interdisciplinary, cross-sectoral work	Bronze
55	**UK university world ranking (QS)**	5.5 UK R&I organisations' reputation enhanced as highly capable, equitable partners of choice for LMICs to deliver challenge-oriented work	Silver
56	**Number of research projects co-investigated by UK and LMIC partners** (by GCRF challenge area, and by location of co-investigators)	5.5 UK R&I organisations' reputation enhanced as highly capable, equitable partners of choice for LMICs to deliver challenge-oriented work	Silver
57	**UK's rank as a university study destination by number of inbound higher education students from LMICs** for previous financial years and current financial year per DP. Broken down by inbound students' countries	5.5 UK R&I organisations' reputation enhanced as highly capable, equitable partners of choice for LMICs to deliver challenge-oriented work	Silver

5.8 Replication and amplification KPIs

The sixth column in the GCRF ToC transits from its intermediate outcomes into a wider sphere of indirect influence, via a series of 'replication and amplification' processes. The indicators that have been proposed for this stage of the ToC are geared towards assessing the extent to which evidence and innovation products are being *'replicated and amplified within different policy, practice and market settings'*. Change at this level starts to become more complex because of the many factors in the wider context that can either enable or inhibit progress, many of which are beyond the control of the GCRF. The ToC proposes that the GCRF must continue to

'proactively engage in this wider context, especially as GCRF aims to bridge sectors and push for change across challenge areas, in order to maintain its aggregate progress towards SDG-level impact' (GCRF ToC). The KPIs proposed for this part of the ToC aim to support the measurement and tracking of two types of replication and amplification processes:

1. Iterative engagement by the GCRF, responding to opportunities to amplify change.
2. Networks, credible evidence/innovation and new capabilities mobilised to amplify change.

The indicators proposed for the first process (iterative engagement) use co-creation spaces and experiences as a proxy for indicating **how responsive and engaged the GCRF is in relation to its wider context.** The assumption here is that the more responsive GCRF projects are to LMIC contexts and user stakeholder priorities, the more likely research outcomes are to be replicated. Co-creation events are defined as engagements in which user stakeholders (e.g. civil society, industry or communities) and researchers both have an active role in problem solving, producing ideas, applying knowledge and developing capacity. For instance, a jointly run series of workshops, a mentoring relationship or training event would constitute co-creation. A participant feedback survey has been proposed for assessing the quality of these events and relationships, particularly from the perspective of user stakeholders.

Two further indicators have been proposed for the second process (credible evidence mobilised), which focus on the **amplification of GCRF-funded research** in credible, open and inclusive spaces. The mentioning of GCRF research products on specialist development media and network websites indicates that research is being amplified to a wider audience of policymakers and practitioners. The discussion of research products in dissemination events co-facilitated by user stakeholders points towards the credibility of GCRF-funded evidence, as well as its engagement with the networks required for replication in the wider context.

Table 10: Proposed replication and amplification process KPIs

#	Indicator	GCRF ToC element	Rating
58	**Number of co-creation engagements with potential users of GCRF-funded research** (by type of engagement, type of user stakeholder, and geography)	6.1 Iterative engagement, by GCRF, responding to opportunities to amplify change	Silver
59	**User stakeholder perceptions of the quality of co-creation spaces** via a feedback survey	6.1 Iterative engagement, by the GCRF, responding to opportunities to amplify change	Bronze
60	**Number of references to GCRF evidence products on specialist development media and network**	6.2 Networks, credible evidence/ innovation and new capabilities	Silver

	websites (by name and type of media site)	mobilised to amplify change	
61	**Number of research dissemination events (by type: seminars, panel discussions, etc.) facilitated with LMIC policy-making, industry or civil society stakeholders** (by type of stakeholder and geography)	6.2 Networks, credible evidence/ innovation and new capabilities mobilised to amplify change	Silver

All of the process indicators proposed for replication and amplification are of relevance to the Newton Fund. Like the GCRF, the Newton Fund is interested in the translation of research outputs into policy, practice and innovation outcomes with eventual impacts on development challenges. To achieve these outcomes, it aims to stimulate similar replication and amplification processes by being responsive to opportunities to apply research outputs in the wider context. The research and translation pillar in the Newton Fund ToC, as they move from outputs into outcomes, are of particular relevance to these proposed KPIs.

5.9 Longer-term outcome and impact KPIs

At its higher levels, the ToC anticipates that the GCRF's aggregate efforts will at a minimum, **influence lasting shifts in research and innovation capabilities.** The ToC proposes that this will contribute to improved future research, which will produce a 'positive feedback loop' to **strengthen the position of UK research organisations** as *'highly capable, equitable partners of choice for LMIC researchers'* (GCRF ToC).

This next stage of the ToC anticipates that improved research and innovation capabilities will contribute to equipping a wide range of **LMIC stakeholders** with enhanced skillsets and products needed to **tackle pressing development challenges.** New and enduring skills, resources and partnerships lay the groundwork for transformational change on a wide scale. Once applied at scale in multiple settings, the ToC proposes that GCRF research-led innovations will **contribute to the achievement of the SDGs** by *'enhancing people's well-being, improving equality for people of all genders, promoting social inclusion, economic development and environmental sustainability in developing countries'* (GCRF ToC). Three critical assumptions underpin how the GCRF ToC anticipates that project level and intermediate outcomes will translate into higher-level change on a wide scale:

- GCRF projects and programmes are able to position their research and innovation for adoption and replication, due to effective foundations established at earlier stages (e.g. strong networks, credible evidence, enhanced capacity of user stakeholders).
- GCRF award holders and their network partners are able to identify and respond to 'windows of opportunity' in the wider environment, so that GCRF

products are taken up by development policymakers, practitioners, entrepreneurs and public/private funders and investors.

- The momentum created by GCRF's aggregate efforts will be sustained beyond a GCRF project by mobilising follow-on investment: 'enduring equitable research and innovation partnerships'.

These assumptions are captured in the KPIs, including process and shorter-term indicators, which precede the longer-term and impact KPIs. They are the factors that that will need to be in place for the GCRF to successfully have impact at scale. The next two sub-sections cover the longer-term outcomes and impact indicators.

5.9.1 Longer-term outcome indicators

The indicators for longer-term outcomes presented in Table 11 attempt to support measurement of the following four longer-term outcomes anticipated by the GCRF ToC:

1. Innovation and research capabilities are improved and maintained in LMICs.
2. New evidence improves policy design and implementation.
3. Innovations in technologies, practices and services are applied, invested in and implemented.
4. Markets and value chains are strengthened to replicate and amplify pro-poor innovations.

Approaching the GCRF's expected impact on development challenges, the indicators for longer-term outcomes are predominantly geared towards measuring change in GCRF LMIC partner countries. At this stage of the ToC, change is expected to occur beyond the project or organisational level, to the country level and beyond. Attributing country-level outcomes (e.g. an increase in the number of interdisciplinary research centres) to GCRF-funded projects poses obvious challenges, particularly when there will be a number of other donor initiatives running parallel to the GCRF in LMIC partner countries that address the same, or similar, development objectives. One way to address this challenge would be to give focus to areas – disciplines, sectors and geographies – that have received the most GCRF investment. The application of the longer-term outcome, and impact, indicators should therefore be responsive to GCRF challenge area priorities and strategies.

The KPIs proposed for 'innovation and research capabilities' include a fairly standard country indicator of innovation capacity (number of researchers in R&D), the data for which is collected by UNESCO and widely available in global indicator platforms.[27] The remaining indicators for this outcome use interdisciplinary practice as a proxy for challenge-oriented research capability, an important priority for the GCRF. These indicators aim to support the measurement of researcher collaboration across disciplines and sectors, underpinned by the understanding that addressing complex development challenges requires this kind of interdisciplinary practice.

[27] Although it is worth noting that LMIC data standards and regularity vary.

For the remaining three longer-term outcomes, a combination of counting the number of cases with more detailed qualitative assessments of change pathways has been proposed. An approach like this overcomes the challenge posed by attribution in the use of county-level outcomes and statistics, but it is much more resource intensive and will require additional resources. The case studies can initially draw from existing data in the Researchfish impact statements and REF case studies (see data sources, section 4). They will also most likely necessitate additional data collection through, for example, interviews with Challenge Leaders and LMIC partners.

Table 11: Proposed longer-term outcome KPIs

#	Indicator	GCRF ToC element	Rating
62	**Researchers in R&D (per million people)** for previous financial years and current financial year. Broken down by LMIC	7.1 Innovation and research capabilities are improved and maintained in LMICs	Bronze
63	**Number of interdisciplinary research centres in LMICs** (by geography, by GCRF challenge area)	7.1 (as above)	Bronze
64	**Number of interdisciplinary PhDs in LMICs** (by geography, by GCRF challenge area)	7.1 (as above)	Silver
65	**Number of cases of policy/practice change linked to new evidence produced by a GCRF-funded project** (by geography, by GCRF challenge area)	7.2 New evidence improves policy design and implementation	Bronze
66	**Qualitative case studies demonstrating the nature and scale of change in policy/practice and change pathways**	7.2 (as above)	Silver
67	**Total and unique instances of IP impact (qualitative) per project** for previous financial years and current financial year per DP. Broken down by type of impact and location of impact	7.3 Innovations in technologies, practices and services are applied, invested in and implemented	Bronze
68	**Number of cases of GCRF research-based innovations being replicated and applied to address development challenges at scale** (by geography, by GCRF challenge area)	7.3 (as above)	Bronze

#	Indicator	GCRF ToC element	Rating
69	**Qualitative case studies demonstrating the nature and scale of new technology implementation**	7.3 (as above)	Silver
70	**Number of cases of GCRF research-based innovations being linked to the strengthening of markets and value chains** (by geography, by GCRF challenge area)	7.4 Markets and value chains are strengthened to replicate and amplify pro-poor innovations	Bronze
71	**Qualitative case studies demonstrating the nature and scale of change in markets and value chains**	7.4 (as above)	Silver

The GCRF longer-term outcome indicators are of particular relevance to the Newton Fund's translation pillar and higher-level outcomes. The GCRF longer-term KPIs are geared towards measuring change in the LMIC partner country, which is within the Newton Fund's expected sphere of influence. For instance, the Newton Fund ToC expects to make 'progress towards addressing development challenges' through the adoption and application of 'new products/solutions/policies'. These development challenges include health, climate change, food security, which overlap with the GCRF's priority challenge areas. The Newton Fund's people pillar is also of relevance to the GCRF KPIs that are proposed for 'innovation and research capabilities' in LMICs. At the outcome level, the Newton Fund's people pillar anticipates *'improved capacity in delivering high-quality science and innovation research in partner countries and the UK'.* There is therefore a strong potential for alignment of these KPIs across both funds.

5.10 Impact indicators

At the impact level, the GCRF ToC anticipates change in three areas:

1. Widespread use and adoption of GCRF research-based solutions and technological innovations enables stakeholders in LMICs to make progress at scale towards addressing complex developmental challenges.
2. Progress sustained by enduring equitable research and innovation partnerships between UK and LMICs, and enhanced capabilities for challenge-oriented research.
3. Contributions to achievement of SDGs: enhancing people's well-being, improving gender equality for people of all genders, promoting social inclusion, economic development and environmental sustainability in LMICs.

As for the longer-term outcomes, the KPIs proposed for the impact level of the GCRF combine country-level statistics available on global indicator platforms, with

qualitative case studies. The latter would provide a more useful and valid indication of the impacts being measured, but the data collection and analysis would require a heavier resource investment. Detailed analysis of change pathways, through a method such as outcome mapping,[28] would overcome the challenge of attribution by showing how a GCRF project is connected to, for example, a specific development outcome.

While the longer-term outcomes focus on change at the LMIC partner country level, the impact-level sphere of expected influence is wider. Change at this level of the ToC is global in nature and therefore encompasses both the UK and LMICs. By synthesising the findings across different projects and countries, the case studies can be used to show that a portfolio of changes has occurred at scale, by GCRF challenge area: Global Health, Food Systems, Resilience, Education, Sustainable Cities, Conflict.

Table 12: Proposed impact KPIs

#	Indicator	GCRF ToC element	Rating
72	**Case studies demonstrating a portfolio of changes has occurred and showing how GCRF-funded research-based solutions are being replicated at scale to address development challenges (by GCRF challenge portfolio:** Global Health, Food Systems, Resilience, Education, Sustainable Cities, Conflict)	8.1 Widespread use and adoption of GCRF research-based solutions and technological innovations enables stakeholders in LMICs to make progress at scale towards addressing complex developmental challenges	Silver
73	(SDG indicator) **Research and development expenditure as a proportion of GDP,** for previous and current financial year, by country and country type (UK/LMIC)	8.2 Progress sustained by enduring equitable research and innovation partnerships between UK and LMICs, and enhanced capabilities for challenge-oriented research	Bronze
74	(SDG indicator) **Researchers (in full-time equivalent) per million inhabitants,** for previous and current financial year, by country and country type (UK/LMIC)	8.2 (as above)	Bronze

[28] Outcome Mapping was developed by the International Development Research Centre (IDRC). The approach is particularly suitable for research uptake and policy influence. It focuses less on the direct deliverables of a (research) project and more on the behavioural changes in peripheral parties affected by the project; in other words, more on the project's influence, both deliberate and unintended. https://www.outcomemapping.ca/

#	Indicator	GCRF ToC element	Rating
75	**Case studies demonstrating a portfolio of changes has occurred and showing nature of influence on people's lives in LMICs** (by GCRF challenge area portfolio, e.g. Global Health, Food Systems)	8.3 Contributions to achievement of SDGs: enhancing people's well-being, improving gender equality for people of all genders, promoting social inclusion, economic development and environmental sustainability in LMICs	Silver

For reporting progress made towards addressing development challenges, the proposed GCRF impact KPIs are of less relevance to the Newton Fund because the expected sphere of influence transcends the Newton Fund's focus on partner countries. At this stage of the GCRF ToC, change is anticipated on a global scale. These indicators will be applied to reporting portfolio-level change, by GCRF challenge area. The two SDG indicators included in the impact KPIs could, however, be of relevance to Newton Fund's expected people pillar outcome*: 'improved capacity in delivering high-quality science and innovation research in partner countries and the UK'.*

6 Shortlist of KPIs

Although labelled as *key performance* indicators, the final list actually ranges from the more operational (inputs, activities, process) through to actual performance-based indicators (outputs, outcomes) and eventual impacts.[29] This is because some of the indicators will be used by BEIS and DPs for internal management, and some will also be used for external communication about the funds (e.g. in the Annual Report). Plus, the indicators are planned to be used alongside other key sources of information about the funds, such as independent evaluations. It is anticipated that most indicators will be reported on an annual basis. *Note: The list presented in this chapter are in draft form, and likely to be refined further in consultations between BEIS and DPs.*

6.1 Reducing the number of KPIs

The central challenge has been to select a practicable and manageable list of indicators that achieves an appropriate breadth and balance across the funds. As detailed in section 3, the long list of potential indicators (as set out in section 5) was reduced following consultations with BEIS and DPs. This included a process of scoring (for feasibility and usefulness), with the list further reduced in a workshop. The resulting set of 26 indicators (18 cross-fund, four GCRF-specific and four Newton Fund-specific) is presented in this section. Once BEIS and DPs agree this final set of indicators, at least in principle, each indicator will be thoroughly worked through to create and agree full definitions and operational delivery plans. See Figure 5.

Figure 5. The shortlist of 26 indicators

What are we doing in the funds?

- **Total funding (£)** received by LMICs [1]
- Newton Fund: **match funding (£)** with narrative for in-kind contribution [22]
- Number of **partnerships/collaborations** (broken down by type, e.g. university to industry) [2]

Types of activities:

- Number and value (£) of **fellowships** [4]
- Number and value (£) of **agile (rapid response)** programmes and grants [18]

[29] BEIS and DPs decided that the long-term impacts of the funds should not be included as indicators. This is partly because the long-term impacts are expected to occur well beyond the lifetime of the funds. It is also because the impacts are likely to be contributions to progress towards global development goals, which will be investigated in a much more rigorous and nuanced way through our independent evaluations.

Distribution of the funds:

- Proportion and value (£) of total projects **addressing each SDG** [5]
- GCRF: Proportion and value (£) of total projects **addressing each challenge area** [20]
- GCRF: Proportion of challenge-oriented activity types funding using GCRF QR [19]

Demand for the funds:

- **Success rates (%)** of applications (with narrative) [6]

Are we doing it in a fair and equitable way?

- Number of **LMIC organisations** listed on grants and proportion of funding going to them [3]
- Aggregate **gender and ethnicity figures** (of UK and LMIC leads) [7]
- Number of **co-authored research publications** [11]
- Proportion of LMIC survey respondents indicating **equitable partnerships** [12]
- Newton Fund: Proportion of survey respondents indicating **positive benefits of co-design** (fund level to researcher level) [23]

What outputs and early outcomes are we seeing?

In capacity building and partnerships:

- Instances of partner country institutions provided with **capacity-building support** [8]
- Newton Fund: Number of individuals who have received **professional development or skills training** [24]
- Newton Fund: Number of **new MoUs/agreements** between UK and partner countries [25]

In research and innovation:

- Number of **physical outputs** (e.g. citable documents, prototypes, creative products, etc.) [9]
- Number of **intellectual property/patents** [13]
- Number of **spin-out companies** [14]
- GCRF: Proportion of 'impacts and benefits' categorised under each impact type from QR [21]

What longer-term outcomes are we seeing?

These indicators can also be used to demonstrate shorter-term outcomes.

Sustainability:

- Total and unique amounts of **further funding** [10]

In policy, practices and innovation:

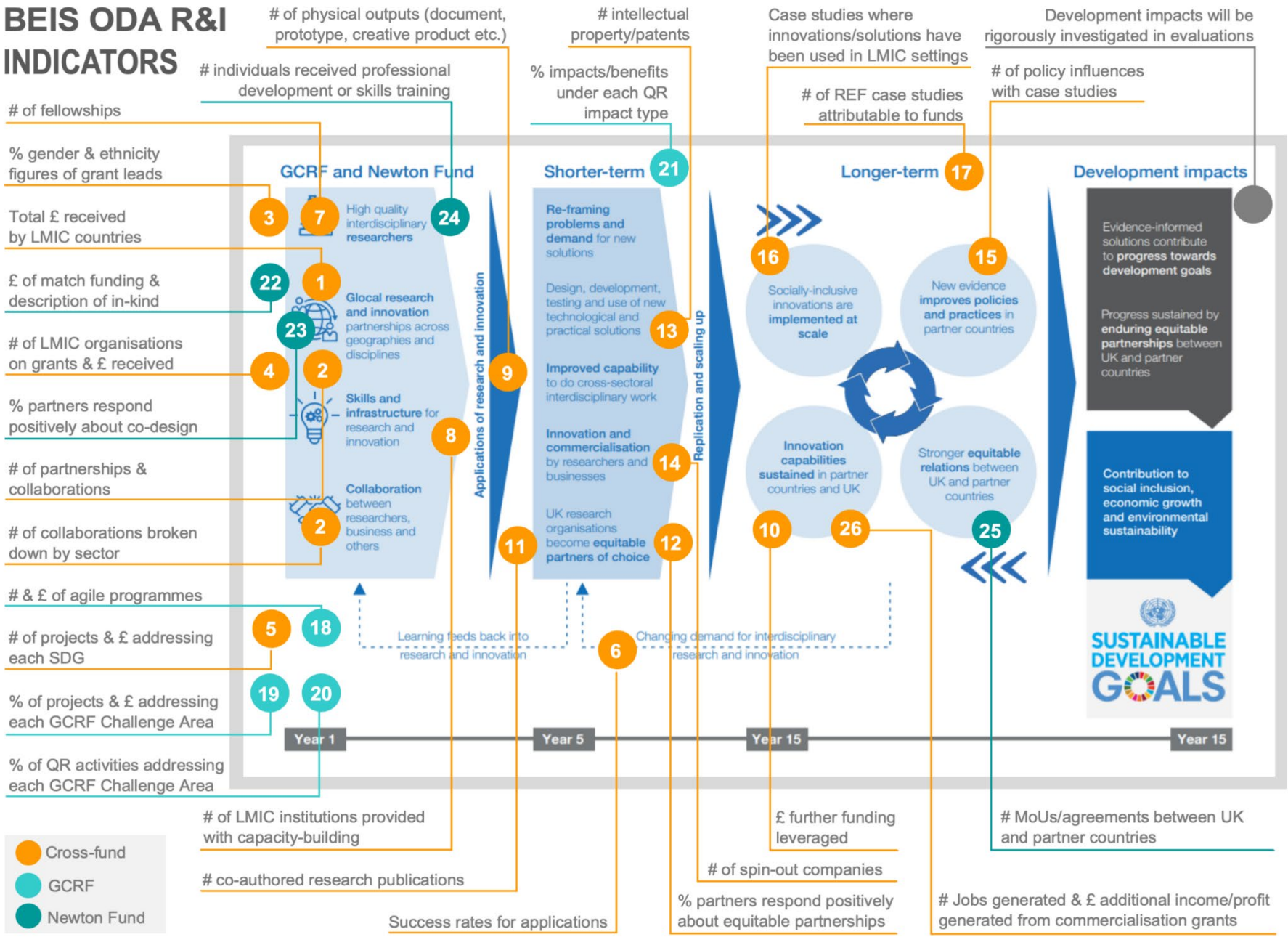
- Total instances of **policy influence** with illustrative case studies [15]
- Instances and case studies where **innovations/practical solutions** have been demonstrated/used in LMIC settings [16]
- Number of **jobs generated** and **additional income/profit (£) generated** from commercialisation grants/programmes [26]
- Number of **REF case studies** attributable to Newton Fund and GCRF funding [17]

Note: References in brackets refer to the original KPI list.

The overall narrative for these indicators (linked to the ToC, Figure 6) can be summarised as (drawn from a BEIS internal note, October 2019):

> *"BEIS research and innovation ODA spend [1, 22] is helping to ensure the UK takes the lead in addressing the challenges faced by developing countries [19, 20] including working to deliver the UN Sustainable Development Goals [5], for which there is a strong demand for research and innovation supported solutions [6]. Through the Global Challenges Research Fund (GCRF) and Newton Fund, BEIS are funding significant numbers of new research and innovation partnerships [2], supporting the development of key research skills in LMICs [4] and providing an agile response to emergencies where there is an urgent research need [18].*
>
> *BEIS and its delivery partners are committed to using the Funds to promote gender equality and inclusion [7]. They will continue to strongly promote fair and equitable global research and innovation partnerships across the broad range of activities we support [1, 3, 11, 12, 23]*
>
> *The work we do is already delivering strong outcomes. The Funds have strengthened the capacity of individuals, organisations and systems in partner countries to carry out high quality research and innovation [8, 24] and strengthened our partnerships through new agreements [25]. The research and innovation funded is delivering a broad range of results from new learning and solutions through to patents and spin out companies [9, 13, 14, 21, 10] and this is making a difference to people's lives and livelihoods [15, 16, 26, 17]".*

Figure 6. Mapping indicators against cross-fund Theory of Change



Source: Internal note on 'GCRF and Newton Fund Draft Indicators, BEIS, October 2019.

6.2 Comparison with other R4D[30] funds

We also conducted a separate review[31] of the use of KPIs by other R4D funds – funds that were similar to both the GCRF and Newton Fund. On the whole, there was a high degree of alignment between the practice of other funds and the KPIs developed and set out in this report. Where differences did occur, they tended to reflect a divergence in programme Theories of Change: for instance, the GCRF and Newton Fund have a lesser focus on institutional capacity building in LMICs than a number of the funds reviewed.

Broadly, there was coverage across seven categories of indicator type (ordered here by the most frequently occurring across the funds reviewed):

- Research partnerships and collaborations
- Capacity building (institutional and individual)
- Influence on policy and practice
- Innovation outcomes and environments
- Research communication and dissemination
- Interdisciplinarity (challenge-orientated capacities)
- Poverty alleviation and other development outcomes

The most commonly occurring indicators were those **for collaboration and partnerships**, which overlapped with indicators used to measure interdisciplinarity. This reflects a recognition that complex global development challenges require collaboration and interactions across disciplines, sectors and geographies. The second most commonly occurring indicators in the reviewed funds were those designed to support the measurement of **research capacity building.** For the most part, these indicators focused on capacity building in LMICs, including individual and institutional capabilities. A number of the funds also included indicators for **research-into-use processes:** most notably indicators used to measure or track communication and dissemination processes. This also aligned to those indicators on partnership and collaboration, as generally the success of R4D change pathways is often dependent on the quality of relationships between researchers, intended users of the research and their specific contexts.

6.2.1 Situating KPIs within good practice

The review also points towards a number of important considerations when developing KPIs for R4D programmes. The impact pathways for such research

30 The review uses the term 'research for development' (R4D) to categorise research that is funded through ODA, with the explicit aim that it should contribute to development outcomes (e.g. poverty reduction, social inclusion, economic growth and sustainable development) for people living in LMICs.
31 Pinnington and Barnett (2019). Op. cit.

and innovation are likely to be highly context dependent, non-linear and take considerably longer than the timeframe of an average 5-year development programme. Impact on social and economic development outcomes in LMICs is therefore likely to come about through a cumulative process of knowledge production and influence, often over decades. As a result of the complexity of measuring research impacts for development, the literature suggests that good practice is likely to be characterised by:

- **An emphasis on process**: indicators should be used to assess how the research project was developed from inception to completion, including the nature and types of relationships that were established, and the extent to which the research was 'positioned for use'.
- **A focus on learning and cumulative knowledge**: KPIs should be linked to a systematic approach to learning within the programme and its knowledge context.
- A focus for KPIs on the **sphere of direct control or influence**, leaving more remote spheres to either 'aspirational targets' or qualitative assessments that use case studies to explore the explanatory power of different causal mechanisms.
- **A clear connection between KPIs and their context** by tying them to the expected implementation space, where research will be used.
- **A theory-based approach**, where KPIs are developed all the way along the Theory of Change, allowing R4D programmes to test assumptions about the relationship between an intervention and its impact on development outcomes in LMICs.

6.2.2 Learning from other funds

While there is general alignment there is also room for continuous improvement. Notable examples from the review of other R4D funds suggests lessons from approaches taken by International Development Research Centre (IDRC), the International Growth Centre (IGC) and Consultative Group for International Agricultural Research (CGIAR).

It is suggested that particular attention be paid to IDRC's Research Quality plus (RQ+) framework. This framework emphasizes that KPIs are used to capture 'positioning for use' dimensions, including process indicators that track communication and dissemination strategies, as well as the quality of research partnerships, relationships with research users, and understanding of user contexts. A common lesson across the R4D programmes is that research that is better positioned for use provides a useful proxy for uptake and potential impact.

Both the IGC and CGIAR benefit from the long-term engagement in specific sectors and/or geographies. As a result, they are in a better position to demonstrate cumulative pro-poor impacts. As the GCRF and Newton Funds develop more fine-tuned strategic focus in specific thematic areas, for example around the twelve GCRF 'challenge areas', it may be useful to consider something like the CGIAR model of 'aspirational targets' tied to the United Nations

Sustainable Development Goals (SDGs). Any adoption of such an approach, however, would have to be underpinned by recognition of the GCRF and Newton Fund's more limited contribution to impact as a result of their shorter timeframes. CGIAR, for instance, has been in operation since 1971 and the International Growth Centre (IGC) since 2008.

The CGIAR also disaggregates innovation indicators so that they reflect 'stages of innovation', from research to uptake. These better captures an understanding of the iterative nature of the innovation process, and adds nuance to the definition of 'innovation'. CGIAR's framework also distinguishes between 'novel' and 'adaptive' innovations – with the latter capturing adaptations of previous innovations for new areas or situations.

7 Suggested next steps

This last section provides an updated set of potential next steps, refining those that were set out in the Interim Report. Since that last report, two of the suggestions have already been achieved: (1) a prioritisation criterion based the intended purpose of the indicator set has been agreed; and, (2) extensive consultation on the feasibility of the KPIs for DPs is in place. These have both been achieved.

The following considerations are still relevant and worth repeating here:

1. **Consider how to address the gap in LMIC partner reporting** of outputs, outcomes and impacts. At present, the datasets tend towards reporting by the PI, such as on Researchfish, even though the PI is able to invite others. This is an important gap to address, given the emphasis placed on LMIC representation in the ToC (and inherent in ODA compliance). We suggest that a formal survey of LMIC award holders is required to fill this void.

2. **Further explore options for the additional data collection required for 'impact KPIs'**. At the moment, the proposed KPIs focus largely on counting cases (REF or otherwise) and mining for qualitative change. There are different options on how to improve the situation including: (1) investing in an ICF-style methodology with a dedicated secretariat; (2) opting for an indicator set that focuses more at the outcome level (leaving the longer-term impacts to be covered by evaluations); and (3) exploring more innovative ways (e.g. artificial intelligence) to 'mine' the current qualitative reporting/cases. Whichever option is taken, we suggest that additional data is still required including a few highly targeted surveys: a survey of LMIC award holders (described above); a very focused survey of UK-based PIs on key ODA-related aspects; and a post-event survey. These will need careful planning to minimise the burden on award holders. The suggested surveys are detailed in section 5.1.

3. **Provide greater strategic focus for impact KPIs, say by challenge area** (discipline, geographic coverage). In terms of longer-term change, in particular contributions to the SDGs, the diffuse nature of grant funding means that impact is likely to be thinly spread. A more effective use of the limited resources available to capture impact-level change is to focus on fewer areas, and measure with more depth. This could for instance be on a country basis (across an innovation system) or a challenge area (around a development problem). While this is not about the KPIs per se, a greater strategic focus will enhance measurement at the impact level. For example, the draft KPIs are mainly focused on 'counting the number of cases' (KPIs 65, 68, 70) and 'qualitative analysis of these cases' (KPIs 66, 69, 71, 72). This emphasises aggregating impact (where individual research grants remain the unit of analysis), rather than capturing systemic impact that is the result of numerous GCRF/Newton Fund grants coalescing around a development challenge (where the unit of analysis is the system – a particular political, social, economic or environmental system).

4. **Decide what level of process and activity-level monitoring is necessary for the portfolio.** We suggest that BEIS consider developing process KPIs that are useful to consider key adjustments to the funds, such as in LMIC representation on selection panels, proxies for gender inclusion, and so on. These can provide the base data for more comprehensive 'audits' of ODA compliance, gender inclusion, and so on. Plus, given ICAI's recent remarks on 'tied aid' it may be helpful to track the proportion of ODA funding spent with partners overseas.

5. **Develop plans for piloting and roll-out.** Inevitably, these metrics will need to change based on the experience of using them, issues with data collection, their value to decision makers, changing political priorities, and so on. Some KPIs may also become redundant over time, particularly some of the process ones as focus shifts and the funds mature. While a detailed plan for roll-out will need to follow the finally agreed set of KPIs, agreeing some of the key parameters earlier on will help with this process. For example, on priorities and use by decision/policymakers (as per point 1 above), deciding which DPs will pilot which KPIs, the available investment in new data collection (like LMIC surveys), etc. We suggest working backwards from the key reporting and decision points (at different levels of the system, including the timings and uses by each stakeholder group). After mapping and prioritising these, then working backwards to which KPIs (and thus data sources) will be needed by when. This will provide the basis for a pilot stage and sequenced plan of rollout, which can be used as a framework for discussing and agreeing resources (people, skillsets, responsibilities) required both within BEIS and DPs.

6. **Build in processes for continuous improvement.** This set of KPIs is an initial set, based on a trade-off between what is useful and importantly what is feasible right now. Over time, new demands and new questions will be asked, as inevitably more and better evidence will refine requests. Plus, the current set of KPIs focuses primarily around the middle of the ODA ToC (shorter and longer -term outcomes). In time, practice should be shared with other government departments and other R4D funders, including learning more on capturing 'positionality for use' (IDRC), scales of innovation (CGIAR) and contributions to the SDGs (CGIAR).

8 Annexes

Annex 1. Specification (terms of reference)

Section 4 – Specification

1. Background

Official Development Assistance (ODA) is provided by official agencies (including state and local governments) with the promotion of economic development and welfare of developing countries as its main objective. ODA is monitored by the Organisation for Economic Cooperation and Development (OECD). ODA funded activity focuses on promoting the long-term sustainable growth of countries on the OECD Development Assistance Committee (DAC) list.

BEIS research and innovation ODA is delivered through the already established Newton Fund, through the new Global Challenges Research fund (GCRF) and ODA spend from the core science and research budget. The ODA Governance Board chaired by the Minister for Universities and Science provides oversight of all BEIS ODA funds.

BEIS is committed to undertaking a robust and thorough monitoring and evaluation of GCRF and Newton. Given the size of the GCRF and Newton contribution to overall ODA activity (circa £2bn over the Spending Review period), the funds will come under significant external scrutiny, from within the UK from HMT, NAO and DfID, but also from ICAI and OECD.

It is essential that BEIS can provide robust evidence that the Funds are on course to deliver significant impact. The Department is now developing key performance indicators (KPIs) which can operate across all the ODA spend to improve its monitoring of outcomes and impact of the spend. The study will provide guidance on the most appropriate and practical KPIs to be rolled out across our delivery partners. This will allow for more transparent reporting of the spend and contribute to ongoing and proposed evaluations.

2. Aims and Objectives of the Project

BEIS is wishing to appoint contractors with expertise in both ODA monitoring and evaluation, and understanding of the research base environment, to work with the in-house team to develop key performance indicators for its ODA spend. The aim of this project is to determine the most effective measures of performance across the BEIS research and innovation ODA funds. It is anticipated that these indicators will consist of a core set of cross-fund KPIs but could also include some fund specific KPIs where necessary. Its objectives are to answer the following key questions:

- What is the full extent of information delivery partners regularly collect on the outputs, outcomes and impact of their ODA spend?
- Can this information be used to form a comprehensive set of performance indicators?
- What are the gaps in the available data and can these be filled with adjustments to existing data collection systems?
- What approaches are used by other ODA programmes and funds and could these be translated across to BEIS Research ODA?

Version 2.6

3. Suggested Methodology

The focus of this project is the development of key performance indicators and it is expected that contractors will conduct a review of delivery partners grant records and other databases and review of approaches adopted by other programmes. This will be supplemented by qualitative interviews with delivery partners to better understand how data is collected and any caveats around quality and accuracy. We also expect interviews will take place with other fund managers to understand how their KPIs operate. This work will build on work already underway for the Newton Evaluation and the foundation stage GCRF Evaluation. In detail the project will:

- Review existing indicator data collected by Delivery Partners
- Review academic databases (eg ResearchFish)
- Review what other funds and research initiative are doing for KPIs (inc. ICF, Prosperity, Fleming, Innovate UK, UKRI, etc)
- Provide summary of review findings
- Consult with BEIS and DPs

4. Deliverables

Key deliverables will be:

- A final report which contains:
  - a review of the current data collection surrounding ODA activities and what related data is currently held by delivery partners
  - a brief review of the KPIs for similar other ODA programmes
  - recommendations on the most appropriate and practical KPIs to roll out for regular reporting.
- A presentation will likely be made to summarise the key findings and explain our approach.

Annex 2. Documents reviewed

Coffey (2016) Evaluation Strategy Report, 13 July 2016, Newton Fund Evaluation, UK

COHRED's Research Fairness Initiative, at: http://rfi.cohred.org

DFID (2013) Research Uptake Guidance, Department for International Development, UK

Evaluation of Humanitarian Innovation and Evidence Programme (HIEP) – Phase 1, August 2016 (HIEP Evaluation Framework Matrix)

Global Innovation Index 2018, at: https://www.globalinnovationindex.org/gii-2018-report

IDRC (2016) A Holistic Approach to Assessing Research Quality, at: https://www.idrc.ca/sites/default/files/sp/Documents%20EN/Research-Quality-Plus-A-Holistic-Approach-to-Evaluating-Research.pdf

International Climate Finance (ICF) KPIs

Newton Fund Monitoring System Review (2016) Evaluation of the Newton Fund, April 2016

ODA Research Portfolio Performance Indicators: UKRI suggestions

Prosperity Fund (PF) (2018) Annex 7 – Secondary Data Quality and Availability

Rethinking Research Collaborative (2018) 'Promoting Fair and Equitable Research Partnerships to Respond to Global Challenges – recommendations to the UKRI', at: https://www.ukri.org/files/international/fair-and-equitable-partnerships-final-report-to-ukri-sept-2018-pdf/

Sustainable Development Goals indicator framework, at: https://unstats.un.org/sdgs/indicators/indicators-list/

UK Collaborative on Development Science (UKCDS) (2017) 'Building Partnerships of Equals', at: https://www.ukcdr.org.uk/resource/finding-and-building-effective-and-equitable-research-collaborations/

Walter Mansfield and Philipp Grunewald (2013) 'The use of Indicators for Monitoring and Evaluation of Knowledge Management and Knowledge Brokering in International Development', Brighton: Institute of Development Studies

REF case studies reviewed:

Aberystwyth and Bangor Universities, 2014. Novel genetic marker-assisted breeding produced a pearl millet hybrid grown on 700,000 ha of drought-prone areas in Northern India which has improved food security of three million people. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=42088

Open University, 2014. Innovation and the private sector in inclusive African development. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=36905

Royal Veterinary College, 2014. Driving the Worldwide One Health Response to the Threat of Avian Influenza. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=15613

University College London, 2014. Improving the evaluation and efficacy of conditional cash transfers in Latin America. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=43817

University of Birmingham, 2014. Improving Road Investment Appraisal. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=38849.

University of Birmingham, 2014. Improving the outcomes of post-conflict peace-building and security reforms: Sierra Leone and Nepal. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=38869

University of Cambridge and the University of East Anglia, 2017. Reducing School Dropout Rates in Malawi and Lesotho. ESRC-DFID Research Impact Case Study, at: http://www.theimpactinitiative.net/resources/reducing-school-dropout

University of Nottingham, 2014. Informing EU negotiations at the 2011 UN Climate Change Conference of the Parties in Durban, South Africa. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=28669

University of Oxford, 2014. Multidimensional poverty measurement improves policy-making. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=3714

University of Sussex, 2014. Guiding treatment and leading advocacy for podoconiosis, a common but highly neglected tropical disease. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=41523

University of Strathclyde, 2014. Reducing morbidity and mortality in Malawi through an integrated Environmental Health approach to improving water quality and health. REF 2014 Impact Case Study, at: https://impact.ref.ac.uk/casestudies/CaseStudy.aspx?Id=42348

Annex 3. DP data fields supplied for foundation evaluation

Grants	Staff	Partners	Classifications	Beneficiary countries	Challenge areas	Abstracts	Personal classifications
Scheme owner	Grant reference	Grant reference	Grant reference	Grant reference	Grant reference	Grant reference	CDR Id
Grant reference	Grant call	Grant organisation type	Award amount	Start date	High-level challenge	Technical summary	Grant ID
Project title	DP owner	Organisation	DP	Funding status	Challenge area	Pathways to impact statement	Classification area
Research organisation	Project title	Organisation city code	Funding status	Country			
Grant department name	Role name	Organisation country	Classification sub-type	DAC status			
Date Last received	CDR Id		Top classification description	Region			
Actual start date	Title		Classification Name				
Actual end date	First name		Health category				

Grant status	Last name		Research activity				
Funding status	Contact organisation		Classification %				
Category	Date of birth						
Scheme	Age at date of application received						
Call	Gender						
Working amount applied for	Ethnicity						
Amount awarded	Email						
Authorised total RC	Organisation City code						
Authorised total FEC	Organisation country						
Total fund value							

Annex 4. Indicator descriptions (for a selection of KPIs)

This section provides examples of how the methodology for an indicator can be developed into a full description covering the rationale, definition, data sources, method of calculation, limitations intended use and so on. Given that the KPI list will be refined further with consultation, the following is included to provide an illustration of what is possible.

Example output indicator:

Ref:	KPI 30	**Short name:**	Next destination of grant
Indicator:	Total and unique reports of upwardly mobile next destination per project for previous financial years and current financial year per DP		
Disaggregation:	By role on the grant, sector (public, private etc.), industrial sector (e.g. energy), scale of progression (e.g. post-doc to reader) and new location		
Description:	PIs have to report next destinations of all involved in the grant (including themselves, their research assistants and students). The details requested in Researchfish relate to an individual's next 'established' destination, rather than very short temporary positions or periods of unemployment between roles. This is a reporting field in Researchfish and will incur no costs to collate.		
Indicator type:	Counting – numbers of activities and outputs		
Method: **(+data source)**	Extracted from Researchfish.		
Limitations:	A limitation is that a PI may not know in all cases where their colleagues go next. Another is classifying what is an 'upward mobility'. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will need to be drawn upon. This applies to all DPs (NFCs may capture this when HEIs report impacts in partner country as a capacity building element).		
GCRF ToC category:	Outputs		
GCRF ToC element:	Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions (3.3)		
Newton Fund ToC:	People pillar – Capacity to engage in international collaborative research		
Relevance to ODA KPIs:	Yes – related to capacity building and skills development		

Example research-into-use indicator:

Ref:	KPI 33	**Short name:**	Alt-metric score
Indicator:		Average publication alt-metric score for GCRF-funded research for previous financial years and current financial year per DP.	
Disaggregation:		Broken down by location and type of attention (patent, news articles, policy document)	
Description:		Alt-metrics are non-traditional bibliometrics that aim to calculate scholarly impact based upon diverse online research outputs including social media, online news media, online reference managers, etc. This indicator complements more traditional citation impact metrics and importantly includes metrics on whether the research in mentioned in policy documents, syllabi and patents.	
Indicator type:		Counting – numbers of activities and outputs	
Method: **(+data source)**		This is not readily available as a simple dataset and will need bespoke analytics from an external provider. This would apply to all DPs bar NFCs.	
Limitations:		There are some key limitations: the score does not take into account the sentiments of mentions made about research objects, and thus does not help one understand the positive nor negative attention that a piece of research has received. More can be found here: https://www.metrics-toolkit.org/altmetric-attention-score/	
GCRF ToC category:		Research-into-use	
GCRF ToC element:		Effective promotion and packaging of research and innovation products (4.1)	
Newton Fund ToC:		Output row 2 – box 6 and the box between row 1 and row 2	
Relevance to ODA KPIs:		Yes – the reach of the published work from both funds, and their use of it.	

Example short-term outcomes indicator:

Ref:	KPI 48	**Short name:**	Mentions of GCRF research use
Indicator:		Number of mentions of where GCRF research is used by industry/community/government stakeholders for previous financial years and current financial year per DP.	
Disaggregation:		Broken down by type of impact and location of impact	
Description:		Whether the research produced by GCRF-funded activities is suited to development problems in LMICs should be judged by its actual use. Industry use of the research would provide support for this, particularly if used in LMICs and specifically on development problems.	
Indicator type:		Mixed methods – combining 'cases' and elucidating them with qualitative insights (e.g. case studies)	
Method: **(+data source)**		This evidence does not readily exist but could be drawn out of existing output/outcome data where there is qualitative impact data. Impact sections of Researchfish, particularly under products and software/technical solutions. REF case studies would also provide a source for this. This applies to all DPs and would incur some cost to pull together case studies. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type GCRF funds report annual data on: 'Benefits to DAC nations' and 'Outputs and impacts'	
Limitations:		Data does not readily exist and will incur some cost and methodological development to compile this indicator.	
GCRF ToC category:		Short-term outcomes	
GCRF ToC element:		Technological and practical solutions to development problems tested to proof-of-concept and positioned for scale in LMICs (5.2)	
Newton Fund ToC:		Translation pillar of Newton applies here (Outputs row, translation column, new products box)	
Relevance to ODA KPIs:		Yes	

Example replication and amplification indicator:

Ref:	KPI 58	**Short name:**	Co-creation engagements
Indicator:		Number of co-creation engagements with potential users of GCRF-funded research	
Disaggregation:		By type of engagement, by type of user stakeholder, by location/ reach	
Description:		This indicator would measure the extent of GCRF's co-creation, which is used as a proxy to measure how 'responsive' and engaged the GCRF is. The assumption here is that the more responsive GCRF projects are to LMIC contexts and user stakeholder priorities, the more likely research outcomes are to be replicated.	
Indicator type:		Counting – numbers of activities and outputs	
Method: **(+data source)**		This information is readily available in Researchfish 'engagements' section, including 'type of engagement' and a free text box on 'results and impact' of engagement, where it is possible to decipher the extent of co-creation vs simple dissemination. Co-creation events are defined as engagements in which user stakeholders and researchers both have an active role in problem solving, producing ideas, applying knowledge and developing capacity. Presentations and panel discussions where research is presented (dissemination events) would not constitute a 'co-creation' activity. A series of workshops, mentoring relationship/ consultancy or training event would, however, constitute co-creation.	
Limitations:		Consistency of definitions and extracting engagements from free text.	
GCRF ToC category:		Process (replication/amplification)	
GCRF ToC element:		Iterative engagement, by GCRF, responding to opportunities to amplify change (6.1)	
Newton Fund ToC:		Collaboration and co-creation are also important for the Newton Fund	
Relevance to ODA KPIs:		Yes	

Example impact indicator:

Ref:	KPI 74	**Short name:**	Researchers per million inhabitants
Indicator:		Researchers (in full-time equivalent) per million inhabitants, for previous and current financial year	
Disaggregation:		By country and country type (UK/ LMIC)	
Description:		This would enable GCRF to measure change in the innovation system, but attribution/ contribution is problematic. It is presumed that governments will be collecting this data anyway (as part of the SDGs), but reporting systems and reliability may vary, particularly across LMICs. One way to overcome the sensitivity issue would be to home in on specific sectors or research disciplines that have received the most GCRF investment.	
Indicator type:		Existing national/international indicators – Relevant data collected by national and multinational organisations that compliment KPI measurement	
Method: **(+data source)**		SDG indicator 9.5.2. Researchers in R&D (per million people). UNESCO definition: Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included.	
Limitations:		Data not available for all LMICs: R&D data is to be collected through surveys, which are expensive, and are not done on a regular basis in many developing countries. Furthermore, (developing) countries do not always cover all sectors of performance. In particular the business sector is not always covered.	
GCRF ToC category:		Impacts	
GCRF ToC element:		Progress sustained by enduring equitable research and innovation partnerships between UK and LMICs, and enhanced capabilities for challenge-oriented research (8.2)	
Newton Fund ToC:		TBC	
Relevance to ODA KPIs:		TBC	

Annex 5. Table of all KPIs

#	Indicator name and description	GCRF ToC element	Newton Fund ToC element
1	Total number of events, and attendees per event, organised specifically to establish links, brief, showcase or otherwise raise awareness about the GCRF for previous financial years and current financial year per DP (including UKRI/BEIS level). Broken down by location (country) and type of event This indicator measures the number of GCRF DPs' partnering activities with LMIC funders, institutions, researchers and other stakeholders. These include all events brokering research and innovation partnerships between UK and LMIC institutions, for example the Global Engagement events. These events should be easily tracked by individual DPs/UKRI/BEIS. This should incur little to no cost and would be the responsibility of DP/UKRI/BEIS teams. It does not apply to NFCs. The number of events may fluctuate but should be a regular feature of GCRF activities for DPs	1.1 Partnering interventions	Perhaps Activities – third box along, or small blue box between people and research pillars 'networking events/workshops'
2	Number of new instances of brokered institutional links attributed to involvement of GCRF for previous financial years and current financial year per DP. Broken down by country and types of institutional link (e.g. research/innovation, commercial, advisory) This measures the actual rate of partnering and what kind of partnerships are being created. This would be collected through stakeholder surveys of PIs/partners. This might form three questions: (1) to your knowledge, has your institution ever had a R&I partnership with the partner institutions? (2) [For each new partnership] what form did this take [select all that apply]. The latter question's options might include memorandum of understanding, official visit, establishing a network, through establishing the GCRF project; (3) What does this partnership involve [select all that apply]: Research activities, innovation and commercialisation, advisory/consulting work, training and development. This data is not readily available, hence the survey, which will incur a cost but will be as part of the wider survey effort. This will be the responsibility of DPs to report the findings. It is logical that the number of new relationships brokered will decline over time due to the finite number of institutions able to engage with GCRF and as the fund itself moves to consolidate relationships. However, as capacities increase in LMICs, more institutions become able to engage in GCRF	1.1 Partnering interventions	Activities – third box along and final box in the translation pillar

3	Number and value of fellowship and training programmes and corresponding grants funded under GCRF for previous financial years and current financial year per DP. Broken down by type of programme. Including average and median grant values per programme and overall This indicates the investment put into direct training and development interventions by GCRF DPs. These kinds of grants offer training, travel and other kinds of exchange activities, including equipment purchase, all of which are basic elements of capacity building. This would apply to all GCRF DPs. The vast majority of GCRF programmes will include some element of training, but this is captured in other indicators, this focuses on specific investment where fellowships/training are the primary activity. One example of programmes specifically designed for training is the BBSRC GCRF Strategic Training Awards for Research Skills (GCRF-STARS). This programme level data is readily available, should incur little to no cost and would be the responsibility of DP teams. These kinds of programme are generally favoured by the academies due to their expertise in this instrument, so numbers across DPs must be weighted somewhat to account for this	1.2 Capacity building	Activities – people pillar box 1, 2, 4
4	Number of GCRF-funded studentships for previous financial years and current financial year per DP. Broken down by level (research masters, doctorate), type (industrial doctorate, staff candidate) and LMIC/non-LMIC Postgraduate degrees (involving research) allow for the next generation of researchers to be trained. Receiving their training under the GCRF banner should encourage challenge-oriented, interdisciplinary working for their future careers, whether that be in academia or elsewhere. This data should be available through regular grant management. However, it may be that studentships are awarded through existing grants rather than by DPs directly, which will be much harder to track. This should incur little cost and would be the responsibility of all DP teams. This indicator may not be as applicable to innovation funding through Innovate UK or UKSA though industrial doctorates will likely apply	1.2 Capacity building	Activities – box 1 and 4
5	Number and proportion of GCRF programmes with two or more DPs broken down by GCRF/non-GCRF DPs for previous financial years and current financial year. Non-GCRF DPs broken down by country of operation (e.g. DFID – UK) and sector of operation (e.g. agriculture) Having multiple DPs funding one programme means that their communities have the opportunity to mix, creating interdisciplinary collaborations and allowing each to access different sectors, depending on the funder. These programmes are already very common. Non-GCRF DPs are less common but do exist and indicate that a new community of researchers are being included in GCRF. Data are readily available, should incur little to no cost and would be the responsibility of DP teams. It does not apply to NFCs. It does not necessarily indicate challenge-led R&I	1.3 Challenge-led, multisectoral research & innovation	Activities – research pillar boxes 5 + 6 (joint research and centres)

6	Number and value of interdisciplinary hub and rapid response programmes and grants for previous financial years and current financial year per DP (double count for joint funded). Broken down by type of programme This addresses the interdisciplinary and challenge-led aspects of this ToC element. Though much of GCRF research has these elements, these types of programmes provide a specific structure for conducting large scale, interdisciplinary, rapid response research. Data are readily available, should incur little to no cost and would be the responsibility of DP teams. It can apply to NFCs as they may support such activities. The rapid response programmes require some stimuli – a crisis – to respond to, so this should be considered when interpreting this indicator. Academies do fund these activities but not to the same extent as the other DPs, so this should be weighted accordingly	1.3 Challenge-led, multisectoral research & innovation	Bottom boxes of research and translation pillars, and joint research centres box (box 6)
7	Number of workshop/symposium programmes and corresponding grants funded under GCRF, number of attendees and types of attendees reached from those grants for previous financial years and current financial year per DP. Broken down by type (research-user, researcher, industry, government) and country This indicator gives an impression of networking interventions being conducted across the piece. However, this does not tell us who was engaged with and how many. There will also be a proportion that only focus on research training. Data are readily available, should incur little to no cost and would be the responsibility of DP teams. As for the audiences reached, determining who engages in these networking activities is important to determine at what level GCRF is being engaged with in-country and in what sector. Data are not readily available and what is available will be inconsistent in terms of numbers. Engagement events and the type of audience is available in Gateway to Research (GtR) and NFCs collect data on GCRF activities. Other DPs may have their own systems to capture some of this data. If this is not usable or comparable year-on-year, the stakeholder survey may provide better or supplementary data at a higher cost	1.4 Stakeholder mobilisation and networking	Activities – boxes 4, box between people and research pillars ‘networking events/workshops’, 7, 11
8	Whether Challenge Leaders are achieving their objectives and adding value to the GCRF portfolio within their three strands of activity annually. Broken down by challenge portfolio This KPI is designed to report on the challenge leaders' activities and achievements against their annually set objectives. These will be judged through the performance review process at UKRI and reported on by the team responsible for the challenge leaders annually. Objectives are self-set by challenge leaders and sit under GCRF Theory of Change. These objectives can be organised within three strands of activity: shaping strategy, maximising research into use, and engagement and partnerships. This will be reported at the Challenge Leader cohort level rather than broken down by portfolio otherwise we miss the cross-portfolio impacts. Information on progress on	1.5 Challenge leaders and champions for uptake	

	objectives is collected as part of the challenge leaders' performance reviews. This KPI will take the form of a high-level judgement by the senior official with responsibility over the Challenge Leaders (e.g. most annual objectives met and significant value added to the fund) with a short supplementary narrative pointing towards quantitative figures on activities and qualitative value added as appropriate.		
9	Number of programmes and corresponding grants that are designed specifically to build capacity through infrastructure/resource development for previous financial years and current financial year. Broken down by type (facilities, data infrastructure) This indicator will measure the level of investment and effort being put into developing R&I infrastructure and resources. Resources refer to activities such as developing secondary data repositories such as the UK BioBank or by building a patient cohort in LMICs. This might also include access to facilities, improvements to them, or support to create them from scratch. One example of a programme specifically designed for infrastructure: Africa Catalyst (RAEng) which aimed to strengthen engineering representative bodies in Africa. These data should be readily available and come to little cost to collate and report. It applies to all DPs. NFCs will report using the activity category in their monitoring documents from HEIs	1.6 Support to research and innovation infrastructures	Activities – box 11 and box between research and translation pillar: 'strengthen national and institutional research infrastructure to support decision making'
10	Number of programmes and corresponding grants that are designed specifically to build capacity through market development, policy and regulatory advocacy for previous financial years and current financial year. Broken down by type (market development, policy) This indicator aims to measure programmes and grants that aim to catalyse economic growth, through developing commercially viable technology which supports national enterprise, market and value chain development, attracting public-private investment, international trade. It will also include those aiming to achieve conceptual and instrumental improvements in policy and practice decisions. Data for this indicator is internally held by DPs (supplied by HEIs for NFCs) but is not tagged for these programme/grant types. These types of programmes should include market development, policy advocacy as top-level aims, rather than possible outcomes. Projects not under the purview of those programmes will be less easy to define, as such text searches of the project titles and abstracts will be required. This will incur some costs in time taken to classify projects as this tag is not readily available. It would apply to all DPs	1.6 Support to research and innovation infrastructures	Activities – box between research and translation pillar: 'strengthen national and institutional research infrastructure to support decision making'
11	Number of LMIC organisations listed on grants and proportion of funding going to those organisations for previous financial years and current financial year per DP. Broken down by type of organisation (private, public, third sector) and country	2.1 Evidence of interest/demand for solutions	Mostly just an input but does relate to the

	The variety of organisations involved in GCRF awards indicates the appetite to work in a challenge-oriented way across sectors, rather than just the university sector. This is an important measure in LMICs to assess the interest across sectors to participate. Most programmes do not allow anything other than a UK research institute eligible for Research Council (RC) funding to apply but DPs like Innovate UK and UKSA do not impose this restriction, so numbers will vary between them. Though partners can usually be from anywhere. This information is collected by DPs on application and is simple to collate but organisations may need to be classified, though this should be straightforward. It applies to all DPs bar the NFCs who do not routinely collect this information	from in-country stakeholders	translation pillar 'collaborative programmes with academia and industry'
12	Number and proportion of LMIC attendees at DP led events for previous financial years and current financial year per DP (including UKRI/BEIS level) and per event. Broken down by type of audience (private sector, HEIs, government etc.) and participant organisation location This indicator measures the engagement of DPs' communications events as well as who they are engaging. It is very important for them to target LMIC stakeholders in this regard. DP organised events should record attendance lists with the participants' organisations and countries so the data should be available and incur no cost. However, it may be difficult to collate this data as it will not be stored in one database. It may also not be reliable as attendance at events is often erratic and dependent on many factors, such as the events location. There may also be validity issues as LMIC stakeholders may not receive funding to attend these events and therefore may be mostly UK audiences This would apply to all DPs bar the NFCs	2.1 Evidence of interest/demand for solutions from in-country stakeholders	None
13	Mentions of GCRF (in news and social media), unique authors, top trending topics, top news stories for previous financial years and current financial year. Reach as a total, over time and from which countries This indicator would measure the profile, visibility and engagement with GCRF content online, whether that be that produced by DPs, universities, industry, governments or individual researchers. This would give an insight into the interest garnered in LMICs. It is not possible to determine who engages with the content but it should be possible to determine where they engaged from. This data is only available through web scraping and would be the responsibility of an external party, incurring a high cost. It would also fluctuate depending on the amount of content produced online, though old content may also be accessed. It would not be applicable for NFCs	2.1 Evidence of interest/demand for solutions from in-country stakeholders	None
14	Proportions of challenge-oriented activity types funded using GCRF QR per NFC. For the current and previous academic years (not possible before 2018-19 as no strategies were in place) broken down by sector (need to confirm whether this means discipline or not)	2.2 Sufficient appetite and capacity in UK to	None

	It may be that HEIs focus on different elements of capacity building (e.g. for home or away) or simply conduct fewer activities in one year compared to another. It is also important to monitor to understand where QR is spent and whether priorities need to be changed as to the guidance for QR e.g. should some activities be capped? These data are collected each year in the monitoring reports against the strategy, but can change from original plans. NFCs have to report this to BEIS each year to account for the GCRF QR spending. This will incur little cost to compile and applies only to NFCs	work in a challenge-oriented way	
15	Success rates (as a percentage with numbers of UK applicants and awardees) for programmes and calls broken down per DP by the applicants' type of organisation, genders, ethnicities, target country, SDG/challenge area targeted, discipline, and type of programme (e.g. fellowship, research centre). Non-competitive awards are not included This indicates demand for the funds across DPs and by applicant characteristics. It is a direct measurement of demand. It may fluctuate across time, type of programme and as eligibility criteria change but is generally reliable, based on non-GCRF experience. These data are not reliably reported across DPs but are collected for the most part and will not require any additional cost since many DPs already publish their success rates online. This applies to all DPs bar NFCs	2.2 Sufficient appetite and capacity in UK to work in a challenge-oriented way	N/A but is an input
16	Success rates (as a percentage with numbers of LMIC applicants and awardees) for programmes and calls broken down per DP by the applicants' type of organisation, genders, ethnicities, country, SDG/challenge area targeted, discipline, and type of programme (e.g. fellowship, research centre). Non-competitive awards are not included This indicates demand for the funds across DPs and by applicant characteristics. It is a direct measurement of appetite. It may fluctuate across time, type of programme and as eligibility criteria change but is generally reliable, based on non-GCRF experience. These data are not reliably reported across DPs but is collected for the most part and will not require any additional cost since many DPs already publish their success rates online. This applies to all DPs bar NFCs	2.3 Sufficient appetite and capacity in LMICs to participate in GCRF	N/A but is an input
17	Joint funding in £ figures for the following by DP for previous financial years and current financial year split by country, level (institutional, national) and funding sources (public, private, charity): Co-funding: where the partner funds the project/activity directly, e.g. for a grant project, a university would invoice the partner for the match funding In-kind: the partner provides resources that we can assign a cash/numerical value to, e.g. the provision of a venue or subsistence, that the UK DP would otherwise have to pay for Matched resource: usually where the effort is matched, even if the cash value is different, e.g. we may pay for outbound flights and the partner pays the return flights. The effort is matched but the	2.3 Sufficient appetite and capacity in LMICs to participate in GCRF	Activities – boxes 3, 5, 6

	value may be different due to exchange rates, cost of the flights etc. Mix: a combination of the above, this could also include cash, whereby the partner gives the BC the funds to disburse Joint funding for GCRF is an important indicator of the fund's relevance and importance on the global stage. Capture of co-funding at the institutional level will indicate LMIC appetite and willingness to invest into the projects, as is seen in the Newton Fund. This information is should be reported by DPs, as it is for Newton, and should be accounted for in financial data from the application process. One issue might be what is committed versus what is actually paid at the time, it will be better to use the former to measure this KPI. This may also be collected through participant reported sources (e.g. GtR) where they cite instances where this kind of funding was secured. This would apply to all DPs. NFCs collect this in their monitoring as a single figure per activity		
18	Instances of co-creation of GCRF proposals as a proportion of total applications for previous financial years and current financial year. Broken down by type of level of involvement (e.g. co-wrote methodology) and co-creation activities (e.g. pre-proposal visits, feedback sought) Co-creation of GCRF proposals shows the extent to which partners were able to co-identify research issues and target specific countries. This information is not readily available and will require specific items in a stakeholder survey (UK+LMIC), as such it will incur costs. It applies to all DPs bar NFCs. The questions might be three items: (1) How involved were you in preparing the proposal [select all that apply]? – not involved, somewhat involved (various approvals, fed back on the proposal), equal contribution with the partner, prepared the majority of the proposal, including the aims and methodology (2) How did you and your partner work together to prepare the proposal [select all that apply]? – we completed it via email exchanges, we took part in calls with each other, we met each other in person, we did not work together, it was one sided (3) what went well/not so well [open question]	2.4 Researchers, innovators and LMIC partners have the expertise to map the landscape and co-identify priorities and research issues	None
19	Proportion of total projects per DP addressing each challenge area and value of those projects for previous financial years and current financial year. If projects address multiple areas, each project will be counted multiple times (e.g. one project targeting 4 areas will be counted 4 times). This will not work for financial commitment if the latter route is taken This indicates both that the researchers have the expertise to identify challenges and that some are not targeted disproportionately to others. This also gives a view on the coverage and concentrations of research addressing the GCRF challenge areas, allowing DPs and BEIS to change priorities as needed or to inform programme design. This is captured by DPs when the grant is submitted/awarded and not after that point. The data is readily available in grant	2.4 Researchers, innovators and LMIC partners have the expertise to map the landscape and co-identify priorities and research issues	None

	management systems and should incur no cost to collate. This applies to all DPs. NFCs also collect SDG as their monitoring captures more than GCRF activities (some are shared between GCRF and other ODA activities not strictly under GCRF)		
20	Number of productive collaborations made between LMIC partners attributed GCRF-funded activity for previous financial years and current financial year per DP. Broken down by sector ((public (research using), public (civil), private, third)) and location (to ensure they are LMIC) based upon participant characteristics held internally GCRF itself is a platform on which international collaborations are made, but it can also be a catalyst for further collaborations. This knock-on effect indicates whether global relations and networks are created as a result of GCRF-funded activities. 'Productive' specifically means that the collaboration has led to uptake and replication of GCRF research and innovation, this might be a connection with a transport ministry due to GCRF showcasing in a LMIC. This would be collected through the stakeholder survey with PIs/partners, incurring additional cost. It would apply to all DPs bar NFCs. After collaboration questions (e.g. what new collaborations have you made in developing countries, what sector are they in? what do these collaborations involve?) It might be formed by a single question: Was this collaboration formed as a result of your involvement in GCRF-funded activities? OR How did this collaboration come about [select all that apply]? my involvement in the GCRF-funded project, knew them before, through an unrelated networking event, through a GCRF networking event, through GCRF communications	2.5 Researchers, innovators and LMIC partners have expertise to mobilise coalitions for uptake and replication in DCS	Outputs row 1 – box 10 (final one)
21	Average gender and ethnicity composition of GCRF UK lead (likely the PI) and LMIC lead (likely the Co-I) and project teams for previous financial years and current financial year per DP. Broken down by LMIC/non-LMIC and successful/unsuccessful The gender and ethnicity composition of teams is an important indicator for inclusivity. Particularly if gender equality and equity is to be taken seriously then these teams must be at least reflective of the researcher population in LMICs and non-LMICs. Increased diversity in the team might also lead to more inclusive pathways to impact. These data are collected by DPs at application but there will be a percentage who will not agree to divulge this information. This should not incur any additional costs and data. Internal DP grant database includes this information per grant staff member. This applies to all DPs bar NFCs (diversity data is not collected by NFCs)	2.6 Gender and social inclusion can be designed into research and innovation for inclusive impacts	None
22	Proportion of pathways to impact statements that address issues of gender and social equity/inclusion for previous financial years and current financial year per DP with accompanying case studies Initial text mining using terms such as 'gender', 'women', 'inclusive', 'social class' and their	2.6 Gender and social inclusion can be designed into research and innovation	None

	proximity to others such as ‘benefits’ ‘impact’ will give an idea of the proportion of statements addressing those issues. An estimate will be reached and case studies showcasing examples will be produced, this will incur time costs. Impact statements are collected at application across the board. This applies to all DPs. NFCs should use the institutional strategies to search for this aspect of intended impact	for inclusive impacts	
23	Proportion of GCRF publications classed in the top 10%, 1%, 0.1% and 0.01% of the most highly cited papers in the world for previous financial years and current financial year per DP. All field/year normalised using full and fractional counting methods This is a quality indicator and GCRF articles will be defined by monitoring system (e.g. Researchfish) publications lists. Different fields have differing citation rates and so different years, hence the normalisation step. In the full counting approach, the credits of a publication are fully allocated to each of the co-authoring research units. In the fractional counting approach, the credits of a publication are fractionally allocated to each of the co-authoring research unit. For instance, in the case of a publication co-authored by three research units, each unit receives one-third of the credits of the publication. The publication data will be available through DP monitoring systems but comparing them to the world’s most highly cited papers will not be possible without using a bespoke service. This applies to all DPs bar NFCs. Appropriate methodological approaches should be used: https://www.metrics-toolkit.org/highly-cited-papers-and-highly-cited-labels/	3.1 High-quality interdisciplinary research and cross-sectoral innovation provides new insights and knowledge for translation into policies, practices, products and services	Outputs row 1 – box 5, row 2 – box 4
24	The interdisciplinarity of GCRF research outputs by categorical analysis of lists of cited references for articles published in previous financial years and current financial year per DP This measures the absolute number of distinct sub-fields, the balance in the representation of these sub-fields and the intellectual distance between them. Informed by grant monitoring system publications list. This will require bespoke analysis which will incur cost, needing external contracting. This applies to all DPs bar NFCs. Ultimately, this relies on the cited research being in some way similar to the actual research being conducted, which is typically a good indicator that it is. This indicator does not cover innovation related outputs as citation lists are the main data sources	3.1 High-quality interdisciplinary research and cross-sectoral innovation provides new insights and knowledge for translation into policies, practices, products and services	Outputs row 1 – box 5
25	Collaboration networks that illustrate new and repeat scientific collaboration patterns between countries, organisations or researchers funded by GCRF for articles published in previous financial years and current financial year per DP. Broken down by new and repeat networks, and expanding networks, countries and disciplines	3.2 Sustainable global research and innovation partnerships	Outputs row 1 – box 10, Outcomes row 1 – second big

	Social network analysis allows for this measurement whereby authors and their affiliations are checked to see if they have worked together before and to show institutional linkages (academic and non-academic). This cannot be done in-house and will incur costs. It can be informed by publication lists from GCRF participants stored on grant monitoring systems. It would apply to all DPs bar NFCs	established across geographies and disciplines	box, row 2 – box1
26	Number of instances where two or more GCRF grant holders and team members are also named on subsequent grants awarded for previous financial years and current financial year per DP. Broken down by funder This would evidence sustainable partnerships that have succeeded in attracting more grant funding after GCRF, which are global and interdisciplinary. It is reliable in DPs' own data sources but not externally if not reported through GtR. This is why a survey item will be used to ask grant holders (past and present) about repeated partnerships to capture any partnerships under other non-GCRF and non-DP funding programmes. Internal DP data would identify GCRF grant holders and team members who are also named on subsequent grants awarded under DPs only. Outcome data held by DPs from GtR usually has funding leveraged as a field which could also indicate this ToC element. This would apply to all DPs	3.2 Sustainable global research and innovation partnerships established across geographies and disciplines	Translation Pillar – New partnerships established and existing partnerships strengthened
27	Total and unique instances of LMIC participant secondments per project for previous financial years and current financial year per DP. Broken down by country and sector This would give an indication of researcher mobility between UK-LMIC and acts as a measure of collaboration and cooperation. It would also indicate capacity building and skills development for the LMIC partners. This is routinely collected in Researchfish: 'Secondments' = Researchers are asked to record details of temporary secondments, placements and internships to or from other organisations that have taken place in connection with the research supported by the award. The data are not always reliably reported or too little is reported for qualitative analysis. This would be applicable to all DPs bar NFCs. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	Activities – box 2 and 11
28	Proportions of 'impacts and benefits' categorised under each impact type per NFC for the current and previous academic years (not possible before 2018-19 as no strategies were in place) and case studies on the impacts and benefits to LMICs from the reported institutional case studies and free text 'impacts and benefits' section Benefits and impacts are categorised by type: academic, economic etc. (full list requested). There	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures)	

	is the added benefit that DPs can capture the impact of having a non-research related activity (e.g. GCRF research centre manager or impact coordinator). Collected each year as part of monitoring. Self-reported impact types by institutions regularly collected through monitoring against strategies. Institutional case studies and free text 'impacts and benefits' section. Case studies are collected as part of the monitoring by ResEng every year until new strategies are released. Other NFCs follow a similar process. These contain free text information about primary benefits to economic and welfare development in partner DAC nations. These are less quantifiable due to the time it would take to codify them so case studies will help form a narrative of impact of QR funding	for research and innovation established in the UK, partner countries and regions	
29	Total number of students gaining doctoral degrees from participation in GCRF-funded research for previous financial years and current financial year per DP. Broken down by country (LMIC/non-LMIC) and next destination of the student (country) This measures improved capacity in delivering high-quality science and innovation research in partner countries and the UK by increasing the amount of people qualified to be academics. Many GCRF doctoral studentships have been created as well as the doctorates that have been gained through participating in GCRF-funded projects. This might also indicate the increased capacity to actually train doctorates in LMICs. It is important to capture where students go after their doctorates to assess where capacity is genuinely built. This data is reported through Researchfish several times a year. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	People pillar – Capacity to engage in international collaborative research
30	Total and unique reports of upwardly mobile next destination per project for previous financial years and current financial year per DP. By role on the grant, sector (public, private etc.), industrial sector (e.g. energy), scale of progression (e.g. post-doc to reader) and new location PIs have to report next destinations of all involved in the grant (including themselves, their research assistants and students). The details requested in Researchfish relate to an individual's next 'established' destination, rather than very short temporary positions or periods of unemployment between roles. This is a reporting field in Researchfish and will incur no costs to collate. A limitation is that a PI may not know in all cases where their colleagues go next. Another is classifying what is an 'upward mobility'. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. This applies to all DPs (NFCs may capture this when HEIs report impacts in partner country as a capacity building element	3.3 Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	People pillar – Capacity to engage in international collaborative research
31	Number of new collaborations (i.e. reported as starting in any year later than the year the grant started) for previous financial years and current financial year per DP. Broken down by sector ((public (research using), public (civil), private, third)), SIC code and location. Excluding those that	3.4 Stakeholder networks for use and replication	N/a

	are ‘changes to existing’ collaborations GCRF itself is a platform on which international collaborations are made, but it can also be a catalyst for further collaborations. This knock-on effect indicates whether global relations and networks are created as a result of GCRF-funded activities. They may also record details of any bi-lateral or multilateral partnerships, participation in networks, consortia or other initiatives and collaborations with other departments or researchers within their institution. They are requested not to record collaborations at an early stage of discussion and not to record any details restricted by contractual confidentiality. This is also a measurement of ‘new’ collaborations to understand the extent to which GCRF could act as a catalyst for new relationships that might not have happened otherwise. Researchers are asked to report new collaborations or changes to existing ones, the latter would be excluded here. This data is collected through Researchfish and would incur not cost to collate. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will be drawn from	established across research, policy, practice, civil society and enterprise in partner countries, internationally and UK	
32	Total and unique instances of engagement activity per project for previous financial years and current financial year per DP. Broken down by form of engagement, whether it was part of the official scheme, geographical reach, primary audience, years in which engagement occurred This measures the reach of GCRF’s impact activities per project. This is important to understand dissemination activities and specifically for this indicator: types of stakeholders reached. This does not necessarily measure whether a network is established but it does provide a leading indicator. These events are also not necessarily how these networks are established so do not represent a full picture. Engagements are recorded in Researchfish. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will be drawn from	3.4 Stakeholder networks for use and replication established across research, policy, practice, civil society and enterprise in partner countries, internationally and UK	Activities – box between people and research pillars ‘networking events/workshops’, 7, 11
33	Average publication alt-metric score for GCRF-funded research for previous financial years and current financial year per DP. Broken down by location and type of attention (patent, news articles, policy document) Alt-metrics are non-traditional bibliometrics that aim to calculate scholarly impact based upon diverse online research outputs including social media, online news media, online reference managers, etc. This indicator complements more traditional citation impact metrics and importantly includes metrics on whether the research in mentioned in policy documents, syllabi and patents. This is not readily available as a simple dataset and will need bespoke analytics from an external provider. This would apply to all DPs bar NFCs. There are some key limitations: the score does not take into account the sentiments of mentions made about research objects, and thus does not help	4.1 Effective promotion and packaging of research and innovation products	Output row 2 – box 6 and the box between row 1 and row 2

	one understand the positive nor negative attention that a piece of research has received. More can be found here: https://www.metrics-toolkit.org/altmetric-attention-score/		
34	Number of user stakeholders involved in new collaborations (by type – industry, civil society etc.) If GCRF is achieving its intended outcomes, then collaborations will both increase and become more diverse over time. This is linked to indicator above ('number of new collaborations'), but enables GCRF to track and measure the expansion and diversity of these collaborations, with a focus on engagement with user stakeholders (i.e. industry, civil society, government, and local communities). This indicator would aim to track changes to new and existing collaborations, rather than simply counting the number of new collaborations. An increasing number of different stakeholder groups involved in a GCRF collaboration would indicate that they are transforming into more dynamic, challenge-oriented networks. 'type' disaggregation would include stakeholder sector/ industry type and geographical location to also measure the extent of LMIC engagement	4.2 Mobilising stakeholder networks across public, business and civil society stakeholders, and local communities	Collaboration between research, business and others (1st pillar of consolidated GCRF/NF ToC)
35	Annual report per DP on user-side capacity building drawing upon 'counting' measures such as engagement activities, trainings and qualitative data in impact summaries An annual commentary on user-side capacity building will be provided by DPs, at the same time as the performance indicators, setting out progress over the past year. This would look at capacity building activity across the funds, and also separately for each fund, due to their distinctive approaches to capacity building. It would use internal process documents on capacity building, training activities reported by grantees, other impacts relating to capacity building that can be linked to increasing the ability of LMIC researchers to tackle global challenges. There are currently discussions about collecting evidence on capacity strengthening through Researchfish but this is not yet in place. Leading indicators might supplement a narrative around this annually	4.3 Building specialist user-side capacities to apply, adapt and champion	Top row of outputs in people pillar
36	Instances and case studies of enhanced specialist capacity for LMIC stakeholders (by type: apply, adapt, champion) for previous financial years and current financial year per DP Questions in the stakeholder survey would check if such capacities are strengthened and their impact for LMIC stakeholders, focusing on research users who may be the researchers themselves. Questions could be: how has involvement in the GCRF enabled you, or others you have worked with, to apply the findings of the project to real world problems in your country? How has involvement in the GCRF enabled you, or others you have worked with, to advocate for or champion efforts to solve the big challenges in your area? (for each) Can you please explain further? Could any of this have happened without the GCRF? This would apply to all DPs bar the NFC and would incur additional cost. Case studies based upon respondents' examples would be produced. Reliability would depend on respondents' interpretations of the questions	4.3 Building specialist user-side capacities to apply, adapt and champion	Activities – box 8. Outputs row 1 – box 4 and 8. Outputs row 2 – box 1-3

37	Total and unique instances of policy influence per project for previous financial years and current financial year per DP with illustrative case studies. Broken down by form (e.g. participation in advisory committee, training of practitioners), Geographical extent of policy influence (e.g. national, local), Sectors of relevance (e.g. energy) and impact category (e.g. improved educational and skill level of the workforce), and impact narrative (free text) This is a key objective of capacity building and applying research outputs to real policy change. Though this measure does not necessarily measure policy impact as it comes from researchers themselves rather than policy makers. It indicates that activities that intend to influence policy have been conducted based upon their work. This is reported in Researchfish. Researchers are asked to provide details of any significant impacts on policy or practice that have been realised as a result of their research. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. It applies to all DPs (NFCs can search for instances and examples in HEI's annual reporting). This would incur some cost due to the case study element. Reliability may be an issue as grantees' perceptions of evidence-based policy applications will vary	4.4 Collaborative problem solving and co-production of evidence-based policy applications	Outputs row 2 – box9. Outcomes row 1 – box 3. outcomes row 3 – box 4
38	Instances and case studies where innovations and practical solutions have been tested and demonstrated in real world LMIC settings for previous financial years and current financial year per DP. Broken down by type of innovation (product, clinical intervention etc.) This indicator captured using a stakeholder survey would assess the extent to which innovations have begun to be tested in situ for later larger scale application in LMICs. Questions might include: (questions on outputs route to these questions if products or services have been identified) (1) What type of innovation are you describing? product, service etc. (2) At what stage of development is it? (perhaps use TRL scale) pilot testing to full roll-out. (3) Who has been engaged in the showcasing/testing/use of it? end-line users, commercial partners/investors, government representatives etc. This would apply to all DPs and would incur additional cost	4.5 Demonstration and testing of innovations and practical solutions	Translation Pillar – Increasing focus on absorbing and using research outputs Translation Pillar – Increased capabilities to translate research into products / solutions/policies
39	Total and unique reporting of physical outputs per project for previous financial years and current financial year per DP with case studies. Broken down by type, provided to others (yes/no), impact (qualitative)	4.5 Demonstration and testing of innovations and	Translation Pillar – Increasing focus on

	Products co-produced by UK-LMIC collaborations are evidence of innovations in practice resulting from GCRF. Researchers are requested to only disclose details of products that have been made public and are fully protected, or that require no protection. this information is collected by Researchfish and the five outcome types captured are: artistic/creative, software/technical products, research tools and methods, research databases and models and medical products and interventions. This would apply to all DPs. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type GCRF funds report annual data on: types of activity funded, the DAC list countries involved, and the impacts and outputs produced, evidence as to why any activity funded through QR GCRF is relevant and primarily beneficial to the economic development and welfare of developing countries. A focus on physical outputs would be applied here	practical solutions	absorbing and using research outputs Translation Pillar – Increased capabilities to translate research into products / solutions/policies
40	Instances and case studies of expert assistance, leadership and mentoring enacted by GCRF-funded researchers for previous financial years and current financial year per DP. Broken down by type of expert assistance, leadership and mentoring This captures instances of consulting, advisory work, advocacy, thought leadership and mentoring to the benefit of LMICs. This would be captured in stakeholder surveys of PIs/partners. Questions might include: (1) During and since your GCRF project, have you engaged in the following? consulting, advisory work, advocacy, leading a programme of related work/initiative/campaign, mentoring (2) who was the main beneficiary of this work? (UK and LMIC columns) policy makers, private sector, students, colleagues, community member (3) can you please describe this activity? This would apply to all DPs and would incur some cost for the survey and putting together case studies. Respondents understanding of the questions might affect reliability	4.6 Expert assistance, leadership and mentoring	Activities – box 1, 4, 7, 10. Outputs row 2 – box 7
41	Number of TA engagement activities by type (working group, presentation, workshops) & by geography (national, regional, international/ UK or LMIC country) TA and advisory work is an important feature of challenge-oriented research because it involves applying knowledge to policy-making and problem-solving processes. This indicator could also be a good measure of the level of demand for research-based solutions from industry and other user stakeholders. The data on engagement activities should be readily available in Researchfish and would be collected fairly routinely in DP monitoring activities. As a simple activity counting indicator, this would not allow GCRF to assess the quality of these engagements, however	4.6 Expert assistance, leadership and mentoring	Collaboration between research, business and others (1st pillar of consolidated GCRF/NF ToC)
42	Stakeholder assessments of the quality of GCRF TA engagements	4.6 Expert assistance,	Collaboration between

	TA and advisory work is an important feature of challenge-oriented research because it involves applying knowledge to policy and problem-solving processes. This indicator complements the indicator above ('number of TA engagement activities'), but provides more information on the quality of TA engagements, particularly from the perspective of user stakeholders. The data may not be readily available, so would require a stakeholder survey of a sample of user stakeholders who have received TA/ mentoring from a GCRF-funded project. Alternatively, a routine, post-engagement feedback survey could be integrated into all TA activities. REF case study stakeholder testimonials may also provide information on the perceived value of GCRF TA activities, but would be less reliable as a data source. A simple scaling system could be used to assess quality in 5 different areas/domains, e.g. (1) 'how would you rate the assistance provided to you?', from 'highly useful' to 'not relevant', and (2) 'has the assistance provided to you enhanced your capacity to address the challenges you face in your work?' etc.	leadership and mentoring	research, business and others (1st pillar of consolidated GCRF/NF ToC)
43	Total and unique amounts of further funding for previous financial years and current financial year per DP. As an absolute value and relative to the grant value (%). Broken down by source (sector and country), duration of further funding and GCRF/non-GCRF Further funding leveraged indicates that the partnership was successful and that the team (or part of it) is continuing to work together. This would refer to continued funding within the team rather than one member securing funding for themselves and no one else on the team. This is collected by Researchfish but does not list the people on the new grant, though it implies that the grant involves at least two members of the original research team and is as a result of the GCRF-funded research. Grant IDs are sometimes given if the further funding is a UK or EU funded grant, but would only have access to named participants for UK grants. Generates: 'for every £1 spent, £X is leveraged' which is a key value for money (VfM) figure and general productivity measure of programmes. This applies to all DPs and will not incur additional costs to collate. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type GCRF funds report annual data on: 'Project funding from Research Councils or other sources (please indicate whether these are GCRF awards)'	4.7 Sustaining commitment for durable and equitable partnerships between UK and LMIC collaborations; leveraging synergies with other programmes	Outcomes row 3 – box 1 long-term linkages
44	Annual report per DP on equitable partnerships drawing upon 'counting' measures such as engagement activities, trainings and qualitative data in impact summaries The standard metrics for capturing evidence of equitable partnerships, such as the number of research and impact outputs specifically co-produced with a partner from the global south, are not currently collected through Researchfish, though there are plans to ensure that Newton and GCRF award holders provide them in the future. Perhaps more importantly, they are also quite problematic, in that they don't actually demonstrate equity – this would need to be done through qualitative evidence. An annual commentary on equitable partnerships will be provided by DPs, at	4.7 Sustaining commitment for durable and equitable partnerships between UK and LMIC collaborations; leveraging	None

	the same time as the performance indicators on outputs and sustainability of partnerships, setting out progress over the past year. This would look at equity across the funds, and also separately for each fund, due to their distinctive approaches to equitable partnership. This would apply to all DPs bar NFCs who would not have a view on this	synergies with other programmes	
45	Proportion of LMIC survey respondents indicating equitable GCRF partnerships for previous financial years and current financial year per DP. Broken down per programme and LMIC respondent country This is a direct measure of equitable partnerships from the participants themselves. This might be a binary type question with supplementary information. (1) [statement of what an equitable partnership is] In your view, how close does your GCRF partnership with the UK partner resemble this definition? somewhat, moderately, very much, fully (2) Please explain. This applies to all DPs bar NFCs and would incur some cost	4.7 Sustaining commitment for durable and equitable partnerships between UK and LMIC collaborations; leveraging synergies with other programmes	None
46	Number/ per cent of user stakeholders (e.g. government policy adviser; business; civil society) who are able to give examples of incremental innovations (applying existing knowledge in new ways, or an improvement to an existing way of working based on new knowledge) via a stakeholder survey Using a stakeholder survey, this indicator would enable GCRF to measure whether projects are having an effect on innovation in its early stages. This would measure attitudinal change and incremental improvements that have not necessarily resulted in a change in policy/ practice or radical innovation yet	5.1 Conceptual, attitude and demand change – reframing problems/solutions; demand for new solutions stimulated	
47	Number of new university-industry collaborations reported in Researchfish in GCRF-funded academic institutions These function as a proxy measures for increased demand among industry stakeholders for university collaboration in R&D. It is linked to indicators above ('number of new collaborations'/ 'number of user stakeholders') but reports change in levels of university-industry collaboration at the university (organisational) level, within the GCRF's direct sphere of influence (i.e. universities that have been involved in a GCRF project). The assumption here is that engagement in a GCRF project would stimulate increased collaboration between universities and industry beyond the project itself. This data should be readily available in Researchfish (collaboration, collaborator	5.1 Conceptual, attitude and demand change – reframing problems/solutions; demand for new solutions stimulated	Reframing problems & increasing demand (shorter-term outcomes)

	type), but relying solely on Researchfish would miss data on LMIC university-industry collaborations beyond a GCRF project		
48	Number of mentions of where GCRF research is used by industry/community/government stakeholders for previous financial years and current financial year per DP. Broken down by type of impact and location of impact Whether the research produced by GCRF-funded activities is suited to development problems in LMICs should be judged by its actual use. Industry use of the research would provide support for this, particularly if used in LMICs and specifically on development problems. This evidence does not readily exist but could be drawn out of existing output/outcome data where there is qualitative impact data. Impact sections of Researchfish, particularly under products and software/technical solutions. REF case studies would also provide a source for this. This applies to all DPs and would incur some cost to pull together case studies. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type GCRF funds report annual data on: 'Benefits to DAC nations' and 'Outputs and impacts'	5.2 Technological and practical solutions to development problems tested to proof-of-concept and positioned for scale in LMICs	Outputs row, translation column, new products box
49	Total and unique instances of IP per project for previous financial years and current financial year per DP. Broken down by licensing (Licence agreement has been reached or not, or are confidential), status (under examination, granted and withdrawn/terminated), patent family (new family, existing family, other), technology area (e.g. textiles, physics), The patent date, city, country, impact (citation), description, inventors can be searched for. This means the database can be searches for all known GCRF grantees and link patents and their impacts. Joint filing would also be instructive. Patents linked to GCRF grants and/or grantees could indicate the extent to which GCRF has enabled the development of inventions likely related to development problems. Work would need to be done to ensure these inventions were indeed related to GCRF grants. Data is available on PATSTAT which is updated regularly. Not clear if they would be positioned for scale. This would apply to all DPs bar NFCs and would need to be conducted by an external provider at an additional cost. It may be informed by existing DP held data on patents in monitoring systems. Or INPADOC (International Patent Documentation) could be used. It is an international patent collection. The database is produced and maintained by the European Patent Office. It contains patent families and legal status information and is updated weekly. The status of a patent application can change over time, normally falling into one of three broad categories: under examination, granted and withdrawn/terminated	5.2 Technological and practical solutions to development problems tested to proof-of-concept and positioned for scale in LMICs	Translation Pillar – New products / solutions / policies derived from science and innovation research
50	Total and unique instances of co-owned spin-out companies per project for previous financial years and current financial year per DP. Broken down by status (percentage active, dormant),	5.3 Direct application of	Fund level impacts –

	industry sector (e.g. electronics), SIC code. Case studies developed by type of impact and location of impact The impact of spin-outs from GCRF research provides a link from impact to input in terms of new products and services applied in the LMIC. This might be difficult to capture as most entries in Researchfish do not list an impact due to not being active for very long. Spin-outs, often based on IP created during the project, are an important output to be measured as they are examples of increased capability and innovation (being based on new IP). Co-ownership is important for this in the context of GCRF, though it might be that UK-LMIC partners are involved in different ways e.g. as board members. This might be difficult to capture. This information is given as part of Researchfish reporting. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type GCRF funds report annual data on: 'Benefits to DAC nations' and 'Outputs and impacts'	pro-poor practices, technologies and products as a result of participating in projects	adoption of innovative products and services
51	Instances and case studies of GCRF derived practices, technologies and products being applied in situ for previous financial years and current financial year per DP. Broken down by type (practices, technologies and products) This would measure instances where specifically 'pro--poor' practices, technologies and products are actually used in LMIC contexts. This would be difficult to collate from existing qualitative impact data and would require survey items with LMIC/UK researchers. [after questions about outputs] (1) Do any of the practices, technologies and products you have described apply specifically to improving the lives of those in poverty or those in very low socioeconomic states? (2) to your knowledge, how have any of these practices, technologies and products been applied in LMIC contexts? (options relating to 'roll-out', 'any benefits realised'). This would have to be carefully worded to ensure it is in fact probing 'pro-poor' practices. This applies to all DPs and would incur an extra cost	5.3 Direct application of pro-poor practices, technologies and products as a result of participating in projects	Outcomes row 3 – box 2
52	Proportion of LMIC institutions that have increased their publication networks post GCRF activity for previous financial years and current financial year per DP. Broken down by LMIC country of the institutions This would indicate the extent to which networks established during GCRF have endured and also to what extent additional partnerships have been established. Institutional networks in LMICs are key for building capacity and are an indicator of this. Social Network analysis would be used here to measure the difference over pre and post GCRF figures in terms of network size and composition. New networks and existing networks would be measured. This would require some effort per institution as there will be thousands involved, but data could be aggregated. This would be an extra cost and apply to all DPs	5.4 Changes in research and innovation capabilities for challenge-focused, interdisciplinary, cross-sectoral work	Translation Pillar – New partnerships established and existing partnerships strengthened

53	Narrative impact' broken down by sectors in which impacts have been achieved (public, private, third/voluntary sectors and elsewhere) and sub-sectors (e.g. energy) for previous financial years and current financial year per DP. Case studies per programme This gives a textual account of outcomes which covers a broad range of things. This is a wide indicator but does specify the sector and sub-sector of impact so might be further disaggregated. Researchers are asked to report how the findings are being, or have been used beyond academia in the public, private, third/voluntary sectors and elsewhere. The expectation is that in the majority of cases it will be possible to say something about initial impacts a year after an award has ended and that the record of impact will be updated annually for at least five years. NFCs collect narrative impact too. This applies to all DPs. Academies and UKSA do not use Researchfish so alternatives in their own systems will be drawn from	5.4 Changes in research and innovation capabilities for challenge-focused, interdisciplinary, cross-sectoral work	Outcomes row
54	Total and unique instances of R&I jobs created in LMICs as a result of GCRF activity captured through survey for previous financial years and current financial year per DP attributable to GCRF activity. Broken down by sector and location Employment can be created through the increased capacity of an LMIC to hire more researchers on the back of successful GCRF work. This might happen through a new grant allowing them to hire a post-doc. It might also be stimulating a local economy and creating jobs with a new technology or infrastructure. Excluding employment as funded by GCRF. This might be collected through the impact sections of Researchfish but there is no specific section for increased employment, thus a survey will be used. Questions could include (1) to your knowledge, how many jobs in R&I have been created as a result of your GCRF work? (excluding anyone supported through GCRF funds e.g. researchers, technicians) [sectors and numbers can be entered] (2) if job creation has been stimulated in another way, please explain. This would apply to all DPs and would incur an extra cost	5.4 Changes in research and innovation capabilities for challenge-focused, interdisciplinary, cross-sectoral work	Top fund level impact
55	UK university world ranking (QS) This ranks universities based upon their reputation overall and for specific subjects. Rankings are notoriously dubious and would not constitute a robust metric for measuring UK reputation in this area, but could at least be indicative with other data as to how well recognised GCRF grant heavy institutions are. Ranking data is produced annually online but not downloadable. The assumption here is that engagement in a GCRF programme will enhance UK university capabilities and that this would be reflected in an increase in their global ranking, which would, alongside other data (focused stakeholder survey?), indicate their reputation. Attribution to GCRF would be difficult to demonstrate, unless ranking was focused on relevant subject areas (e.g. development studies). But, even then, it would not be straightforward. Methodology of ranking is based on: survey of 84k academics for opinions on university	5.5 UK Research and Innovation organisations' reputation enhanced as highly capable, equitable partners of choice for LMICs to deliver challenge-oriented work	People Pillar – Capacity to engage in international collaborative research

	departments that are not their own, survey of 43k recruiters, citations, and h-index. This would be reported as a ranking number over the years, allowing for a baseline (ranking based on funding initiatives or research funded at least 2-3 years ago)		
56	Number of research projects co-investigated by UK and LMIC partners (by GCRF challenge area, and by location of co-investigators) This indicator would measure the extent of UK university collaboration with LMIC in the challenge areas that GCRF has prioritised. It would be difficult to attribute to GCRF, and would not enable a particularly valid measure of how 'equitable' partnerships are. This would require a more thorough qualitative assessment, for example using COHRED's Research Fairness Initiative Framework (at the evaluation stage?). Data published by UKRI and HESA annually	5.5 UK Research and Innovation organisations' reputation enhanced as highly capable, equitable partners of choice for LMICs to deliver challenge-oriented work	
57	UK's rank as a university study destination by number of inbound higher education students from LMICs for previous financial years and current financial year per DP. Broken down by inbound students' countries This rank would indicate the UK's reputation as a destination for excellent research and learning. This would also indicate stronger relationships between UK and LMICs as students promote cultural and knowledge exchange. This data is not collected by DPs but is collected by UK international via HESA. It applies to all DPs	5.5 UK Research and Innovation organisations' reputation enhanced as highly capable, equitable partners of choice for LMICs to deliver challenge-oriented work	None
58	Number of co-creation engagements with potential users of GCRF-funded research (by type of engagement, by type of user stakeholder, by location/ reach) This indicator would measure the extent of GCRF's co-creation, which is used as a proxy to measure how 'responsive' and engaged the GCRF is. The assumption here is that the more responsive GCRF projects are to LMIC contexts and user stakeholder priorities, the more likely research outcomes are to be replicated. Co-creation events are defined as engagements in which user stakeholders and researchers both have an active role in problem solving, producing ideas, applying knowledge and developing capacity. Presentations and panel discussions where research is presented (dissemination events) would not constitute a 'co-creation' activity. A series	6.1 Iterative engagement, by GCRF, responding to opportunities to amplify change	

	of workshops, mentoring relationship/ consultancy or training event would, however, constitute co-creation. This information is readily available in Researchfish 'engagements' section, including 'type of engagement' and a free text box on 'results and impact' of engagement, where it is possible to decipher the extent of co-creation vs simple dissemination		
59	Perceptions of user stakeholders involved in co-creation spaces Stakeholder surveys would be integrated into co-creation engagements to measure the extent to which they were perceived by user stakeholders to be responsive, relevant and useful specifically for applying findings for their own purposes, whether that be in civil society, research or business. The surveys could be feedback straight after the event/ engagement, or conducted with a sample of user stakeholders who have been involved in co-creation events at the reporting stage	6.1 Iterative engagement, by GCRF, responding to opportunities to amplify change	
60	Number of references to GCRF evidence products on specialist development media and network websites (by name and type of media site) This measure would indicate the amplification of GCRF-funded evidence through its discussion in credible, open and inclusive spaces. The data would not be readily available and would require a combination of alt-metrics (for papers) and web scraping (for other products and outputs) using search term: GCRF project name + investigator name/s + GCRF	6.2 Networks, credible evidence / innovation and new capabilities mobilised to amplify change	Research pillar of NF ToC – dissemination & communication of research results
61	Number of research dissemination events (by type: seminars, panel discussions etc) facilitated with LMIC policy-making, industry or civil society stakeholders (by type and geography/ reach) This measure indicates the amplification of GCRF-funded evidence through its dissemination and discussion in credible spaces. The information should be readily available in Researchfish ('engagements') and in DP monitoring data	6.2 Networks, credible evidence / innovation and new capabilities mobilised to amplify change	Research pillar of NF ToC – dissemination & communication of research results
62	Researchers in R&D (per million people) for previous financial years and current financial year. Broken down by LMIC country Improved capacity in delivering high-quality science and innovation research in partner countries and the UK by increasing the amount of people qualified to be academics. Though not fully attributable to GCRF, it does indicate capacity built. This data can be sourced through global indicator platforms like the World Bank but may not be reliable depending on the method of collection and how attributable it is to GCRF. This applies to all DPs and would incur no cost as the data is readily available online. Source: Researchers in R&D (per million people) – UNESCO Definition: Researchers in R&D are professionals engaged in the conception or creation of new	7.1 Innovation and research capabilities are improved and maintained in LMICs	People pillar – Capacity to engage in international collaborative research. Fund level impact row – box 3

	knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included		
63	Number of interdisciplinary research centres in LMICs (by geography, by GCRF challenge area) The establishment of research centres can be an indication of interdisciplinarity, which is a feature of challenge-oriented innovation and research capability. As a longer-term indicator, this would measure change at the LMIC partner country level, beyond the institutions that were directly involved in a GCRF project. Attribution would therefore be an issue, but focus could be given to subject areas or disciplines that have received most GCRF investment (i.e. responsive to challenge area priorities and strategies). Data availability may be an issue	7.1 Innovation and research capabilities are improved and maintained in LMICs	
64	Number of interdisciplinary PhDs in LMICs (by geography and GCRF challenge area) The data for this indicator could be found in thesis repositories, either on university institutional websites or open access thesis repository websites. Interdisciplinary PhDs would be classed as those that cite more than one supervisory department in the thesis description. The way PhDs are supervised can be an indication of interdisciplinary practice, which is a feature of challenge-oriented innovation and research capability. As a longer-term indicator, this would measure change at the LMIC partner country level, beyond the institutions that were directly involved in a GCRF project. Attribution would therefore be an issue, but focus could be given to subject areas or disciplines that have received most GCRF investment (i.e. responsive to challenge area priorities and strategies). The data should be available in theory, but LMIC partner contexts and institutions vary	7.1 Innovation and research capabilities are improved and maintained in LMICs	
65	Number of cases of policy/ practice change linked to new evidence produced by a GCRF-funded project (by type from ToC) The REF case studies relating to GCRF-funded research can be downloaded and manually coded, according to the Theory of Change outcome and impact areas (e.g. change in policy design and implementation: 'Stakeholders reform policy processes to include more diverse stakeholders'). This would enable the counting of the number of times that GCRF grants have been linked to a change in policy and/or practice. Counting the number of cases would be complemented by more detailed qualitative analysis (below) on the nature and scale of the change achieved	7.2 New evidence improves policy design and implementation	Translation pillar of NF ToC
66	Qualitative case studies demonstrating the nature and scale of change in policy/ practice and change pathways Counting cases alone would not be very insightful, so a sample of cases would be purposively chosen for more in-depth qualitative analysis. Case studies would be categorised by grant, sector, DP, geography, the nature and type of research (using the DFID framing: to develop products or technologies, to understand what works and why, to understand the world and the context, or	7.2 New evidence improves policy design and implementation	Translation pillar of NF ToC

	research capacity building). Case study findings could be aggregated and synthesised by challenge area to demonstrate that a portfolio of changes has occurred (evaluation/ impact level). REF case studies/ Researchfish 'impact' free text and additional data collection via key informant interviews (KII) and a stakeholder survey		
67	Total and unique instances of IP impact (qualitative) per project for previous financial years and current financial year per DP. Broken down by type of impact and location of impact Actual use of IP in developing country contexts is a key measure for the GCRF. This can be very long term and fairly rare but represents research-into-use and its actual results. IP impact is captured in Researchfish qualitatively which is one way of looking at this. PatCite looks at specific cited scholarly work found in patent literature can be searched for as well as patents that cite scholarly articles. Patent families are identified by technology area as defined by the highest level within the Co-operative Patent Classification scheme. However, this reports only minimum figures as it can only ever identify a subset (an unknown proportion) of the actual citations. This would require some effort and cost, particularly if PatCite is used. It applies to all DPs	7.3 Innovations in technologies, practices and services are applied, invested in and implemented	Adoption of innovative products box in the fund level impacts
68	Number of cases of GCRF research-based innovations being replicated and applied to address development challenges at scale (by type) The REF case studies relating to GCRF-funded research can be downloaded and manually coded, according to the ToC outcome and impact areas (e.g. applications of innovations in technologies: 'Local communities and groups adopt and diffuse new practices and innovations'). This would allow GCRF to count the number of times that GCRF grants have been linked new technologies being applied or invested in. Counting the number of cases would be complemented by more detailed qualitative analysis (below) on the nature and scale of the change achieved	7.3 Innovations in technologies, practices and services are applied, invested in and implemented	Adoption of innovative products box in the fund level impacts
69	Qualitative case studies demonstrating the nature and scale of new technology implementation and change pathways Case studies would be categorised by grant, sector, DP, geography, the nature and type of research (using the DFID framing: to develop products or technologies, to understand what works and why, to understand the world and the context, or research capacity building). Case study findings could be aggregated and synthesised by challenge area to demonstrate that a portfolio of changes has occurred (evaluation/ impact level). REF case studies/ Researchfish 'impact' free text and additional data collection via KII interviews and a stakeholder survey	7.3 Innovations in technologies, practices and services are applied, invested in and implemented	Adoption of innovative products box in the fund level impacts
70	Number of cases of GCRF research-based innovations being linked to the strengthening of markets and value chains (by type) The REF case studies relating to GCRF-funded research can be downloaded and manually coded, according to the ToC outcome and impact areas (e.g. strengthened markets and value chains:	7.4 Markets and value chains are strengthened to replicate and	Translation pillar in NF ToC and 'development impacts' pillar

	'Stakeholders mobilise public and/or private investment to further develop innovations'). This would allow GCRF to count the number of times that GCRF grants have been linked to the strengthening of markets and value chains. Counting the number of cases would be complemented by more detailed qualitative analysis (below) on the nature and scale of the change achieved	amplify pro-poor innovations	in consolidated GCRF/ NF ToC
71	Qualitative case studies demonstrating the nature and scale of change in markets and value chain, and change pathways. Case studies would be categorised by grant, sector, DP, geography, the nature and type of research (using the DFID framing: to develop products or technologies, to understand what works and why, to understand the world and the context, or research capacity building). Case study findings could be aggregated and synthesised by challenge area to demonstrate that a portfolio of changes has occurred (evaluation/ impact level). REF case studies/ Researchfish 'impact' free text and additional data collection via KII interviews and a stakeholder survey	7.4 Markets and value chains are strengthened to replicate and amplify pro-poor innovations	
72	Case studies demonstrating a portfolio of changes has occurred and showing how GCRF-funded research-based solutions are being replicated at scale to address development challenges (by GCRF challenge portfolio: Global Health, Food Systems, Resilience, Education, Sustainable Cities, Conflict) Again, these would rely on the REF case studies, and free text 'results and impact' sections of Researchfish, which could be triangulated with a survey of and/or interviews with Challenge Leaders and industry stakeholders. REF case studies would be coded manually according to the GCRF ToC impact area of 'widespread use and adoption of GCRF research-based solutions'. Cases would be mapped onto the GCRF challenge areas to show that a portfolio of changes has occurred. REF case studies/ Researchfish 'impact' free text and additional data collection via KII interviews and stakeholder surveys	8.1 Widespread use and adoption of GCRF research-based solutions and technological innovations enables stakeholders in LMICs make progress at scale towards addressing complex developmental challenges	
73	(SDG indicator) research and development expenditure as a proportion of GDP, for previous and current financial year, by country and country type (UK/ LMIC) This would enable GCRF to measure change in the innovation system, but attribution/ contribution would be problematic. Presumably governments will be collecting this data, but reporting/ data reliability may vary, particularly across LMICs. One way to overcome the sensitivity issue would be focus on specific sectors or research disciplines that have received the most GCRF investment in	8.2 Progress sustained by enduring equitable research and innovation partnerships	

	a particular country or region. UNESCO Institute for Statistics (reported by country, annually, though data not available for all LMIC countries)	between UK and LMICs, and enhanced capabilities for challenge-oriented research	
74	(SDG indicator) Researchers (in full-time equivalent) per million inhabitants, for previous and current financial year, by country and country type (UK/ LMIC) Would enable GCRF to measure change in the innovation system, but attribution/ contribution would be problematic. Presumably governments will be collecting this data, but reporting systems and reliability may vary, particularly across LMICs. One way to overcome the sensitivity issue would be to hone in on specific sectors or research disciplines that have received the most GCRF investment. Researchers in R&D (per million people) – UNESCO Definition: Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included. Data not available for all LMICs	8.2 Progress sustained by enduring equitable research and innovation partnerships between UK and LMICs, and enhanced capabilities for challenge-oriented research	
75	Case studies demonstrating a portfolio of changes has occurred and showing nature of influence on people's lives in LMICs (by GCRF challenge portfolio, e.g. Global Health, Food Systems) Again, these would rely on data available in the REF case studies, and free text 'results and impact' section of Researchfish, and could be triangulated with data from stakeholder (users and Challenge Leaders) surveys and interviews. These data sources would be coded manually according to the GCRF ToC impact areas for SDGs (e.g. 'improving gender equality'; 'promoting social inclusion'; 'economic development'; 'environmental sustainability') and then mapped onto the GCRF challenge portfolios. REF case studies/ Researchfish 'impact' free text and additional data collection via KII interviews and a stakeholder survey	8.3 Contributions to achievement of SDGs: enhancing people's well-being, improving gender equality for people of all genders, promoting social inclusion, economic development and environmental	

		sustainability in LMICs	

Annex 6. Pilot testing of select KPIs

Before presenting the results of this pilot we emphasise here that this was a rapid exercise using early stage KPIs. We are very grateful to Rebecca Tanner (UKRI) for supplying the data. This data for GCRF and Newton Fund grants and activities was taken from UKRI DPs (Research Councils and Innovate UK) unless otherwise specified.

UKRI originally suggested nine KPIs to test based upon a mix of those that appeared simple to answer, those that appeared more difficult, and those that may produce contradictory results. These were KPIs #1, #11, #15, #18, #20, #30, #36, #49, #56. Due to unforeseen circumstances, there was only time to produce information on KPIs #11, #15, #18 and #56. Additionally, we were assured that KPI#30 was achievable but there was insufficient time to produce data for this pilot stage.

The results against sample KPIs are presented below. Despite a small sample of relatively straightforward KPIs, the results are positive in that the numbers can be pulled off the system relatively easily. These are not broken down fully by elements such as challenge area, but we are assured that this is possible.

On the other hand, these results point to the issues in data collection highlighted during the process evaluation, specifically regarding the completeness of data. Firstly, the country lists are not complete here as there were more than 130 countries just in the funded category identified in the process evaluation, whereas less than 50 are identified here. Success rates are also a difficult figure to confirm due to various problems already discussed in the previous study. These issues will need more attention if these KPIs are to be used.

As stated at the beginning of this section, this was a rapidly conducted test and any errors or incomplete data may be down to the time allowed to supply the data.

KPI#11 Number of LMIC organisations listed on grants for previous financial years and current financial year per DP. Broken down by type of organisation (private, public, third sector) and country

LMIC Country	2014	2015	2016	2017	2018	Grand Total
Bolivia			1		2	3
Cameroon			1	3		4
Côte d'Ivoire				3		3
Egypt			4	6	5	15

Georgia				3		3
Ghana			3	16	6	25
Guatemala			1			1
Guyana			2		2	4
India	1	26	32	95	80	234
Indonesia			3	20	43	66
Kenya	2	15	15	32	22	86
Kyrgyzstan					2	2
Mongolia			2		4	6
Morocco				1		1
Nicaragua			6	4		10
Nigeria		2	2	12	3	19
Pakistan	1	3	2	11	4	21
Papua New Guinea			3	1	1	5
Philippines			12	7	12	31
Samoa				1		1
Sri Lanka		3	4	12	2	21
Tajikistan				1	1	2
Ukraine		1	3	4		8
Uzbekistan				1		1
Vietnam		2	14	12	3	31
West Bank and Gaza Strip			1	4		5
Grand Total	4	52	111	249	192	608

Organisation Type	2014	2015	2016	2017	2018	Grand Total

Academic Institution	3	25	48	109	72	257
Charitable Organisation			3	4	3	10
Civic Organisations					1	1
Department		1				1
Government Department		7	8	20	16	51
Hospital / NHS trust	1	1	5	4	4	15
Independent Research Org		6	10	20	15	51
Industrial / Commercial			1	16	6	23
Local and Regional Government				2		2
Other		12	32	68	69	181
Public Research Organisation			3	4	5	12
RC / RC Institute				2	1	3
Trade Associations and RTOs			1			1
Grand Total	4	52	111	249	192	608

KPI#15 Success rates (as a percentage with numbers of UK applicants and awardees) for programmes and calls broken down per DP by the applicants' type of organisation, genders, ethnicities, target country, SDG/challenge area targeted, discipline, and type of programme (e.g. fellowship, research centre). Non-competitive awards are not included

Ethnicity	Funded	Unfunded	Grand Total	Success rate
Blank	46		46	N/a
Asian	172	452	624	28%
Black	3	19	22	14%
Black & Black British - Africa	45	84	138	33%
Chinese	51	189	240	21%
Mixed	6	26	32	19%
Mixed - Other	33	73	106	31%
Mixed - White & Asian	26	26	52	50%
Mixed - White & Black African	4	10	14	29%
Mixed - White & Black Caribbean	5	4	9	56%
Not Disclosed	259	437	696	37%
Other	3	12	15	20%
White	198	824	1022	19%
White - British	1648	2123	3771	44%
White - Irish	56	101	157	36%
White - Other	605	1017	1622	37%
Grand Total	3160	5406	8566	37%

Gender	Funded	Unfunded	Grand Total	Success rate
Blank	55	19	74	74%
Female	1146	1876	3022	38%
Male	1917	3444	5361	36%
Not Disclosed	42	67	109	39%

Grand Total	3160	5406	8566	37%

KPI#18 Success rates (as a percentage with numbers of LMIC applicants and awardees) for programmes and calls broken down per DP by the applicants' type of organisation, genders, ethnicities, country, SDG/challenge area targeted, discipline, and type of programme (e.g. fellowship, research centre). Non-competitive awards are not included

Countries	Applicants	Funded	Applicants	Funded	Applicants	Funded	Applicants	Funded	Total
Armenia			2				1		3
Bolivia	1	1	1	1	1		4	1	7
Cameroon	1	1	12	1			4		17
Congo			3		3				6
Côte d'Ivoire			5				4	1	9
Egypt	1	1	19	1	39	22	13	1	72
El Salvador							1		1
Georgia			3				3		6
Ghana	2	2	72	2	10	5	37	13	121
Guatemala			2						2
Guyana	4	4	1	4			3	1	8
Honduras					1				1
India	64	41	222	41	123	69	201	86	610

Indonesia			155		4	3	105	20	264
Kenya	20	12	147	12	43	36	205	47	415
Kyrgyzstan							1	1	1
Mongolia			1				3	1	4
Morocco			2				5		7
Nicaragua			3		3	1	1		7
Nigeria	1	1	48	1	16	4	36	8	101
Pakistan	8	3	30	3	14	4	25	8	77
Papua New Guinea	5	5	1	5	1	1	5	2	12
Philippines	79	23	19	23	50	29	3	1	151
Sri Lanka	2	2	32	2	11	10	26	12	71
Syria			3						3
Tajikistan			1						1
Ukraine	2	2	4	2			8		14
Uzbekistan			1						1
Vietnam	38	34	130	34	46	6	28	15	242
West Bank and Gaza Strip			6		1	1	1	1	8
Grand Total	228	132	925	227	366	191	723	219	22

									42
Success Rate (%)	58%		25%		52%		30%		

KPI#56 Number of research projects co-investigated by UK and LMIC partners (by GCRF challenge area, and by location of co-investigators)

Country	2014	2015	2016	2017	2018	Grand Total
United Kingdom total	**35**	**306**	**671**	**1135**	**569**	**2717**
LMIC total	**4**	**74**	**88**	**246**	**156**	**568**
Bolivia			1		1	2
Cameroon			1	3		4
Côte d'Ivoire				1		1
Egypt			1	3	6	10
Georgia				1		1
Ghana			4	23	7	34
Guatemala			2			2
Guyana			4		1	5
India	1	44	6	60	68	179
Indonesia				42	4	46
Kenya	2	10	4	41	24	81
Kyrgyzstan					1	1
Mongolia			1		1	2
Nicaragua			2			2
Nigeria		4	2	14	7	27

Pakistan	1	9	1	7	5	23
Papua New Guinea			4	1	2	7
Philippines			22	13	25	60
Sri Lanka		4	1	10		15
Tajikistan				1		1
Ukraine		1	1			2
Uzbekistan				1		1
Vietnam		2	30	20	4	56
West Bank and Gaza Strip			1	5		6
Grand Total	39	380	759	1381	725	3284

Annex 7. Shortlisted KPIs (26 indicators)

New #	Original #	Fund	Indicator name	Indicator description	Categorisation	BEIS R&I ODA Theory of Change element	Type
1	1	Cross-fund	Total funding received by LMIC countries (universities, partners etc.) per financial year per DP. Broken down by country. As an absolute value (£) and relative value (% of total funds).	This measures how much of GCRF and Newton Fund funding is received by LMIC countries.	Inputs	Global research and innovation partnerships across geographies and disciplines	Counting - numbers of activities and outputs
2	2, 31, 47	Cross-fund	Number of partnerships and collaborations (broken down by present at start of award, and arising during award) (broken down by type, e.g. university to industry) per financial year per DP.	This measures the actual rate of partnering and what kind of partnerships and collaborations are being created. These include links between all types of organisations involved, including B2B, academia-industry and third sectors links. Most of this information should be available as part of grant applications and annual reporting. It could be supplemented through stakeholder surveys of PIs/partners. This might form three questions: (1) to your knowledge, has your organisation ever had a R&I partnership with the partner organisations? (2) [For each new partnership] what form did this take [select all that apply]. The latter question's options might include: MoU, official visit,	Inputs	Global research and innovation partnerships across geographies and disciplines	Stakeholder surveys - large scale surveys to UK PIs, LMIC partners, Challenge Leaders and other stakeholders

				establishing a network, through establishing the both funds project; (3) (for existing partnerships) To what extent were those partnerships strengthened or expanded as a result of the project? And how?; (4) What does this partnership involve [select all that apply]: Research activities, innovation and commercialisation, advisory/consulting work, training and development. This data is not readily available, hence the survey, which will incur a cost but will be as part of the wider survey effort. The funds are a platform on which international collaborations are made, but it can also be a catalyst for further collaborations. This knock-on effect indicates whether global relations and networks are created as a result of GCRF funded activities. They may also record details of any bi-lateral or multi-lateral partnerships, participation in networks, consortia or other initiatives and collaborations with other departments or researchers within their institution. They are requested not to record collaborations at an early stage of discussion and not to record any details restricted by contractual confidentiality. This is also a			

				measurement of 'new' collaborations to understand the extent to which GCRF could act as a catalyst for new relationships that might not have happened otherwise. Researchers are asked to report new collaborations or changes to existing ones, the latter would be excluded here. This data is collected through Researchfish and would incur not cost to collate. Academies, Innovate UK and UKSA do not use Researchfish so alternatives in their own systems will be drawn from			
3	3	Cross-fund	Number and value of fellowships and corresponding grants funded under both funds per financial year per DP. Broken down by type of programme and country (as applicable, particularly for Newton).	This indicates the investment put into direct training and development interventions by both funds' DPs. These kinds of grants offer training, travel and other kinds of exchange activities, including equipment purchase, all of which are basic elements of capacity building. This would apply to all DPs. The vast majority of both funds' programmes will include some element of training, but this is captured in other indicators, this focuses on specific investment where fellowships/training are the primary activity. One example of programmes specifically designed for training is the BBSRC GCRF Strategic Training Awards for Research Skills (both funds-	Inputs	High quality interdisciplinary researchers	Counting - numbers of activities and outputs

				STARS). This programme level data is readily available, should incur little to no cost and would be the responsibility of DP teams. However, breakdown by country will be more difficult for Newton as not all DPs have information on partner country recipients, which may require further research to work out. These kinds of programme are generally favoured by the academies due to their expertise in this instrument, so numbers across DPs must be weighted somewhat to account for this			
4	11	Cross-fund	Number of LMIC organisations listed on grants and proportion of funding going to those organisations per financial year per DP. Broken down by type of organisation (private, public, third sector) and country	The variety of organisations involved in GCRF awards indicates the appetite to work in a challenge orientated way across sectors, rather than just the university sector. This is an important measure in LMICs to assess the interest across sectors to participate. Most programmes do not allow anything other than a UK research institute eligible for RC funding to apply but DPs like Innovate UK and UKSA do not impose this restriction, so numbers will vary between them. Though partners can usually be from anywhere. This information is collected by DPs on application and is simple to collate but organisations may need to be classified, though this should be	Activities	Global research and innovation partnerships across geographies and disciplines	Counting - numbers of activities and outputs

				straightforward. It applies to all DPs bar the NFCs who do not routinely collect this information			
5	92 - New	Cross-fund	Proportion of total projects per DP addressing each Sustainable Development Goal and value of those projects per financial year.	This is going to be part of IATI anyway. This gives a view on the coverage and concentrations of research addressing the SDGs, allowing DPs and BEIS to change priorities as needed or to inform programme design. Will need consideration of grants that do not neatly fit into SDGs (some capacity-building fellowships etc.) plus an accompanying narrative	Activities	(GCRF ToC) Sufficient appetite and capacity in UK to work in a challenge orientated way	Counting - numbers of activities and outputs
6	15, 16	Cross-fund	Success rates (as a percentage with numbers of UK and LMIC applicants and awardees) for programmes and calls broken down per DP. Non-competitive awards are not included.	Suggest that this might look like %funded, %fundable but unfunded and % unfundable. This indicates demand for the funds across DPs and by applicant characteristics. It is a direct measurement of demand. It may fluctuate across time, type of programme and as eligibility criteria change but is generally reliable. These data are not reliably reported across DPs but are collected for the most part and will not require any additional cost since many DPs already publish their success rates online. This applies to all DPs bar NFCs. They must be viewed in context. For example, a low rate suggests huge demand and insufficient funds to fund all of them perhaps,	Activities	Global research and innovation partnerships across geographies and disciplines	Counting - numbers of activities and outputs

				but it might also indicate that the bids were low quality and didn't meet quality standards, so some short accompanying narrative will be required			
7	21	Cross-fund	Aggregate gender and ethnicity figures of both funds: UK lead (either academic or non-academic) (and LMIC lead if possible (whether research co-investigator or partner country business)) and project partners per financial year per DP.	The gender and ethnicity composition of teams is an important indicator for inclusivity. Increased diversity in the team might also lead to more inclusive pathways to impact. These data are collected by DPs at application but there will be a percentage who will not agree to divulge this information. This should not incur any additional costs and data. Internal DP grant database includes this information per grant staff member. This applies to all DPs bar National Funding Councils (diversity data is not collected by NFCs)	Activities	High quality interdisciplinary researchers	Counting - numbers of activities and outputs
8	9, 36, 79	Cross-fund	Instances of partner country institutions provided with capacity building support, (where possible broken down into capacity through training, through infrastructure/resource development, market/regulatory development, enhanced specialist	This indicator will measure the level of investment and effort being put into developing R&I infrastructure and resources. Resources refer to activities such as developing secondary data repositories such as the UK BioBank or by building a patient cohort in LMICs. This might also include access to facilities, improvements to them, or support to create them from scratch. One example of a programme specifically designed for	Outputs	Improved capability to do cross-sectoral interdisciplinary work	Counting - numbers of activities and outputs

			capacity) per financial year, by country	infrastructure: Africa Catalyst (RAEng) which aimed to strengthen engineering representative bodies in Africa. This indicator also aims to measure programmes and grants that aim to catalyse economic growth, through developing commercially viable technology which supports national enterprise, market and value chain development, attracting public-private investment, international trade. It will also include those aiming to achieve conceptual and instrumental improvements in policy and practice decisions			
9	39, 72	Cross-fund	Total and unique reporting of physical outputs per project per financial year per DP with case studies. Broken down by type (e.g. citable document, artistic product, prototype)	Products produced are evidence of innovations in practice resulting from both funds. Researchers are requested to only disclose details of products that have been made public and are fully protected, or that require no protection. this information is collected by Researchfish and the five outcome types captured are: artistic/creative, software/technical products, research tools and methods, research databases and models and medical products and interventions. This would apply to all DPs. Some DPs do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type both	Short term outcomes	Applications of research and innovation	Mixed methods - combining 'cases' and elucidating them with qualitative insights (e.g. case studies)

				funds report annual data on: types of activity funded, the DAC list countries involved, and the impacts and outputs produced, evidence as to why any activity funded through QR both funds is relevant and primarily beneficial to the economic development and welfare of developing countries. A focus on physical outputs would be applied here			
10	43	Cross-fund	Total and unique amounts of further funding per financial year per DP. As an absolute value and relative to the grant value (%). Broken down by source (sector and country), duration of further funding and both whether they are GCRF/Newton or other funds.	Further funding leveraged indicates that the partnership was successful and that the team (or part of it) is continuing to work together. This would refer to continued funding within the team rather than one member securing funding for themselves and no one else on the team. This is collected by Researchfish but does not list the people on the new grant, though it implies that the grant involves at least two members of the original research team and is as a result of the both funds funded research. Grant IDs are sometimes given if the further funding is a UK or EU funded grant, but would only have access to named participants for UK grants. It may be difficult to track and verify this across DPs. Generates: "for every £1 spent, £X is leveraged" which is a key VfM figure and general productivity measure of programmes. This	Short term outcomes	Innovation capabilities sustained in partner countries and UK	Counting - numbers of activities and outputs

				applies to all DPs and will not incur additional costs to collate. Some DPs do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type both funds report annual data on: "Project funding from Research Councils or other sources (please indicate whether these are both funds awards)"			
11	84	Cross-fund	Number of co-authored research publications per financial year, by country	Publications that have UK and partner country authors. Likely will need to be contracted out for enhanced bibliometric analysis. Limited usefulness vis-à-vis interdisciplinarity unless we included something on the subject areas covered and created a categorisation of these to show that institutional / subject silos are being broken	Short term outcomes	Improved capability to do cross-sectoral interdisciplinary work	Counting - numbers of activities and outputs
12	18, 45	Cross-fund	Proportion of LMIC survey respondents indicating equitable GCRF partnerships per financial year per DP, including looking at co-creation of proposals. Broken down per programme and LMIC respondent country	This is a direct measure of equitable partnerships from the participants themselves. This could be important for learning and improving our approach to equitable partnerships. This might be a binary type question with supplementary information. (1) [statement of what an equitable partnership is] In your view, how close does your GCRF partnership with the UK partner resemble this definition? somewhat, moderately, very much, fully (2) Please	Short term outcomes	UK research organisations become equitable partners of choice	Stakeholder surveys - large scale surveys to UK PIs, LMIC partners, Challenge Leaders and other stakeholders

				explain. This applies to all DPs bar NFCs and would incur some cost			
13	49	Cross-fund	Total and unique instances of IP per project per financial year per DP. Broken down by licensing (Licence agreement has been reached or not, or are confidential), status (under examination, granted and withdrawn/terminated), patent family (new family, existing family, other), technology area (e.g. textiles, physics)	The patent date, city, country, impact (citation), description, inventors can be searched for. This means the database can be searches for all known grantees and link patents and their impacts. Joint filing would also be instructive. Patents linked to grants and/or grantees could indicate the extent to which both funds have enabled the development of inventions likely related to development problems. Work would need to be done to ensure these inventions were indeed related to grants. Data is available on PATSTAT which is updated regularly. Not clear if they would be positioned for scale. This would apply to all DPs bar National Funding Councils and would need to be conducted by an external provider at an additional cost. It may be informed by existing DP held data on patents in monitoring systems. Or INPADOC (International Patent Documentation) could be used. It is an international patent collection. The database is produced and maintained by the European Patent Office (EPO). It	Short term outcomes	Design, development, testing and use of new technological and practical solutions	Counting - numbers of activities and outputs

				contains patent families and legal status information and is updated weekly. The status of a patent application can change over time, normally falling into one of three broad categories: under examination, granted and withdrawn/terminated			
14	50	Cross-fund	Total and unique instances of spin-out companies per project per financial year per DP. Case studies developed by type of impact and location of impact. Could be expanded to include start-ups etc.	The impact of spin outs from both funds research provides a link from impact to input in terms of new products and services applied in the LMIC. This might be difficult to capture as most entries in Researchfish do not list an impact due to not being active for very long. Spin outs, often based on IP created during the project, are an important output to be measured as they are examples of increased capability and innovation (being based on new IP). Co-ownership is important for this in the context of both funds, though it might be that UK-LMIC partners are involved in different ways e.g. as board members. This might be difficult to capture. This would apply to all DPs. Some DPs do not use Researchfish so alternatives in their own systems will be drawn from. HEIs receiving QR type both funds report annual data on: "Benefits to DAC nations" and "Outputs and impacts"	Short term outcomes	Innovation and commercialisation by researchers and businesses	Mixed methods - combining 'cases' and elucidating them with qualitative insights (e.g. case studies)

15	37, 65, 66	Cross-fund	Total and unique instances of policy influence per financial year per DP with illustrative case studies (case studies demonstrating the nature and scale of change in policy/ practice and change pathways)	Case studies can be for the short and long-term. This is a key objective of capacity building and applying research outputs to real policy change. Counting cases alone would not be very insightful, so a sample of cases would be purposively chosen for more in-depth qualitative analysis. Case studies would be categorised by grant, sector, DP, geography, the nature and type of research (using the DFID framing: to develop products or technologies, to understand what works and why, to understand the world and the context, or research capacity building). Case study findings could be aggregated and synthesised by challenge area to demonstrate that a portfolio of changes has occurred (evaluation/ impact level). REF case studies/ Researchfish 'impact' free text and additional data collection via KII interviews and a stakeholder survey. Though this measure does not necessarily measure policy impact as it comes from researchers themselves rather than policy makers. It indicates that activities that intend to influence policy have been conducted based upon their work. This is reported in Researchfish. Researchers are	Short- & long-term outcomes	New evidence improves policies and practices in partner countries	Mixed methods - combining 'cases' and elucidating them with qualitative insights (e.g. case studies)

				asked to provide details of any significant impacts on policy or practice that have been realised as a result of their research. Some DPs do not use Researchfish so alternatives in their own systems will be drawn from. It applies to all DPs (NFCs can search for instances and examples in HEI's annual reporting). This would incur some cost due to the case study element. Reliability may be an issue as grantees' perceptions of evidence-based policy applications will vary			
16	38, 68, 69, 70, 82	Cross-fund	Instances and case studies where innovations and practical solutions have been tested, demonstrated and/or used in real world LMIC settings (case studies demonstrating the nature and scale of change in innovation and change pathways) per financial year per DP. Broken down by type of innovation (product, clinical intervention etc.)	Case studies can be short and long-term. This indicator might already be captured through some case studies. Case studies would be categorised by grant, sector, DP, geography, the nature and type of research (using the DFID framing: to develop products or technologies, to understand what works and why, to understand the world and the context, or research capacity building). Case study findings could be aggregated and synthesised by challenge area to demonstrate that a portfolio of changes has occurred (evaluation/ impact level). REF case studies/ Researchfish 'impact' free text and additional data collection via KII interviews and a stakeholder survey.	Short- & long-term outcomes	Socially-inclusive innovations are implemented at scale	Stakeholder surveys - large scale surveys to UK PIs, LMIC partners, Challenge Leaders and other stakeholders

				Could further be captured using a stakeholder survey would assess the extent to which innovations have begun to be tested in-situ for later larger scale application in LMICs. Questions might include: (questions on outputs route to these questions if products or services have been identified) 1. What type of innovation are you describing? product, service etc. 2. At what stage of development is it? (perhaps use TRL scale) pilot testing to full roll out 3. Who has been engaged in the showcasing/testing/use of it? end-line users, commercial partners/investors, government representatives etc. This would apply to all DPs and would incur additional cost			
17	New	Cross-fund	Number of REF case studies attributable to Newton and GCRF funding, with the case studies	This was originally part of other indicators but it was felt that there was bias in what universities put forward. Therefore, it is now a standalone indicator that shows how many peer-reviewed REF case studies universities put forward from GCRF and Newton funding. This is one measure of high-quality research, but will need to be supplemented with other information.	Longer term outcomes		Mixed methods - combining 'cases' and elucidating them with qualitative insights (e.g. case studies)

18	6	GCRF	Number and value of agile (rapid response) programmes and grants per financial year per DP (double count for joint funded). Broken down by type of programme	Part of GCRF's strategy is to fund rapid response research where there is a need. The rapid response programmes require some stimuli - a crisis - to respond to, so this should be considered when interpreting this indicator. Academies do fund these activities but not to the same extent as the other DPs, so this should be weighted accordingly	Inputs	(GCRF ToC) Challenge-led, multi-sectoral research & innovation	Counting - numbers of activities and outputs
19	14	GCRF	Proportions of challenge orientated activity types funded using GCRF QR per National Funding Council. For the current and previous academic years (not possible before 2018-19 as no strategies were in place) broken down by sector (need to confirm whether this means discipline or not)	It may be that HEIs focus on different elements of capacity building (e.g. for home or away) or simply conduct fewer activities in one year compared to another. It is also important to monitor to understand where QR is spent and whether priorities need to be changed as to the guidance for QR e.g. should some activities be capped? These data are collected each year in the monitoring reports against the strategy, but can change from original plans. NFCs have to report this to BEIS each year to account for the GCRF QR spending. This will incur little cost to compile and applies only to NFCs	Activities	(GCRF ToC) Sufficient appetite and capacity in UK to work in a challenge orientated way	Counting - numbers of activities and outputs
20	19	GCRF	Proportion of total projects per DP addressing each challenge area and value of those projects per financial year. Case studies likely to	This indicates both that the researchers have the expertise to identify challenges and that some are not targeted disproportionately to others. This also gives a view on the coverage and concentrations of research	Activities	(GCRF ToC) Sufficient appetite and capacity in UK to work in a challenge orientated way	Counting - numbers of activities and outputs

			be more enlightening than a number.	addressing the GCRF challenge areas, allowing DPs and BEIS to change priorities as needed or to inform programme design. This is captured by DPs when the grant is submitted/awarded and not after that point. The data is readily available in grant management systems and should incur no cost to collate. This applies to all DPs. NFCs also collect SDG as their monitoring captures more than GCRF activities (some are shared between GCRF and other ODA activities not strictly under GCRF)			
21	28	GCRF	Proportions of 'impacts and benefits' categorised under each impact type per National Funding Council for the current and previous academic years (not possible before 2018-19 as no strategies were in place) and case studies on the impacts and benefits to LMICs	Benefits and impacts are categorised by type: academic, economic etc. (full list requested). There is the added benefit that DPs can capture the impact of having a non-research related activity (e.g. GCRF research centre manager or impact coordinator). Collected each year as part of monitoring. Self-reported impact types by institutions regularly collected through monitoring against strategies. Institutional case studies and free text 'impacts and benefits' section. Case studies are collected as part of the monitoring by ResEng every year until new strategies are released. Other NFCs follow a similar process. These contain free text information about primary benefits to	Short-term outcomes	(GCRF ToC) Enhanced challenge-oriented capabilities (skills and infrastructures) for research and innovation established in the UK, partner countries and regions	Mixed methods - combining 'cases' and elucidating them with qualitative insights (e.g. case studies)

				economic and welfare development in partner DAC nations. These are less quantifiable due to the time it would take to codify them so case studies will help form a narrative of impact of QR funding			
22	71	Newton	Match funding in £ figures, with narrative for in-kind for the following: by DP per financial year split by country, level (institutional, national) and funding sources (public, private, charity).	Joint funding for Newton is an important indicator of the fund's relevance and importance on the global stage. Though very different mechanisms exist across the funds in this respect, joint funding is an important indicator of appetite and capacity in LMICs. Capture of co-funding at the institutional level will indicate LMIC appetite and willingness to invest into the projects, as is seen in the Newton fund. This information should be reported by DPs in the activity tracker, and should be accounted for in financial data from the application process. One issue might be what is committed versus what is actually paid at the time, it will be better to use the former to measure this KPI. This may also be collected through participant reported sources (e.g. GtR) where they cite instances where this kind of funding was secured. This would apply to all DPs. When reporting this, DPs should be reported in £ and PPP measures should be applied by BEIS post-reporting to reflect	Inputs	Global research and innovation partnerships across geographies and disciplines	Counting - numbers of activities and outputs

				significant differences in purchasing power across countries. A useful action may be to follow Coffey's recommendation for a how to' guide for delivery partners in how to demonstrate and evidence match (especially when non-monetary match is used and BEIS' preferred approach on dealing with purchasing power parity (PPP) in evidencing monetary match)			
23	18, 91	Newton	Proportion of survey respondents indicating positive benefits of co-design (fund level to researcher level) - TBD as this was added at the workshop.	Co-design is crucial to the Newton - from Country Strategies work at the fund level through to co-design of research at the researcher level. Therefore, Delivery Partners felt it was important to have an indicator that looks at this. A survey may be the best way to capture UK and LMIC voices here.	Inputs	Global research and innovation partnerships across geographies and disciplines	Stakeholder surveys - large scale surveys to UK PIs, LMIC partners, Challenge Leaders and other stakeholders
24	78	Newton	# of individuals having received professional development or skills training through Newton Fund, per financial year, by country	Those individuals benefiting from training (not including PhD courses). This is a wider measure than fellowships in Indicator 3. This should be straightforward for DPs to compile taking data on participants of awards under the people pillar relating to training or with a training element (potential risk that people begin and don't complete training and DP may only have data on enrolment and not on completion)	Outputs	High quality interdisciplinary researchers	Mixed methods - combining 'cases' and elucidating them with qualitative insights (e.g. case studies)

25	87	Newton	Number of new MoUs and agreements signed between UK and partner country at different levels (government, funders, delivery partners), per financial year	As per indicator.	Short term outcomes	UK research organisations become equitable partners of choice	Counting - numbers of activities and outputs
26	93	Cross-fund	Number of jobs generated and additional income/profit (£) generated from commercialisation grants/programmes	It is important to recognise that many research grants will eventually lead to more jobs in LMICs and the UK but it is hard to capture this. Therefore, this indicator will need to be caveated that it is only capturing what is reported by grants with a specific commercialisation focus, and the actual number is likely to be higher This would include: Value (in £) of additional sales/income generated due to the participation in the programme, to UK and partner countries businesses and Value (in £) of additional profit generated due to participation in the programme, for UK and partner countries businesses. It would also include number of FTE jobs generated due to participation in the programme, for UK and partner country businesses and number of FTE jobs safeguarded due to participation in the programme, for UK and partner country businesses, with the	Longer term outcomes	Innovation capabilities sustained in partner countries and UK	Stakeholder surveys - large scale surveys to UK PIs, LMIC partners, Challenge Leaders and other stakeholders

				average time those outcomes would be expected to last.			

Annex 8. List of consultations

Name	Role	Organisation	Reason
Dr Nelly Wung	Senior policy advisor and person responsible for the monitoring and evaluation of quality-related (QR) GCRF	Research England	To understand what information is collected from HEIs on their QR GCRF spend and what KPIs would be suitable to build around that data
Heidi Peterson	Senior evidence and evaluation manager	UKRI	To coordinate our KPIs within wider monitoring activities ongoing within UKRI
Rebecca Tanner	GCRF data manager/ODA research data analyst	UKRI	To test drive a sample of KPIs using real UKRI data and to consult on data availability
Dr Robert Felstead	Senior policy manager – International Development Team	UKRI	To understand what is reported by GCRF Challenge Leaders
Athene Gadsby	International partnership programme manager	UK Space Agency	To verify what GCRF-related data the Agency collect from grantees
Minna Lehtinen	Research communications and impact manager	University of Oxford	Best practices for KPI development
Dr Jude Fransman	Research fellow	The Open University	Best practices for KPI development
Dr Rachel Hayman	Research learning and communications director	INTRAC	Best practices for KPI development
Dr Isabel Vogel	Independent consultant	N/a	Best practices for KPI development
Jamie Fotheringham	Lead, Newton Evaluation	Coffey	Exchanges on refresh of Newton Fund KPIs. Follow-up (pending) to review cross-fund KPIs
All Delivery Partners	Responsible for GCRF and Newton Fund	Delivery Partners	KPI workshop led by BEIS on 14th October 2019 to short list KPIs.

For more information:

Itad Ltd

Preece House

Davigdor Road

Hove BN3 1RE, UK

mail@itad.com

www.itad.com

Technopolis UK
3, Pavilion Buildings

Brighton BN1 1EE
UK

info@technopolis-group.com

www.technopolis-group.com