Department for
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Evaluation of the Global Challenges Research Fund: Midpoint Synthesis Report: Assessing quality, impact positioning and early outcomes against GCRF's Theory of Change

Synthesis of the evidence from the assessment of Research Quality plus Positioning for Use plus Results (RQ++) of GCRF awards

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Disclaimer

The views expressed evaluation in this report are those of the evaluators. They do not represent those of DSIT or of any of the individuals and organisations referred to in the report.

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Acronyms

AFIDEP	African Institute for Development Policy
AHRC	Arts and Humanities Research Council
AMS	Academy of Medical Sciences
APC	Article Processing Charge
ARUA	African Research Universities Alliance
BBSRC	Biotechnology and Biological Sciences Research Council
BEIS	Department for Business, Energy & Industrial Strategy
CAGR	Compound Annual Growth Rate
Cidacs	Centre for Data and Knowledge Integration for Health
Co-I	Co-Investigator
DBIS	Department for Business, Innovation and Skills
DE	Department of Education (Northern Ireland)
DOI	Digital Object Identifier
DSIT	Department of Science, Innovation and Technology
ECR	Early Career Researcher
EDI	Equity, Diversity and Inclusion
EPSRC	Engineering and Physical Sciences Research Council
EQ	Evaluation Question
ESRC	Economic and Social Research Council
FCDO	Foreign, Commonwealth & Development Office
FCR	Field Citation Ratio
FLAIR	Future Leaders – African Independent Research
FoR	Field of Research
GCRF	Global Challenges Research Fund

GNI	Gross National Income
GROW	Growing Research Capability
GtR	Gateway to Research
HCP	Highly Cited Publication
HEFCW	Higher Education Funding Council for Wales
HEI	Higher Education Institution
HIC	High-Income Country
ICAI	Independent Commission for Aid Impact
IDRC	International Development Research Centre
IDS	International Development Strategy
IIA	Insufficient Information to Address
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IR2023	2023 Refresh of the 2021 Integrated Review of Security, Defence, Development and Foreign Policy Strategic Framework
ISPF	International Science Partnerships Fund
KPI	Key Performance Indicator
LMIC	Low and Middle-Income Country
MEQ	Main Evaluation Question
MOU	Memorandum of Understanding
MRC	Medical Research Council
NERC	Natural Environment Research Council
NGO	Non-Governmental Organisation
NHS	National Health Service
NIH	National Institute on Minority Health and Health Disparities
NIHR	National Institute for Health and Care Research

ODA	Official Development Assistance
PI	Principal Investigator
PO	Partner Organisation
QR	Quality-Related
R&I	Research and Innovation
R4D	Research for Development
RCT	Randomised Control Trial
RQ	Research Quality
RQ+	Research Quality Plus
RQ++	Research Quality plus Positioning for Use plus Results
SDG	Sustainable Development Goal
SFC	Scottish Funding Council
STFC	Science and Technology Facilities Council
TBE	Theory-Based Evaluation
ToC	Theory of Change
UK	United Kingdom
UKRI	United Kingdom Research and Innovation
UKSA	United Kingdom Space Agency
UN	United Nations
UNDP	United Nations Development Programme
US	United States
VfM	Value for Money

Executive Summary

This is the Global Challenges Research Fund (GCRF) report that synthesises the evidence on the quality, positioning for development impact and early outcomes of GCRF-funded research and innovation (R&I). This assessment draws conclusions about the performance of GCRF at the midpoint of its expected pathway to impact and Theory of Change (ToC).[1] The assessment uses an established standard for assessing R&I for international development – Research Quality Plus (RQ+) – and adapts it by adding a GCRF-specific element (the RQ++ approach). The assessment is based on the qualitative analysis of a sample of 150 awards as well as bibliometric analysis of the full GCRF portfolio of approximately 3,000 awards.

GCRF overview

GCRF is a large-scale, nine-year fund, representing an unprecedented investment of £1.5 billion of official development assistance (ODA) to support pioneering R&I that addresses the challenges faced by developing countries; it runs from 2016 to 2025.[2] GCRF is overseen by the United Kingdom's (UK's) Department for Science, Innovation and Technology (DSIT),[3] and GCRF funding is managed and disbursed by the UK's R&I funders and the four UK higher education funding bodies.[4] The evaluation of GCRF tracks the Fund's progress by examining its ToC from activities to impacts over a five-year period from 2020 to 2025 and through a number of stages and evaluation modules.

Aiming to accelerate progress towards the United Nations (UN) Sustainable Development Goals (SDGs), GCRF supports challenge-led, interdisciplinary work which mobilises multi-stakeholder partnerships across the Global North and South and across sectoral boundaries. Its goals are to promote innovative solutions to complex global development challenges and build lasting R&I capabilities and infrastructures in low and middle-income countries (LMICs). The pathway to impact set out in the Fund's ToC states the intention that widespread adoption of GCRF's research-based solutions and technological innovations should contribute to achieving the SDGs. This impact is expected to be sustained through equitable R&I

[1] See Annex 1 for GCRF's ToC, which sets out its pathway to impact.
[2] GCRF stopped offering funding in 2022, so the period of 2022–25 represents a long tail of completion activities rather than intensive, impact-oriented activities. BEIS (2017) 'Global Challenges Research Fund (GCRF): How the Fund Works'. Available at: https://www.gov.uk/government/publications/global-challenges-research-fund/global-challenges-research-fund-gcrf-how-the-fund-works#:~:text=GCRF%20forms%20part%20of%20the,the%20poorest%20people%20and%20countries
[3] Prior to 2023, DSIT was known as the Department for Business, Energy & Industrial Strategy (BEIS).
[4] GCRF is delivered through 17 partner organisations (POs): the umbrella organisation, UK Research and Innovation (UKRI); seven research councils and Innovate UK; the four National Academies (the Royal Society, the British Academy, the Academy of Medical Sciences and the Royal Academy of Engineering); the UK Space Agency (UKSA); the four UK higher education funding bodies (Research England, Scottish Funding Council, HEFC Wales and Dept of Economy, Northern Ireland). These POs manage and disburse funding through the existing system of universities and other research organisations, as well as to their partners in LMICs. Higher education funding is devolved to the four nations of the UK and administered by the governments of Scotland, Wales and Northern Ireland. In England, this funding stream is administered by Research England.

partnerships between the UK and LMICs and through the improved capabilities for challenge-oriented R&I developed over the life of the Fund.

Between 2016 and 2022, GCRF funders have awarded more than 3,000 grants in more than 40 LMICs, creating a highly diverse portfolio covering a wide range of development challenges, disciplines, modalities, partnerships and geographies.[5] During 2022–23, most GCRF investments were significantly affected by Covid-19 and the related ODA budget reductions. The evaluation observes that delays and reprofiling of resources have meant that many awards have not delivered the levels of outputs and results that were expected, and impact-oriented activities have been curtailed, with implications for GCRF's midterm outcomes and impact.

Midpoint Synthesis Report: Assessing quality, impact positioning, and early outcomes against GCRF's Theory of Change

This present report assesses the quality, positioning for use and results of GCRF awards at the midpoint of GCRF's pathway to impact. The quality of a sample of 150 R&I awards is assessed using the RQ+ method (explained below), which considers a range of dimensions – scientific rigour, research legitimacy, research importance and positioning for use of the investments. The assessment includes an integrated bibliometric analysis of the GCRF portfolio.

Positioning for use

Positioning R&I ready for use involves focusing on user needs, especially in the local context, R&I product accessibility, and investing in engagement strategies. This means building relationships before or during research, using platforms to share findings, and involving users in the research process. These are all strategies that research teams should be considering to optimise the chances of their research being used and having an influence on policy or practice.[6]

The Research Quality plus Positioning for Use ***plus*** Results (RQ++) assessment (explained below) is an adapted version of RQ+ which enables an assessment of the midpoint of GCRF's ToC. This is where RQ and strategies to position research for impact combine and start to lead to early results and outcomes. The assessment addresses GCRF's evaluation question (EQ) 2: '*How are GCRF's investments working and what has been achieved?*' and lays the groundwork for answering GCRF EQ 3: '*What results has GCRF produced or contributed to, and what has worked in terms of transforming outputs to outcomes, and outcomes to impacts?*'

To do so, it aims to:

[5] For an overview of GCRF's global footprint and the distribution of grants, please see the Stage 1a Synthesis Report of evidence on integration of relevance, fairness, gender, poverty and social inclusion in funded activities https://assets.publishing.service.gov.uk/media/620d8fc08fa8f54916f45e71/gcrf-evaluation-1a-synthesis-report.pdf.

[6] IDRC (2016) Research Quality Plus [RQ+]: A Holistic Approach to Evaluating Research.

- assess whether excellent research is being undertaken by GCRF award holders
- assess whether this research is of high quality against more development-oriented standards
- capture emerging results from across the fund to explore the links between RQ and results.

The primary users of the evaluation are the DSIT Global Research and Innovation Team and the POs. Secondary users are others who fund research for development (R4D). The wider R&I community, in the UK and in LMICs, should also have an interest in the insights and findings of this evaluation.

RQ++ approach and method

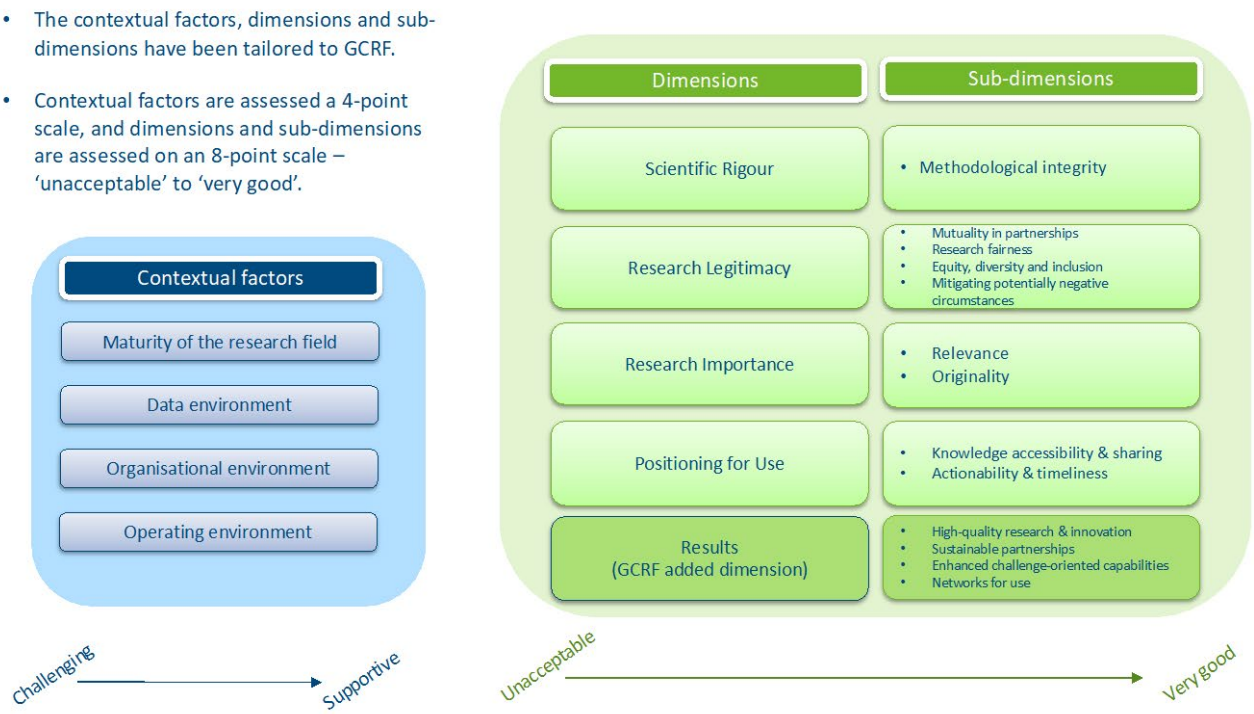
RQ+ is an established standard for assessing the quality of R4D efforts, over and above more conventional norms of scientific excellence. [7] Originally developed by Canada's International Development Research Centre (IDRC), RQ+ was first used in the IDRC's external programme evaluations in 2015.

RQ++ is a GCRF-specific adaptation of this instrument, with an extra dimension of a results assessment added, as explained below.

A rubrics-based approach, RQ+ frames excellent ODA R&I as having technical merit (i.e. it is methodologically sound and has empirically warranted conclusions), but goes beyond this to include building in the foundations for development impact: an integral focus on equity, diversity and inclusion, and promotion of fairness and equity in international partnerships. ODA excellence also involves active positioning for use and policy and development relevance by producing actionable knowledge and mobilising stakeholder networks for uptake.[8] RQ+ understands that technical quality is a necessary but not sufficient condition for an overall determination of excellence. To that end, RQ+ also considers the context in which development research is carried out. Figure 1 illustrates the RQ++ rubric's dimensions and subdimensions.

Figure 1. Overview of the GCRF RQ++ assessment rubric

[7] IDRC (2022) 'Research Quality Plus'. Available at: https://www.idrc.ca/en/rqplus
[8] The concept of 'ODA R&I excellence' was first examined in the GCRF Evaluation at Stage 1a. See BEIS (2021) Stage 1a: Synthesis Report of Evidence on Integration of Relevance, Fairness, Gender, Poverty and Social Inclusion in Funded Activities. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055522/gcrf-evaluation-1a-synthesis-report.pdf



For the GCRF evaluation the original instrument has been tailored, with an additional dimension and added subdimensions (see the 'Results' dimension in darker green) in Figure 1). This encompasses an assessment of the results and early outcomes of the research against the GCRF ToC (the second 'plus' – hence 'RQ++'). Results are formally defined by the four result areas articulated in the midsection GCRF ToC:

1. High-quality interdisciplinary research and cross-sectoral innovation, positioned for use.
2. Sustainable global R&I partnerships.
3. Enhanced challenge-oriented capabilities.
4. Stakeholder networks for use and replication.

The RQ++ instrument and the rationale for its use are set out in Section 4. Criteria for selection of the sample of awards were developed collectively with DSIT and are detailed in the same section. The main evidence sources for the RQ++ assessment were:

- documentation from the research awards, including proposals, publications (formal and non-formal) and reports
- interviews with the principal investigator (PI) or co-investigator (Co-I)
- bibliometric data on the sample and on the whole GCRF portfolio.

Like all evaluations, our approach has strengths and limitations. Among its strengths are that RQ+ is explicitly designed for R4D (or use-inspired research), ensuring a more in-depth

assessment of R4D projects than is possible with standard research quality metrics. Its limitations include: weak reporting of evidence in non-academic formats (e.g. video, policy papers, photovoice) across the GCRF portfolio – results which appear particularly important in successful R4D research; lack of evidence in formal literature around interdisciplinarity that accompanies many of the most successful projects; weak data management in the GCRF systems at both fund and PO levels, which negatively affected the sample selection (no updating of end dates in the database meant that our focus on closed projects could not be achieved). On balance we have confidence in the findings that we achieved.

Findings

Overall

On the whole, GCRF awards have seen strong performance against the RQ++ standard, with a high preponderance of high-quality research that is well positioned to progress towards the next stages of GCRF's pathway to impact. The sample awards are performing well not only against conventional measures of research excellence but also in some key components of ODA research excellence.[9] The RQ++ findings show that the sample of GCRF awards is aligning with the objectives of the fund at the midpoint of its ToC.

The approach to funding through the UK's national research funding organisations has shown itself to be a strong mechanism for the funding of research (although the commissioning process was not directly assessed in this module). Against conventional measures of research excellence, the bibliometric analysis shows that completed awards have resulted in publications in high-quality journals. Some of the ongoing awards have also already published their work. The sample awards have also demonstrated originality and relevance to the needs of LMICs where the research was taking place.

Against RQ++ criteria, which are designed for use-inspired development research and to reflect the specific elements of GCRF's ToC, the sampled awards also performed well across many dimensions. There are few low-scoring projects in the sample, and most of the completed projects have indicated actual or potential contributions to development. The majority have demonstrated strong relevance to perceived needs in LMICs and excellent positioning for use, often through non-formal publications and other tools to present evidence.

The incorporation of GCRF's results to the RQ+ approach has allowed the assessment of a key step within GCRF's ToC, and helped to identify factors that have contributed to effective performance. As mentioned, the results assessment required additional criteria to be added into the RQ+ approach (hence the additional 'plus' in the RQ++ approach). The anticipated formal result areas outlined in GCRF's ToC (see annex 1) encompass high-quality research positioned for use. The RQ++ assessment showed that GCRF has indeed generated high-quality research, as evidenced by bibliometric analysis showcasing instances of high-scoring publications.

[9] ODA excellence includes R&I that, over and above technical merit, includes an integral focus on equity, diversity and inclusion (EDI), promotes fairness and equity in international partnerships, and is positioned for use, policy and development relevance by producing actionable knowledge and mobilising stakeholder networks for uptake.

Qualitative and bibliometric evidence both show that the sampled GCRF awards are, on the whole, well positioned for use and for the next stages in the ToC. Partnerships have been developed successfully in most projects that intended to do so, frequently building on ongoing relationships, with good potential for sustainability. Interdisciplinarity is important to successful partnerships, as can be seen in examples of successful partnerships among Hubs and other large partnerships.

In other results areas anticipated in GCRF's pathway to impact, we see evidence of enhanced challenge-oriented capabilities, both in technical aspects and in research management, in the majority of sampled GCRF awards. Higher-scoring awards also show that technical and research management capabilities were built in the UK as well as in LMICs. For LMIC partners specifically, both bibliometric and qualitative analysis highlighted that raising the capacity of LMIC-based researchers to publish was a key factor for higher scores against the capabilities dimensions. However, the bibliometric analysis shows very low rates of LMIC authorship, suggesting that there is much more to be done to promote this in the remaining period of the Fund. There are examples of capacity strengthening between community organisations, non-governmental organisations (NGOs), commercial and academic organisations and policymakers in support of the application of findings. Stakeholder networks for use are emerging, established in over one-third of the sampled awards. However, networks take time to develop, and it is early in the timeline of the fund for many awards to have created networks.

What worked

As noted in the overview above, from the publications achieved, working through POs has evidently been key to ensuring a high-quality set of awards, owing to rigorous commissioning processes. The importance of existing partnerships and relationships, often built around ongoing shared research agendas, contributed to the successful and high-quality development research observed. In the same way, engagement with potential users of the research in the identification, design and conduct of the research made a difference to promoting its utility. Further to promoting use was the active use of non-formal outputs, expressing findings in, for example, street theatre or games as well as the more traditional non-formal outputs of policy papers, blogs and photo displays.

Capacity strengthening, which was central to GCRF's 'signature investments',[10] was also present in many other awards. It was strongest where it was intentional and planned for, and was present in both LMIC and UK partnerships. It should be noted that although both Covid-19 and the ODA budget cuts seriously affected the research, the teams were able to make adjustments to what they could accomplish in the new realities.

In a departure from the usual application of RQ++, basic science awards were also assessed. RQ++ is usually applied to R&I intended to be positioned for use beyond the academic sphere. This tends to exclude basic science, as these awards are designed for a different purpose and so do not provide sufficient evidence to assess against the breadth of RQ++ dimensions such

[10] DSIT provides GCRF funding through a collective fund, with the aim of supporting cross-council and cross-academy initiatives to promote large-scale interdisciplinary and challenge-focused initiatives that are intended to mobilise GCRF's signature strengths. This funding stream supported the six 'signature investments' that were the focus of the evaluation in 2021–22.

as stakeholder engagement. Where GCRF basic science awards in the sample were use-inspired, it was possible to assess them effectively with RQ++. Those it was possible to assess scored well on originality of the research, and the majority of all research was in new and emerging fields, reflecting originality across the sample.

What needs improvement

EDI was generally weak in the sampled awards, and particularly so in basic science awards.[11] Around half of the sampled awards scored as less than acceptable against this dimension. For example, there were inherent inequities in the way GCRF managed the awards, with leadership, funding and dispute management located in the UK (with the exception of the Future Leaders – African Independent Research (FLAIR) programme, which was a partnership between the Royal Society and the African Academy of Sciences). Almost all awards were able to manage these inequities in a positive way across their teams, via management solutions such as rotating chairs and transparent, joint budgeting; but time spent on resolving these matters could have been better spent on the research, and an opportunity to expand equity in UK ODA funding was lost. In terms of other inequities, gender was considered as a minimum in the sampled awards, but rarely beyond gender parity in teams and gender disaggregated data. Other aspects of EDI, such as multiple vulnerabilities experienced by individuals or groups – such as race, class, sexual orientation and ethnicity, alongside gender – were considered by only about one-third of awards.

In addition to gaps in results data, such as poor recording of non-academic outputs, gaps in management of the data reduced the effectiveness of the RQ++ assessment. The highest-scoring awards contained not only formal peer-reviewed publications but also many and varied non-formal publications; at present these are poorly captured. Non-academic outputs are frequently central to policy and practice influence so that evidence is translated into the common language of the users, be they policymakers, practitioners, community groups or the private sector. Each of these has its own approaches and ways of knowing, and researchers need to tap into these. Incentives to improve the capture of these are needed.

Some of the gaps in current programme data, e.g. duration information, affect many aspects of programme management as well as the application of the RQ++ approach. DSIT and POs could usefully update data more regularly, not only for evaluation purposes but also for programme management purposes. Additionally, nine projects in the sample turned out not to have LMIC partners. This is a misalignment with GCRF's stated strategy and seems to be a hang-over from the early stages of the fund when programmes were commission before GCRF's strategy was fully developed. This highlights the need for better management data to

[11] In the RQ++ rubric, the highest scores for EDI align with EDI-transformative research/innovation. EDI-transformative R&I unpacks social inequalities, provides space for addressing intersectionalities to learn, and engages with people across the socioeconomic spectrum to change the norms that enable inequalities. The RQ++ rubric assesses that a project is 'EDI-transformative' if these considerations are addressed in its rationale and methodology and if it includes a rigorous analysis of root causes, gender power relations and intersectionality (multiple vulnerabilities experienced by individuals or groups, such as race, class, sexual orientation, and ethnicity, alongside gender) as well as shared management and decision making.

support programme management, ensure alignment with strategy and that evaluation samples reflect the relevant characteristics of awards.

Networks for use and application of the research take time to mature, and any significant results in this area should not be expected early in award implementation. Short projects have difficulty in establishing new networks. Networks take time, and new networks were seldom created within the 18–24 months of the majority of awards in the sample. If a network is part of the goal of an award, a longer period of time will be needed for that award, and resources need to be dedicated to that end.

GCRF had the potential to be a learning network in its own right, but this potential has not been realised. The programme brings together some of the top scientists in LMICs and the UK. In a highly diverse fund, there has been much learning, at multiple levels, about collaboration and shared decision making, specific subject matter, capacity strengthening and managing international programmes. In challenging areas such as EDI, working together at the fund level could have supported teams in, for example, how to integrate an analysis of gender and intersecting vulnerabilities. Opportunities to learn from each other around these issues could have been enormously beneficial to many of the teams. This is seen as a missed opportunity, in line with the evaluation's findings from earlier stages and modules.

Recommendations

GCRF has done many things very well, as evidenced by the strong showing against both standard and RQ++ assessment criteria; these strengths should be continued as a strong foundation in GCRF and future funds.

Any future funds should take these aspects into account in their design: rigorous commissioning processes; promoting interdisciplinary research; requiring equitable and fair partnerships; ensuring researchers and their stakeholders and beneficiaries are actively engaged in the design and conduct of research; building on existing bodies of work; promoting non-formal outputs to reach users and beneficiaries; being intentional about learning and capacity strengthening.

There are some areas where future funds could benefit from learning from the challenges faced in the implementation of GCRF.

1. **Learning across award programmes should be promoted.** GCRF itself could have been treated as a learning and capacity strengthening network, promoting learning at the fund level. This opportunity should be better grasped in future funds, with the establishment and incentivising of learning networks from the outset. These should span programmes and, more importantly, POs.
2. **POs and programmes should actively promote EDI in all R&I.** EDI was weak in GCRF but should play a key role in all research. More active guidance and incentives around EDI are needed.

3. **As part of EDI, POs should adapt their processes to promote LMIC leadership of research projects, both in academic and in financial terms.** Funds should promote LMIC leadership and greater fairness in partnerships. Models where management of funding can be directly offered to LMIC researchers and their institutions should be explored.

4. **POs and programmes should actively encourage the engagement of relevant non-academic stakeholders throughout the research process, from problem definition to use and uptake.** The most successful projects engaged these stakeholders, not just in sharing the evidence but in understanding the problem and in designing the research and implementation. This engagement is hampered where non-academic partners cannot be identified as full partners in a relationship.

5. **POs and programmes should incentivise researchers to record better data on non-formal outputs being produced.** Non-formal outputs (e.g. expressing findings in street theatre or games) are poorly captured, although they play an important role in development-oriented research. Incentives are needed from both fund managers and POs to promote more regular and more consistent reporting and capture of non-formal outputs from awards.

6. **Improve programme data management.** Some of the gaps in current programme data, e.g. duration information, affect many aspects of programme management, as well as the application of the RQ++ approach. DSIT and POs could usefully update data more regularly, not only for evaluation purposes but also for programme management purposes.

7. **Ensure that basic science grants intended for funding through a development research programme have a clear use case from design.** For the first time, an RQ+-based assessment included some basic research in its sample. What emerged is that as long as the research is use-inspired, it is possible to conduct an appropriate assessment using RQ+ tools. Pure basic research oriented to the quest for fundamental understanding would not be well served by assessment using RQ+.

8. **Consider using RQ++ criteria – such as the research legitimacy dimensions that speak to fairness in partnerships and integration of EDI concerns – in calls and in selection and assessment processes.** The RQ++ assessments have identified both strengths and gaps in the research that has been supported. If these aspects are captured in the design stage of programming, the likelihood of success should be even higher. It is reasonable to address evaluation criteria in selection processes so that expectations are clear to all parties. Fund managers and POs need to collaborate to ensure this is implemented effectively.

Finally, as the IDRC also found in its use of RQ+, it is a solid quality assessment tool for development-oriented research with a clear use and user in mind. In the GCRF assessment, the RQ++ framework was able to highlight many strengths and some weaknesses in the fund, along with the factors associated with stronger and weaker performance. Better data and a wider pool of interviews, especially with LMIC partners, would improve future assessments.

The next and final stage of the GCRF evaluation takes place over 2023–25. The evaluation will examine how GCRF's awards are moving into use to promote development outcomes in LMICs. Two outcome evaluation modules will be implemented. The Research Into Use module includes a series of case studies in five LMICs in Africa and Asia, and will explore how clusters of GCRF awards working in the same sectors are contributing to development outcomes. The UK Capacity module assesses the extent to which GCRF has contributed to the UK R&I community's capacities for partnered international ODA research.

1 Introduction

This report for the evaluation of the Global Challenges Research Fund (GCRF) presents a synthesis of the evidence from the assessment of Research Quality plus Positioning for Use plus Results (RQ++) of GCRF awards. A key component of Stage 1b of GCRF's evaluation, the aim of the RQ++ assessment is to assess the quality of GCRF awards against a development-oriented quality standard for research and innovation (R&I) that captures scientific excellence, positioning for use and early results.

GCRF is a large-scale, nine-year fund (running from 2016 to 2025), representing an unprecedented investment of £1.5 billion of official development assistance (ODA) to support pioneering R&I that addresses the challenges faced by developing countries.[12] GCRF was established to spur progress towards the United Nations (UN) Sustainable Development Goals (SDGs) by mobilising international interdisciplinary R&I to address urgent and evolving global development challenges. The GCRF evaluation runs from 2020 to 2025 and follows the implementation of the fund from its inception in 2016 through a number of stages and evaluation modules (described further below).

GCRF forms part of the United Kingdom's (UK's) ODA commitment and is overseen by the Department for Science, Innovation and Technology (DSIT) (formerly the Department for Business, Energy & Industrial Strategy (BEIS)). GCRF funding is managed and disbursed by the UK's R&I funders and by the UK's four higher education funding bodies.[13] These partner organisations (POs) have developed a wide-ranging set of GCRF-funded grant programmes and calls through their existing systems to commission a large-scale and highly diverse portfolio of R&I projects, sometimes jointly between councils and national academies. Grants and projects are implemented by UK higher education institutions (HEIs) and their partner institutions in numerous low and middle-income countries (LMICs). Between 2016 and 2022, GCRF funders awarded more than 3,000 grants in more than 40 LMICs, creating a highly diverse portfolio covering a wide range of development challenges, disciplines, modalities, partnerships and geographies.

This report sets out the findings from a key component of GCRF's evaluation – the Research Quality Plus (RQ+) assessment of a sample of GCRF awards, which aimed to assess the

[12] BEIS (2017) Global Challenges Research Fund (GCRF): How the Fund Works. Available at: https://www.gov.uk/government/publications/global-challenges-research-fund/global-challenges-research-fund-gcrf-how-the-fund-works#:~:text=GCRF%20forms%20part%20of%20the,the%20poorest%20people%20and%20countries

[13] GCRF is delivered through 17 partner organisations: the umbrella organisation, UK Research and Innovation (UKRI); seven research councils and Innovate UK; the four National Academies (the Royal Society, the British Academy, the Academy of Medical Sciences (AMS) and the Royal Academy of Engineering); the UK Space Agency (UKSA); the UK's four higher education funding bodies (Research England, Scottish Funding Council, HEFC Wales and the Dept of Economy, Northern Ireland). These POs manage and disburse funding through the existing system of universities and other research organisations, as well as to their partners in LMICs. Higher education funding is devolved to the four nations of the UK and administered by the governments of Scotland, Wales and Northern Ireland. In England, this funding stream is administered by Research England.

quality of GCRF awards against research for development (R4D)-oriented standards, plus a fund-wide results analysis to capture emerging results of GCRF R&I.

Structure of the report

This **introduction** to the evaluation is followed by Section 2, which presents an **overview** of the five-year evaluation of GCRF and indicates where this report on research quality (RQ) fits with the whole evaluation. Section 3 addresses the **strategic and policy context** and the many changes that have taken place in the recent past, changes in the ODA context and changes in the environments in which research takes place. Section 4 then elaborates the **methodology** for the study, which is based on the RQ+ method – a method specifically designed for the assessment of the quality of development research or use-inspired research.

Section 5 provides a detailed review of the **findings** against the context in which the research is taking place, as well as the five dimensions and subdimensions of RQ – considering scientific rigour, research legitimacy, research importance, positioning for use, and results of the research – and the rationale for this breakdown. Section 6 presents **conclusions, what works, and recommendations**. The recommendations are geared towards future funds and are presented for DSIT and for others in the ODA community who may wish to consider them.

2 Overview of GCRF and the evaluation

GCRF was announced by the UK Government in late 2015 to support pioneering research that addresses the challenges faced by developing countries. The fund design assumed that new kinds of R&I are needed to tackle challenges of this scale. The response developed was to support interdisciplinary work which mobilises multi-stakeholder partnerships across sectoral boundaries and across the Global North and South, with the aim of building lasting R&I capabilities and infrastructures in LMICs.

The pathway to impact set out in the Fund's Theory of Change (ToC) states the intention that widespread adoption of GCRF's research-based solutions and technological innovations should contribute to achieving the SDGs (see Annex 1 for the full ToC diagram).[14] This impact is expected to be sustained through the equitable R&I partnerships between the UK and LMICs and through the improved capabilities for challenge-oriented R&I developed over the life of the fund.

The GCRF strategy sets out three objectives to support this impact:[15]

- promote challenge-led disciplinary and interdisciplinary research, including the participation of researchers who may not previously have considered the applicability of their work to development issues
- strengthen capacity for research, innovation and knowledge exchange in the UK and developing countries through partnership with excellent UK research and researchers
- provide an agile response to emergencies where there is an urgent research need.

As a secondary objective, GCRF also aims to build the position and role of the UK R&I sector as global leaders in addressing global development challenges.

GCRF's investment strategy and overview of the portfolio

Since 2016, DSIT has provided GCRF funding through three channels. First, it provides annual allocations to UKRI, individual research councils and national academies to design and develop their own GCRF programmes.[16] Approximately 45% of the GCRF budget

[14] GCRF ToC Update 2022, DSIT website forthcoming 2023.
[15] BEIS (2017) Global Challenges Research Fund (GCRF): How the Fund Works. Available at: https://www.gov.uk/government/publications/global-challenges-research-fund/global-challenges-research-fund-gcrf-how-the-fund-works#:~:text=GCRF%20forms%20part%20of%20the,the%20poorest%20people%20and%20countries
BEIS (2017) UK Strategy for the Global Challenges Research Fund (GCRF). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/623825/global-challenges-research-fund-gcrf-strategy.pdf
[16] GCRF Evaluation, Inception Report and portfolio analysis, 2020.

(approximately £809 million)[17] is managed in this way, where each PO designs and delivers GCRF-related funding calls aligned with development challenges within their disciplinary remits, as well as (occasionally) jointly with other councils or national academies.

Second, DSIT provides GCRF funding through a collective fund, with the aim of supporting cross-council and cross-academy initiatives to promote large-scale interdisciplinary and challenge-focused initiatives that are intended to mobilise GCRF's signature strengths. This funding stream supported the six 'signature investments' that were the focus of the evaluation in 2021–22.

In 2017 this collective fund was invested through two cross-GCRF funding initiatives for interdisciplinary challenge-led R&I activities – one for UKRI and one for the national academies.[18] The POs bid for funding for innovative collaborative programmes. An additional allocation was made from the collective fund to the United Kingdom Space Agency (UKSA) for a dedicated ODA R&I programme to explore applications of space technology to development challenges. These signature investments differed from the direct GCRF allocations by being large-scale, interdisciplinary, multisectoral and challenge-focused rather than being led mainly by research funders' domains and disciplines.

The third channel is the GCRF allocations made through the three UK higher education funding bodies, and through Northern Ireland's Department of Education (DE), to HEIs in the UK. The three funding councils and DE (sometimes referred to as the four UK higher education funding bodies) distribute GCRF funding to HEIs using two main systems. Research England distributed GCRF funding through an established system of grants – known as 'quality-related' (QR) research funding – based on a periodic assessment of their research excellence. The Scottish Funding Council (SFC), the Higher Education Funding Council for Wales (HEFCW) and DE allocated funding to HEIs on the basis of their research council drawdowns over the preceding three years. GCRF funding was disbursed in this way, with the rationale of supporting R&I infrastructures and full economic costs to HEIs delivering GCRF projects that met ODA criteria.[19]

Finally, in 2018 an additional cross-fund investment was made from the collective fund: the creation of the 'Challenge Leader' initiative. This established nine cross-fund Challenge Leader posts; the role of Challenge Leaders was to curate, connect and lead nine strategic thematic

[17] Independent Commission for Aid Impact (ICAI) (2017) Rapid Review of GCRF, p.12; Department for Business, Innovation and Skills (DBIS) (2016) The Allocation of Science and Research Funding 2016/17 to 2019/20. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505308/bis-16-160-allocation-science-research-funding-2016-17-2019-20.pdf

[18] ICAI (2017) Rapid Review of GCRF, p.13; DBIS (2016) The Allocation of Science and Research Funding 2016/17 to 2019/20. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505308/bis-16-160-allocation-science-research-funding-2016-17-2019-20.pdf

[19] DBIS (2016) The Allocation of Science and Research Funding 2016/17 to 2019/20. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505308/bis-16-160-allocation-science-research-funding-2016-17-2019-20.pdf

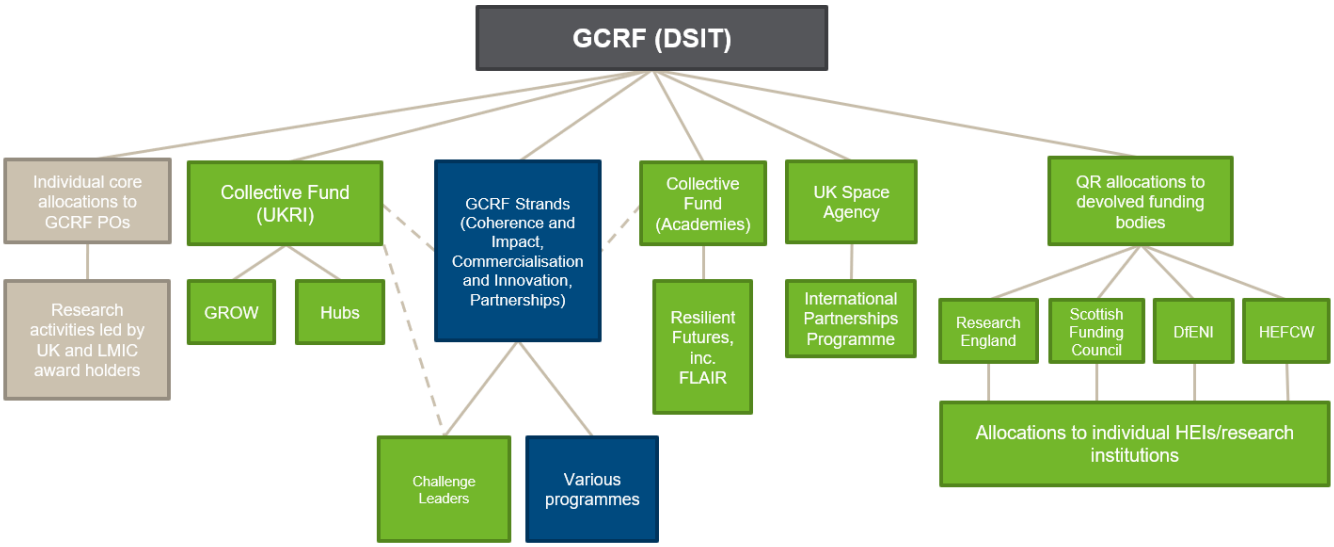
portfolios from existing awards for greater collective development impact. Academics with expertise in these areas were recruited into UKRI to become Challenge Leaders.

These six strands of cross-fund investment became GCRF's 'signature investments'. This collective fund reached an ultimate value of approximately £824 million by 2022; this was approximately 55% of the total GCRF budget.

GCRF's budget allocation falls into two phases, following the UK Government's spending review cycles. The original allocation of five years was made from 2016 to 2020, and a second allocation was made from 2021 to 2025 (see Figure 2). Since 2022 there has been no new commissioning of programmes or awards. In total, between 2016 and 2022, GCRF's POs have made approximately 3,000 awards.

Figure 2 summarises the GCRF investment strategy through individual allocations to POs, the collective funds and investments made to promote coherence in the fund.

Figure 2. GCRF investment strategy[20]



GCRF's evaluation

The evaluation of GCRF assesses the extent to which the fund has contributed to its objectives and impact. This has a dual learning and accountability purpose, as set out clearly in the evaluation objectives:

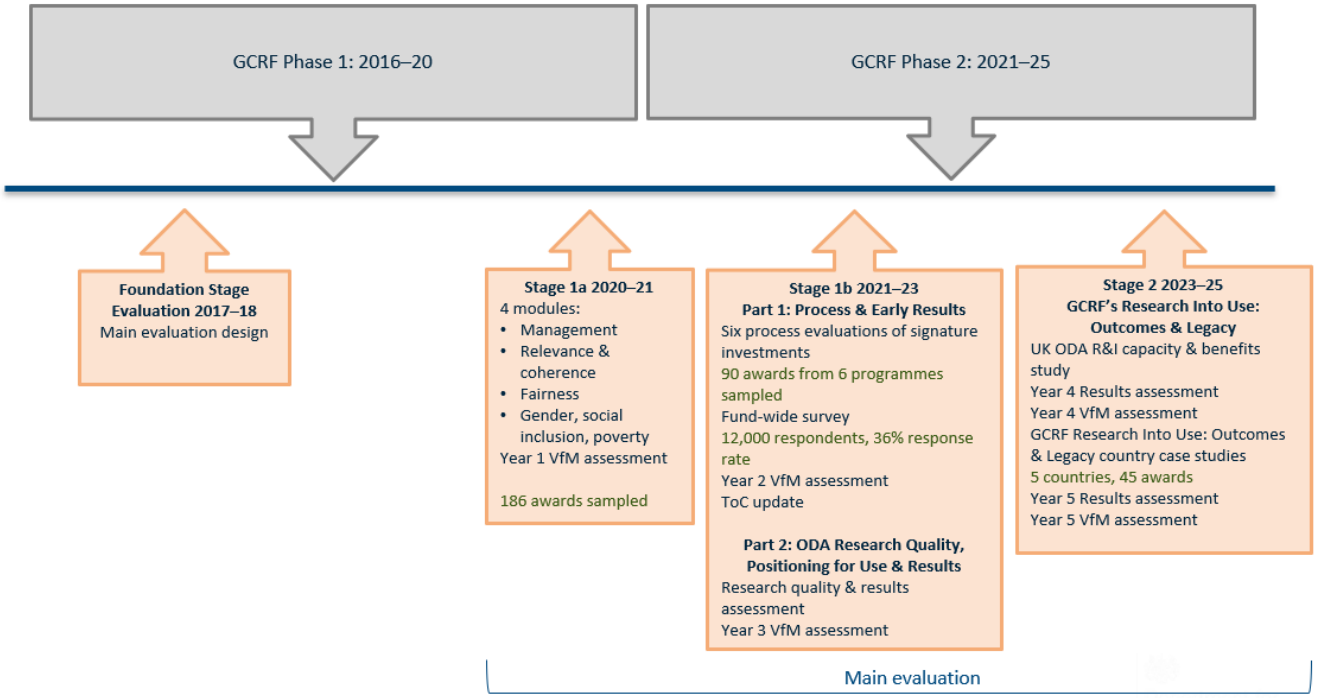
- to assess whether the fund is achieving its aims (*accountability and learning*)
- to assess whether it is on course to achieve impact (*accountability*)

[20] From interviews with the GCRF Fund Management team, 2020, GCRF Evaluation, Stage 1a, 2021. FLAIR: the Future Leaders – African Independent Research programme. GROW: the Growing Research Capability programme.

- to support DSIT in their development of a cross-fund and fund-specific key performance indicator (KPI) framework to provide a robust measure of the fund's impact and value for money (VfM) (*learning and accountability*)
- to provide evidence of what works and make interim assessments of VfM to feed into GCRF learning loops to improve the fund while it is in operation (*learning and accountability*)
- to inform the design of a VfM case for future funds (*learning*).

The evaluation provides evidence of GCRF's contribution towards impact, and engages with DSIT's developing processes for learning about aid effectiveness. Given the complexity of the fund, the evaluation is designed in three stages, conducted over five years from 2020 to 2025, as summarised in the 'main evaluation' section of Figure 3.

Figure 3. Overview of GCRF evaluation



The overall GCRF evaluation takes a theory-based design, examining aspects of the GCRF ToC over the life of the fund (see Annex 1 for the GCRF ToC). Between 2020 and 2023 the evaluation has examined the foundations for development impact (Stage 1a) and programme management, implementation processes and early results in GCRF's signature investments (Stage 1b), and it is now assessing RQ, positioning for use and results. The next stage, in 2023–25, will examine how GCRF's portfolio is moving into use and promoting outcomes in LMICs.

The RQ++ assessment (included in Part 2, Stage 1b in Figure 3 above) was conducted in 2022–23 and is the main module for assessing GCRF's RQ. The RQ++ assessment aims to:

- assess research excellence of GCRF awards

- assess RQ against development-oriented standards (as described in the RQ++ rubric, p.22)
- capture emerging results of GCRF R&I.

The RQ++ assessment contributes to answering the GCRF evaluation question (EQ) 2: '*How are GCRF's investments working and what has been achieved?*' and lays the groundwork for answering GCRF EQ 3: '*What results has GCRF produced or contributed to, and what has worked in terms of transforming outputs to outcomes, and outcomes to impacts?*'

What is Research Quality Plus (RQ+)?

As an ODA fund, GCRF is aligned with the goals of R4D – to use R&I as drivers of solutions to address development issues and bring benefits to disadvantaged communities around the world. As such, GCRF awards are hybrid efforts – neither purely academic research nor a direct development intervention.[21] As set out in GCRF's ToC, the GCRF portfolio of awards needs to contribute to tangible development outcomes.

RQ+ is an established standard for assessing the quality of R4D efforts, over and above more conventional norms of scientific excellence.[22] Originally developed by Canada's International Development Research Centre (IDRC), RQ+ was first used in the IDRC's external programme evaluations in 2015. RQ++ is a GCRF-specific adaptation of this instrument.

The RQ+ approach and family of instruments are based on the premise that a credible, balanced and comprehensive assessment of the quality of R&I for development requires the consideration of elements beyond just the research outputs or the use of conventional metrics. These additional elements include processes related to design, implementation and the positioning for use of the findings (which make up the 'plus' in 'research quality plus').

In the RQ+ framing, excellent ODA R&I has technical merit (i.e. it is methodologically sound and has empirically warranted conclusions) and is positioned for use, influence, policy relevance, relevance for development, actionable knowledge and impact. It understands that technical quality is a necessary but not sufficient condition for an overall determination of excellence.

For the GCRF evaluation the original instrument has been tailored, with additional elements added, including the results of the research against the GCRF ToC (the second 'plus' – hence RQ++). The RQ++ instrument and the rationale for its use are set out in more detail in Section 4, and the full instrument is included in Annex 2.

[21] Apgar, M., Snijder, M., Higdon, G.L. and Szabo, S. (2023) Evaluating Research for Development: Innovation to Navigate Complexity. The European Journal of Development Research 35:241–59. https://doi.org/10.1057/s41287-023-00577-x

[22] IDRC (2018) 'Research Quality Plus'. Available at: https://www.idrc.ca/en/rqplus

Evaluation users

Our evaluation design is grounded in a utilisation focus. This requires having clarity on who the different stakeholders of the evaluation are at the start of the evaluation and on how and when they want to use the findings. The evaluation is designed in such a way that it engages stakeholders at the most appropriate moments in the process.

The primary users of the evaluation are DSIT Global R&I Team and the POs. Secondary users are others who fund R4D. The wider R&I community in the UK and in LMICs should also have an interest in the insights and findings of this evaluation.

The main uses of the evaluation will be to inform the management of the remaining term for GCRF and to inform the design of successor ODA funds, whether at DSIT or elsewhere.

The next section will discuss the changing strategic and policy context for the 2022–23 stage of the GCRF evaluation.

3 Strategic and policy context 2022–23

As evidence for this stage of the evaluation was collected in 2022–23, it is important to outline the context, as significant events have shaped the trajectory of GCRF awards. The first years of GCRF's evaluation, 2020–23, have seen significant changes in the strategic, policy and economic context of GCRF that have affected the whole fund. In 2023 these have included new policies and strategies governing the UK's international development and foreign policy, as well as a greater role for science and technology in the UK's international policies. In late 2021 the policy decision was made to wind down GCRF by 2025, with a continuation of commitments for existing awards and programmes but no new commissioning.

Over 2022–23, since the last GCRF evaluation synthesis report in 2021, there have been some important changes.[23] These include:

- a refresh in March 2023 of the 2021 Integrated Review of Security, Defence, Development and Foreign Policy strategic framework (IR2023) that integrates ODA into defence and foreign policy, setting seven new campaigns – areas for priority effort – for the International Development Strategy
- the creation of a new UK Government department, DSIT, which will be the new funder of GCRF and the evaluation
- the announcement of a new ODA and non-ODA blended science and technology fund – the International Science Partnerships Fund (ISPF) – part of the successor fund for GCRF and the Newton Fund
- the continuing effects on awards of significant ODA budget reductions for 2021–22 as a result of the Covid-19 pandemic response.

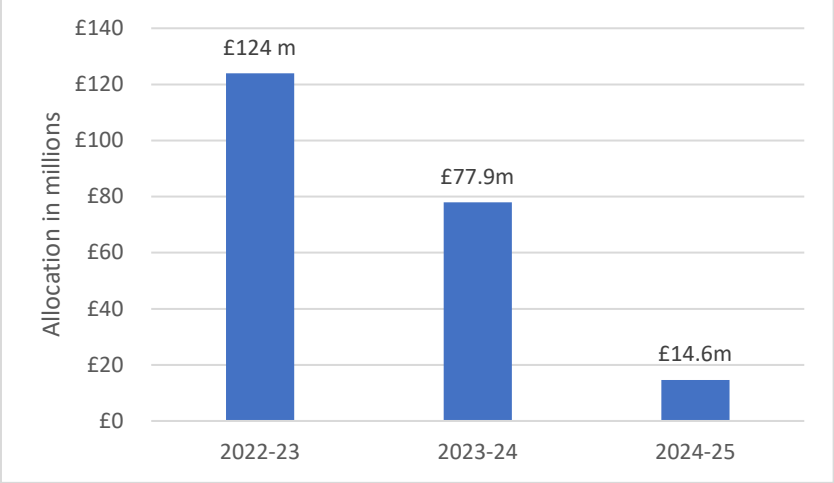
IR2023 was prompted by the pace of geopolitical change since the original review in 2021, including the war in Ukraine and its far-reaching energy and economic effects.[24] The refresh sets out the vision for the UK's overarching national security and international strategy, bringing together defence, security, resilience, diplomacy, development and trade as well as elements of economic and science and technology policy.

The Covid-19 pandemic continues to have a long tail of effects on GCRF awards and their impact potential. The Covid-19 response significantly affected ODA spending and management across all departments, with subsequent cuts being made to the GCRF budget in 2021–22 as part of the reductions in the UK's ODA commitment from 0.7% of gross national income (GNI) to 0.5%.[25] These rather sudden budget reductions, which amounted to around

[23] More detail on the strategic and policy context, including new priorities for the UK's ODA, is provided in Annex 3.
[24] https://www.gov.uk/government/publications/integrated-review-refresh-2023-responding-to-a-more-contested-and-volatile-world/integrated-review-refresh-2023-responding-to-a-more-contested-and-volatile-world#iii-ir2023-updated-strategic-framework
25 Dickson, A. (2020) 'Spending Review: Reducing the 0.7% aid commitment'. Available at: https://commonslibrary.parliament.uk/spending-review-reducing-the-aid-commitment/

70% of committed spend in 2021–22, affected GCRF's POs and investments across the board, with grants being delayed, reprofiled or terminated.[26] The evaluation has observed over 2022–23 that delays and reprofiling of resources have meant that many awards have not delivered the level of outputs and results that were expected, and impact-oriented activities have been curtailed, with implications for GCRF's midterm outcomes and impact. GCRF spending is now on a declining trajectory (see Figure 4).

Figure 4. GCRF budget allocation 2022–25[27]



Effectively there are fewer than 18 months of R&I activity remaining, as in the final year awards and programmes will be focused on finalising outputs. Award teams – and, potentially, partnerships – will move on. Some will disband, but others have already identified other sources of funding to continue their collaborations. DSIT has decided that it is important that the evaluation continue to track GCRF up to its close in March 2025. In response to the new context, the design of the evaluation and GCRF's ToC have been reshaped to capture lessons and document GCRF's accomplishments and legacy in LMICs. Capturing lessons and establishing GCRF's achievements is a particular priority for DSIT in 2023, as these provide important foundations for the ISPF and the UK's wider global partnership ambitions.

26 UKRI (2021) 'UKRI Official Development Assistance letter 11 March 2021'. Available at: https://www.ukri.org/our-work/ukri-oda-letter-11-march-2021/
27 Internal DSIT communication.

4 Methodology

The overall GCRF evaluation takes a theory-based design, assessing progress in line with the GCRF ToC and pathway to impact over the projected nine years of the fund. For the RQ+ assessment, we have developed a bespoke adaptation of the instrument developed by IDRC and have taken a mixed-methods approach (qualitative and quantitative) to develop the evidence for the quality assessment.

This section provides an overview of the RQ++ instrument and our approach to the assessment. It also summarises our sampling, data collection and data analysis and the key strengths and limitations of the method.

Summary:

The evaluation as a whole is a theory-based evaluation (TBE) design, using the GCRF ToC as the framework. To meet the different evaluation purposes, the evaluation is implemented in three stages that sequentially examine aspects of the GCRF ToC over five years, using a modular approach at each stage.

The RQ assessment (RQ++) module is a key part of Stage 1b of the main GCRF evaluation, looking at quality, positioning for use and results. The RQ++ assessment was implemented from April 2022 to March 2023, and combined the qualitative assessment of 150 awards and associated bibliometric data with a portfolio-wide assessment of bibliometric data for approximately 3,000 awards against selected RQ++ dimensions and all results areas. The findings from these assessments were then synthesised to draw out overall evaluative judgements.

RQ++ overview of approach

To meet its purpose and objectives, the evaluation of GCRF takes an overarching TBE design that is built around GCRF's ToC, developed in the Foundation Stage evaluation.[28] The RQ++ module is a key module in Stage 1b of the main GCRF evaluation (see Figure 3 for an overview of the whole evaluation), implemented from April 2022 to March 2023. The RQ++ assessment helps to answer main evaluation question (MEQ) 2: *'How are GCRF's investments working and what has been achieved?'*

The aims of the RQ++ assessment are to:

- assess whether excellent research is being undertaken by GCRF award holders

[28] BEIS (2019) GCRF Foundation Stage Evaluation Final Report. Available at: https://www.gov.uk/government/publications/global-challenges-research-fund-gcrf-foundation-stage-evaluation

- assess whether this research is of high quality against more development-oriented standards
- capture emerging results from across the fund to explore the links between RQ and results.

The RQ++ module also lays the groundwork for answering MEQ 3a: *'What results has GCRF produced or contributed to, and what has worked in transforming research outputs to outcomes?'*

In summary, the RQ++ module combined three strands of analysis, as follows:

1. **Award-level assessments of a sample of 150 awards,** selected to reflect the diversity of the GCRF portfolio:
    a. qualitative evidence gathered against the RQ++ dimensions and results areas through key informant interviews, award document review and evaluation evidence from earlier rounds;
    b. bibliometric quantitative analysis of the sampled awards against the RQ++ dimensions and results areas.
2. **Whole portfolio results assessment:** bibliometric quantitative analysis spanning the whole portfolio of 3,000 awards against selected RQ++ dimensions and all results areas.
3. **Synthesis of evidence** from the award-level assessments and the whole portfolio.

Figure 5 provides an overview of the methodology for both the award-level assessment and the synthesis. The detailed methods will be set out in the coming sections – the sampling strategy, an overview of how the RQ++ rubric was applied for the award-level assessment, and the synthesis method. The bibliometrics analysis is also described.

RQ++ – a standard for assessing the quality of research & innovation for development

RQ++ is a GCRF-specific adaptation of an established instrument for assessing the quality of R4D beyond conventional norms of scientific excellence. As set out earlier, the RQ+ approach and family of instruments[29] are based on the premise that a credible, balanced and comprehensive assessment of the quality of R&I for development requires the consideration of elements beyond just the research outputs or the use of conventional metrics. The approach considers quality as a multidimensional concept. RQ+ understands that technical quality is a necessary but not sufficient condition for an overall determination of excellence. The RQ+ assessment instrument therefore encompasses three essential components:

[29] The RQ+ instrument developed by IDRC has been adapted for use in assessing RQ for co-production research (McLean *et al.* (2022)), as well as here as RQ++ for assessing GCRF research. See www.idrc.ca/rqplus

- Key contextual factors that have significant potential to affect the quality of R4D. These need to be considered as part of the assessment.
- Dimensions and subdimensions that characterise RQ, as relevant in the context of IDRC-funded R4D.
- Ratings on a scale defined by rubrics, to indicate the level at which a project performs per dimension or subdimension.

In its ToC and strategy, GCRF aims to go beyond considering research excellence alone to promoting challenge-led, excellent research with impact. This incorporates a wider understanding of what GCRF as an ODA fund should strive towards, which the evaluation has termed 'ODA R&I excellence'.

RQ++ thus offers a standard to define what 'ODA R&I excellence' looks like in GCRF, given that this has been a weakness previously identified by the evaluation (see below, 'Building on the preceding evaluation findings 2020–23'). RQ++ enables the evaluation to build on the findings of the two previous evaluation stages to examine the links between scientific excellence, effective positioning for use and early results.

Building on the preceding evaluation findings 2020–23

In Stage 1a (2020–21),[30] **the evaluation found a highly diverse portfolio with much innovation but with few clustering and learning structures to transmit lessons around how to address development challenges or build capacity across the whole GCRF research ecosystem – a stated aim in GCRF's strategy.** Stage 1a also identified an unresolved tension that, at times, privileged conventional research excellence and took a minimal compliance approach to the fundamentals of development impact. Awards only had to comply with the ODA requirement that the award was to benefit an LMIC country, and only at the commissioning stage, rather than meet any standards of excellent practice in ODA research. The need to integrate and promote both dimensions of excellence in ODA R&I was brought into the Stage 1b process evaluation framework to understand in more depth whether this had been achieved in the signature investments.

Stage 1b (2021–22) examined GCRF's signature investments, the programmes most aligned with GCRF's strategy, which represented about half the level of investment in the fund. Overall, the evaluation found that GCRF's signature investments offered unique R&I opportunities in terms of their ambition, scale, scope and promotion of interdisciplinary and intersectoral work on development challenges. The signature investments demonstrated how a programmatic approach could bring additional benefits to the research-led approach implied by the Haldane Principle by prioritising key fundamentals for development impact – such as a focus on gender and inclusion,

[30] BEIS (2021) Stage 1a: Synthesis Report of Evidence on Integration of Relevance, Fairness, Gender, Poverty and Social Inclusion in Funded Activities. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055522/gcrf-evaluation-1a-synthesis-report.pdf

fairness in partnerships, and stakeholder networks – and cascading these from programme to award level.

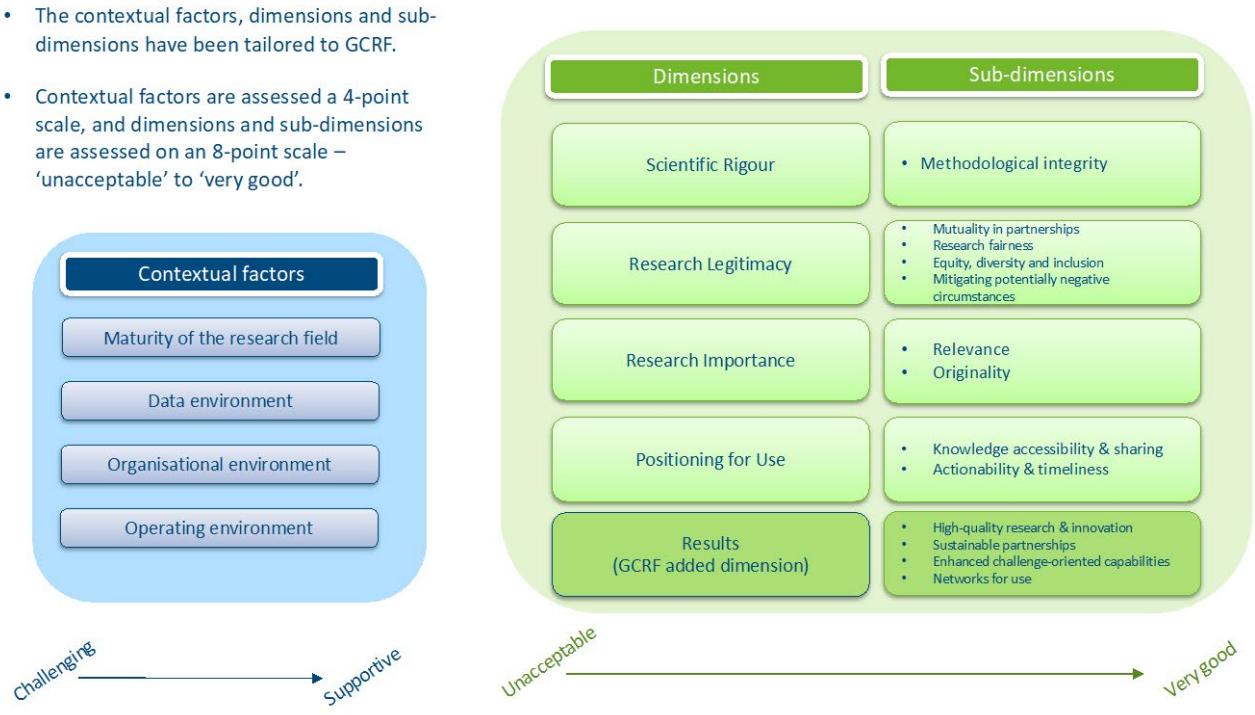
However, performance was uneven, and the evaluation recommended that GCRF establish quality standards for 'ODA R&I excellence' to optimise the combination of excellent R&I with development impact. An agreed set of standards for ODA R&I excellence would help DSIT and POs to move beyond compliance in ODA R&I and promote excellence throughout the fund. The RQ++ assessment (2022–23) offers an established standard for development research that could meet this need.

Adapting the RQ+ approach to GCRF's portfolio

Although all RQ+ assessments employ the three components listed above, each of them needs to be adapted to the evaluation and the fund or programme being evaluated. For this evaluation of GCRF, adaptations included adding a results assessment and tailoring the existing contextual factors and dimensions and their rubrics.

The results component of the evaluation module was added to the standard RQ+ assessment rubric as a fifth dimension: 'Results'. The contextual factors and four quality dimensions were then reviewed and tailored to GCRF. Figure 5 shows the adapted RQ++ context and quality dimensions (see the 'Results' dimension in darker green).

Figure 5. Overview of the GCRF RQ++ assessment rubric



GCRF results assessment

The results assessment was added as a fifth dimension to the tailored GCRF RQ++ to provide quantitative evidence of GCRF's progress towards four intended result areas identified in the GCRF ToC:

- high-quality interdisciplinary research and cross-sectoral innovation provide new insights and knowledge for translation into policies, practices, products and services
- sustainable global R&I partnerships are established across geographies and disciplines
- enhanced challenge-oriented capabilities (skills and infrastructures) for R&I are established in the UK, partner countries and regions
- stakeholder networks for use and replication are established across research, policy, practice, civil society and enterprise in partner countries internationally and in the UK.

Bibliometric data relating to these four areas was curated and analysed for both the sample of 150 awards and the whole portfolio, attributed to GCRF using data science techniques (the detailed technical methods note can be found in Annex 4). The bibliometric data was sourced from Digital Science,[31] drawing on their proprietary databases, which include linked data on publications, collaboration, funding awards, citation in policy documents, mentions of publications on social media and evidence on reproducibility. We also drew on evidence from Gateway to Research (GtR) for awards from UKRI. Bibliometric indicators were identified and mapped to the RQ++ rubric (see the detailed technical note in Annex 4). The data science team identified 12,571 journal publication outputs emerging from GCRF-funded activities across the whole portfolio and 2,672 from the sample; more non-journal outputs were also identified (the dataset achieved is set out in the next sections). The results assessment will be repeated in the remaining years of the evaluation to ensure that GCRF results are captured as they emerge. The RQ++ and results assessment lay the foundations for the legacy case studies in Stage 2.

Sampling strategy

Rationale for a purposive sampling approach

The evaluand for RQ++ is the award. The sampling approach was designed purposively to select sampled awards with (a) sufficient data available to apply the RQ++ rubric and (b) a good likelihood of having produced outputs. It was agreed with DSIT that the evaluand for the RQ++ assessment would be GCRF awards, because a programme-level or other form of clustered assessment was not feasible, due to the heterogeneity and limited programmatic concentration in GCRF. An award-level focus still permits insights into the GCRF fund as a whole as well as these awards. In particular, it allows us to speak to the mechanisms and approaches that have been successful. It will not, however, allow us to generalise across the GCRF portfolio, because of (among other challenges) the size and diversity of the sample.

[31] https://www.digital-science.com

Throughout the evaluation so far, the heterogeneity of the GCRF portfolio has been a key challenge for sampling. For example, the size of award in GCRF ranges from £40,000 to £20 million, and the type of activity ranges from a one-off symposium to a multi-year, multi-country, multi-partner project. Thematically, GCRF spans arts projects with marginalised communities in LMICs to clinical trials for vaccines and to innovations in space technology. It also includes basic science projects. There has been limited structuring of the awards into thematic or geographic programmes that could provide a basis for representative sampling. A purposive sampling approach has therefore been chosen to reflect the diversity and to maximise opportunities for learning to meet the objectives of the RQ++ module. This diversity in GCRF means that the sample contains a relatively small number of awards in each subject area and across POs.

A sample of 150 awards was agreed with DSIT as the largest feasible number that could be assessed within the evaluation resources in order to provide a sufficiently heterogenous sample. We recognise that 150 awards is a small proportion of the total number of GCRF awards (approximately 3,000). Nevertheless, 150 awards is the largest sample to which RQ++ has hitherto been applied, as it is a qualitative approach. The criteria applied ensured coverage of the diversity of award types within the GCRF portfolio, inclusion of Global South-led awards to allow analysis of impacts of Southern leadership on research excellence, and inclusion of all POs.

The resulting sample of 150 awards can therefore provide insights into trends in the performance of the sample against the RQ++ rubric, and insights into the approaches that have been successful, but it is limited in terms of generalising across the whole GCRF portfolio. Nevertheless, there are sufficient exemplars from across the breadth of GCRF-funded activity to provide rich insights.

Selection approach

The decision was made to draw a sample of 150 awards from the dataset of responses obtained from the survey of GCRF award holders, conducted earlier in Stage 1b of the GCRF evaluation,[32] triangulated with the fund-level administrative information on awards. Typically the administrative data for the whole population of awards would be used for sampling; however, this information is not easily linked to data on outputs and results, as they are on different systems. These latter dimensions are essential to a comprehensive assessment of quality and positioning for use via the RQ++ instrument. Rather, we used the survey dataset as the starting point. The survey was sent to all UK and LMIC award holders in GCRF in 2021, and achieved a 36% response rate. The dataset comprises 3,456 individual responses linked to 2,336 grants, with a balance of responses from UK award holders and LMIC partners. Overall the response and matching rates were high, meaning that a wide range of sizes, durations and types of award was covered, with good representation across POs.[33] The survey dataset includes responses on outputs and results that offer an indication that awards have started to produce early results. Thus the survey dataset offered a more

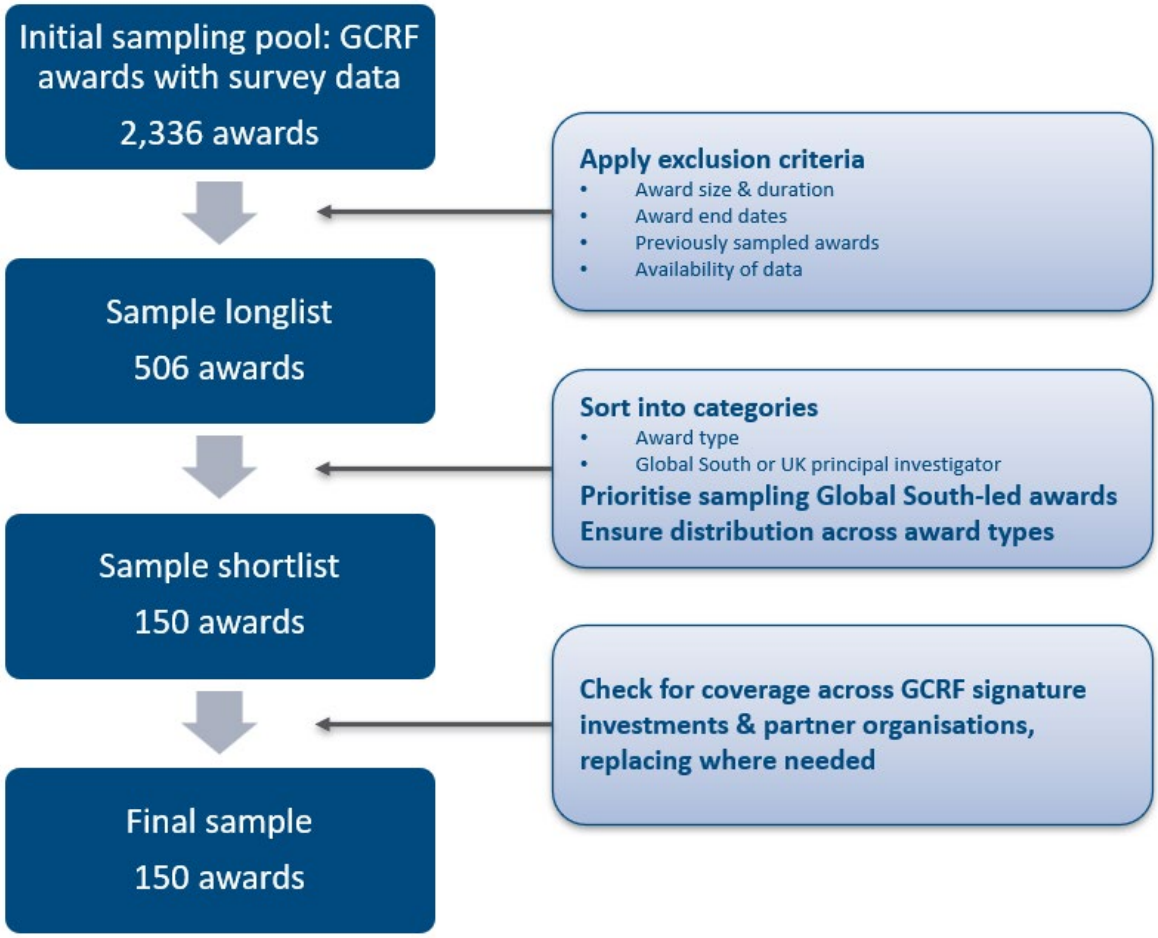
[32] n=9755.
[33] See the Stage 1b Synthesis Report, 2023 for more details (DSIT forthcoming).

structured sampling population for RQ++ assessment as a starting point. The survey responses also provided an additional evidence base that included LMIC partner responses. The initial sample was subsequently triangulated with the fund-level administrative data to refine the longlist sample.

The steps used to build the final sample are shown in Figure 6. Full details of the process are included in Annex 5. In summary, from the initial sampling pool of 2,336 awards, several exclusion criteria were applied to refine the longlist of awards, e.g. excluding awards without matched survey data, excluding the smallest (lowest-value) awards to ensure that there was sufficient data to make the assessment, and excluding awards with end dates in 2023 or later to ensure that outputs had been produced. (Exceptionally, Hubs were brought back into the sample even though they do not complete until 2024; the rationale for this was their large size and importance to GCRF as an approach. Equally, some low-value awards were added back to ensure coverage across all POs.) This produced a longlist of approximately 500 awards, which were then triangulated with the fund-level administrative information and sorted into broad categories to represent different types of investment, to ensure coverage.[34] The shortlist was then checked for coverage across GCRF's POs and programmes. The draft sample of 150 awards was then checked with the POs, and adjustments were made if any issues were identified.

Figure 6. Steps used in sampling strategy

[34] GCRF was not designed with a clear typology of awards, so the award types were developed in conjunction with the DSIT GCRF fund manager, drawing on their knowledge of the portfolio.



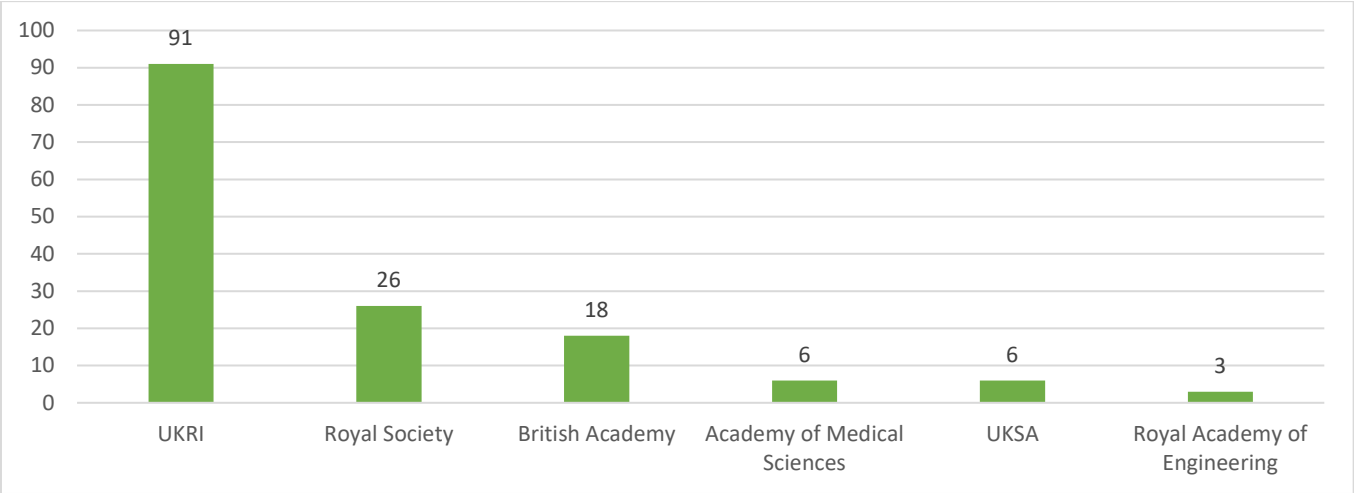
Overview of the final sample and evidence base

This section gives an overview of the final sample achieved and of the extent and nature of the quantitative and qualitative evidence gathered.

Final sample achieved for the qualitative analysis of 150 awards

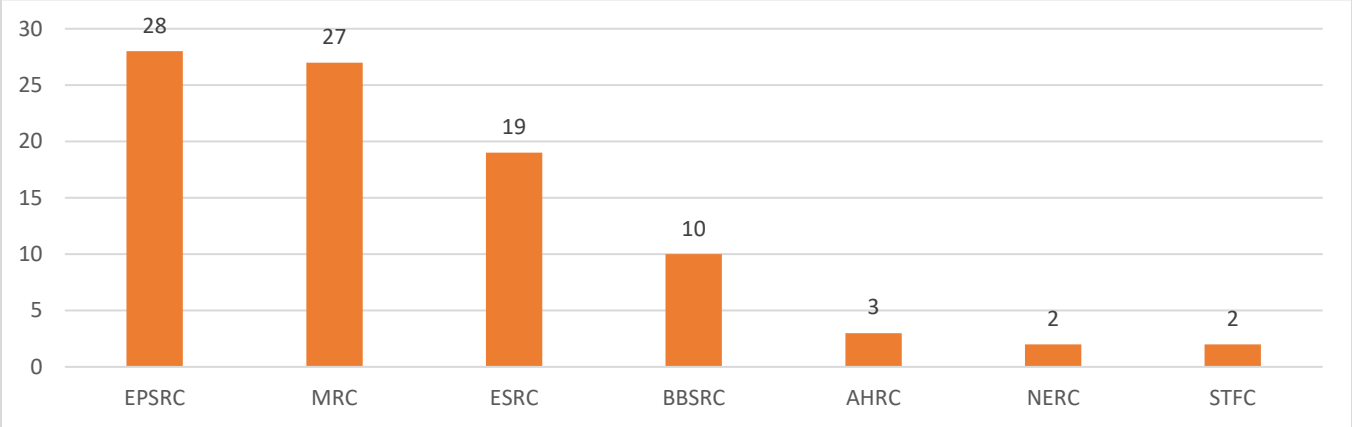
The GCRF portfolio is broad and diverse, and the sampling strategy used ensured that the final set of 150 awards reflects this. The full range of POs was captured in the sample, with an approximately proportionate number of awards to reflect the size of their GCRF portfolios (see Figure 7).

Figure 7. Distribution of 150 sampled awards across GCRF POs



UKRI, the largest PO, delivered its GCRF programmes through seven research councils, all of which were also represented proportionately in the sample (see Figure 8).

Figure 8. Distribution of sampled UKRI awards across research councils[35]

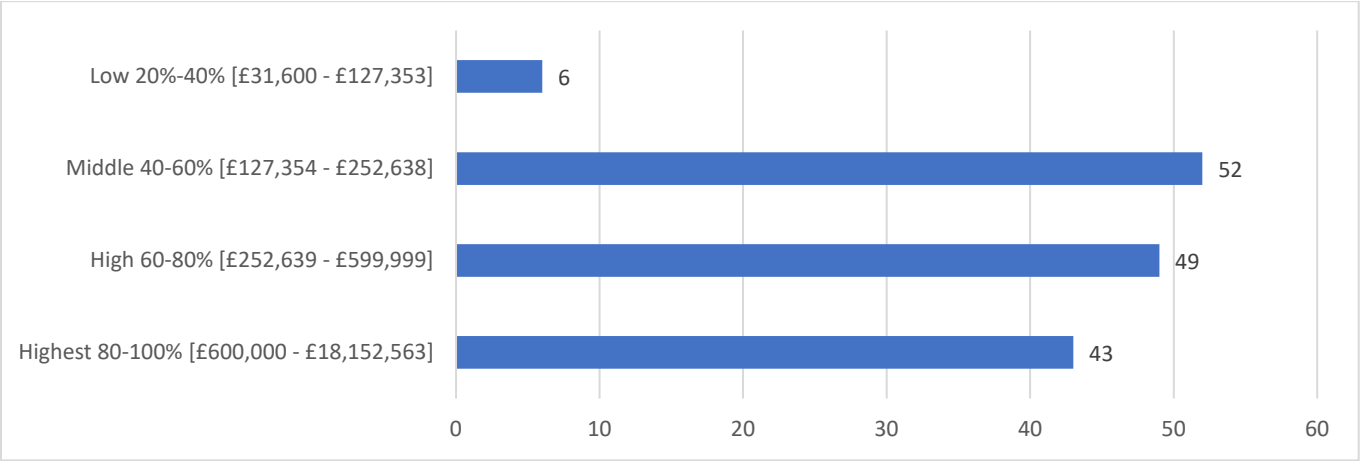


The sample also achieved distribution across size and type of awards. To ensure distribution across differently sized awards, quintiles were applied to the sample data.[36]

Figure 9. Distribution of award sizes across the final sample

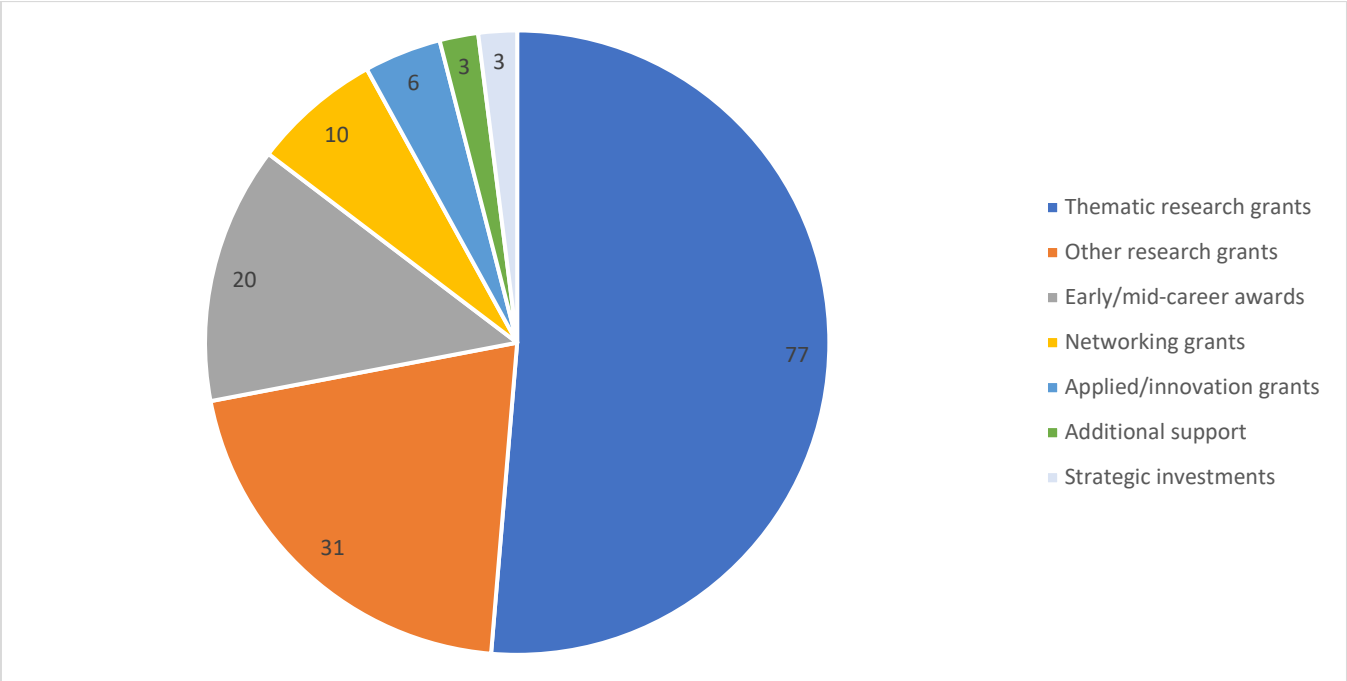
[35] AHRC: Arts and Humanities Research Council; BBSRC: Biotechnology and Biological Sciences Research Council; EPSRC: Engineering and Physical Sciences Research Council; ESRC: Economic and Social Research Council; MRC: Medical Research Council; NERC: Natural Environment Research Council; STFC: Science and Technology Facilities Council.

[36] The two lowest quintiles were initially excluded due to concerns that there would be insufficient data to conduct a full RQ++ assessment. This excluded all AMS awards. Since inclusion of all POs was necessary, six of the largest AMS awards were put back into the sample. These are the awards in the low value quintile.



GCRF was not designed with a clear typology of awards, so a set of award types was developed with the DSIT GCRF fund manager, drawing on their knowledge of the portfolio. The proportion of thematic and other research grants in the sample reflects the large number of these type of awards in the portfolio as a whole.

Figure 10. Frequency of award types in the final sample



The sampling process also sought to achieve a distribution across different geographies in terms of both the location of the principal investigator (PI) and the geographical focus of the research itself. Although awards led by a PI based in the Global South were prioritised for the sample, only 34/150 sampled awards were Global South-led. This is reflective of low levels of Global South leadership in GCRF as a whole. A number of factors caused this: a policy decision in favour of UK-only leadership in the early phase of GCRF; unequal access to research opportunities; lack of experience in submissions among Global South researchers in later phases.

Although RQ++ is not typically used to assess basic science projects, this is a core part of GCRF's portfolio. DSIT wanted to understand the quality of the research produced, and requested that we add some basic science awards to the sample; 37/150 basic science projects were therefore included in the final sample. Not all were suitable for RQ++ assessment, although some were notable in being designed with use in mind. Discovery science has limited concern with process issues, such as integration of local knowledge, knowledge accessibility and sharing, and timeliness.[37] This meant that some RQ++ subdimensions did not fit well into some awards, and therefore there was insufficient evidence to assess them. This resulted in a smaller overall evidence base for analysis.

Bibliometric analysis dataset

In order to complement and contextualise the smaller qualitative sample, we used quantitative bibliometric data to analyse GCRF awards and their associated publications, patents and policy outputs (among other factors) in order to identify broad trends and patterns about the portfolio and how it has been performing. A series of bibliometric indicators was identified that could inform the RQ++ dimensions at both the sample level and the portfolio level. Where possible, bibliometric analysis was applied via the same indicator at both sample and fund level, but this was not always possible, either due to the limitations in the available global bibliometric scholarly information or to the small size of the sample, which did not permit a meaningful analysis. In the findings, we have indicated at what level the bibliometric analysis is being reported, and the limitations are set out transparently. As has been the case in earlier stages of the evaluation, the bibliometric analysis provides a 'broad but thin' view of GCRF's performance, and the qualitative analysis of the sample provides a richer, in-depth examination of performance and factors that underlie it.

The bibliometric data for the analysis was obtained from our partner, Digital Science, which manages a large database of linked scholarly information: Dimensions – one of the most comprehensive databases in global research.[38] Dimensions offers a comprehensive collection of linked data in a single platform – from grants, publications, datasets and clinical trials to patents and policy documents. The database links publications and citations, investigators and their institutions with (i) related grants and supporting funders, (ii) article metrics and (iii) the related patents, clinical trials, policy documents and datasets to deliver a holistic view of the research landscape.

The data for the RQ++ assessment was curated and developed by:

- locating publications and other outputs attributable to GCRF awards in Dimensions, through matching the GCRF grants reported by BEIS to grants in Dimensions via their

[37] Bodicoat, D.H., Routen, A.C., Willis, A., *et al.* (2021) Promoting Inclusion in Clinical Trials – a rapid review of the literature and recommendations for action. Trials 22(880). Available at: https://doi.org/10.1186/s13063-021-05849-7

[38] Website: https://www.dimensions.ai Dimensions is the database owned by our partner, Digital Science, and is the dataset that we have curated for this analysis. Other approaches and databases are available. Each database will have a different dataset; alternatives include Scopus and Web of Science. DevPubMetric provides alternative measures of research outputs. Available at: https://www.pvgglobal.uk/activity/devpubmetric/

grant number, then searching acknowledgements for grant IDs or generic references to GCRF

- drawing on GCRF project information from GtR and Researchfish to combine with the Dimensions analysis
- aggregating information provided by POs in a range of different formats, summarising their portfolio.

Through this process, the data science team has identified 12,571 publication products emerging from GCRF-funded activities across the whole portfolio, and 2,672 from the sample.

Figure 11 and Figure 12 show the process for achieving these totals.

Figure 11. Overview of the bibliometric dataset for the whole GCRF portfolio[39]

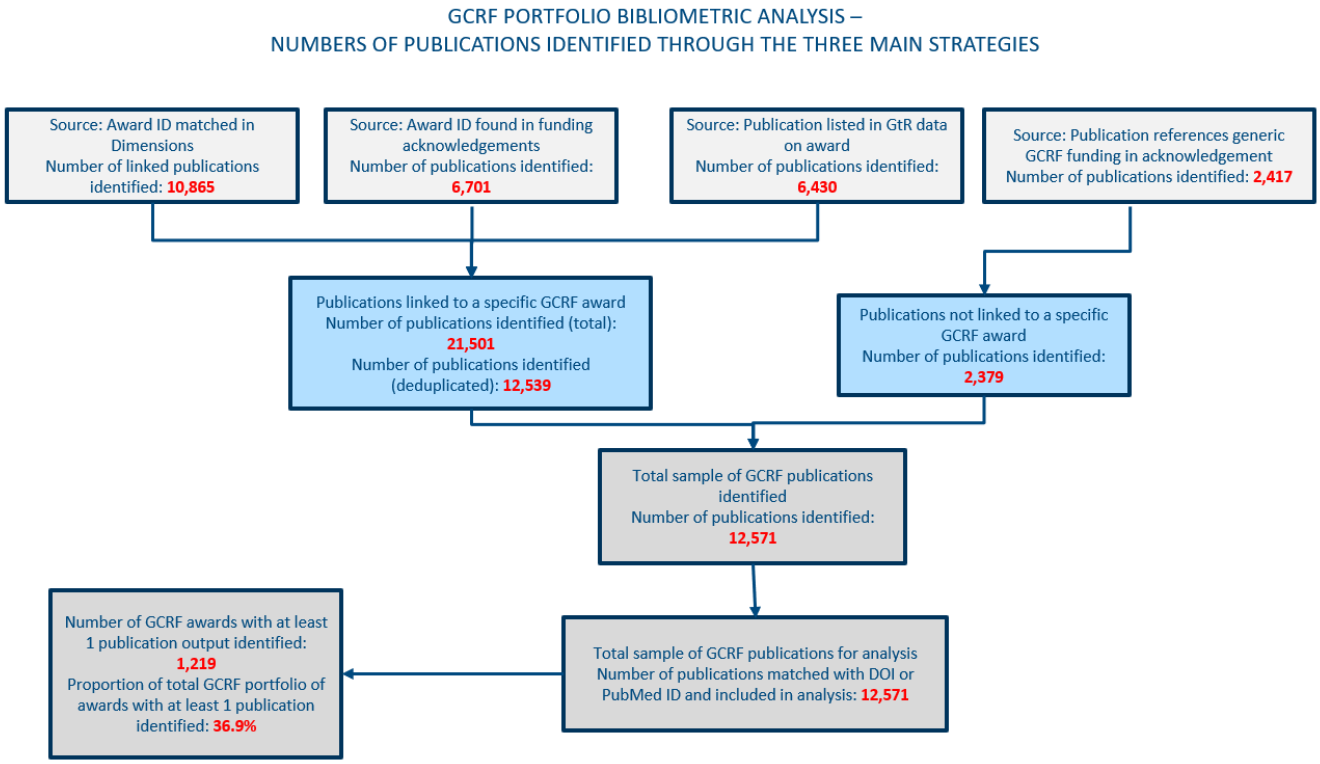
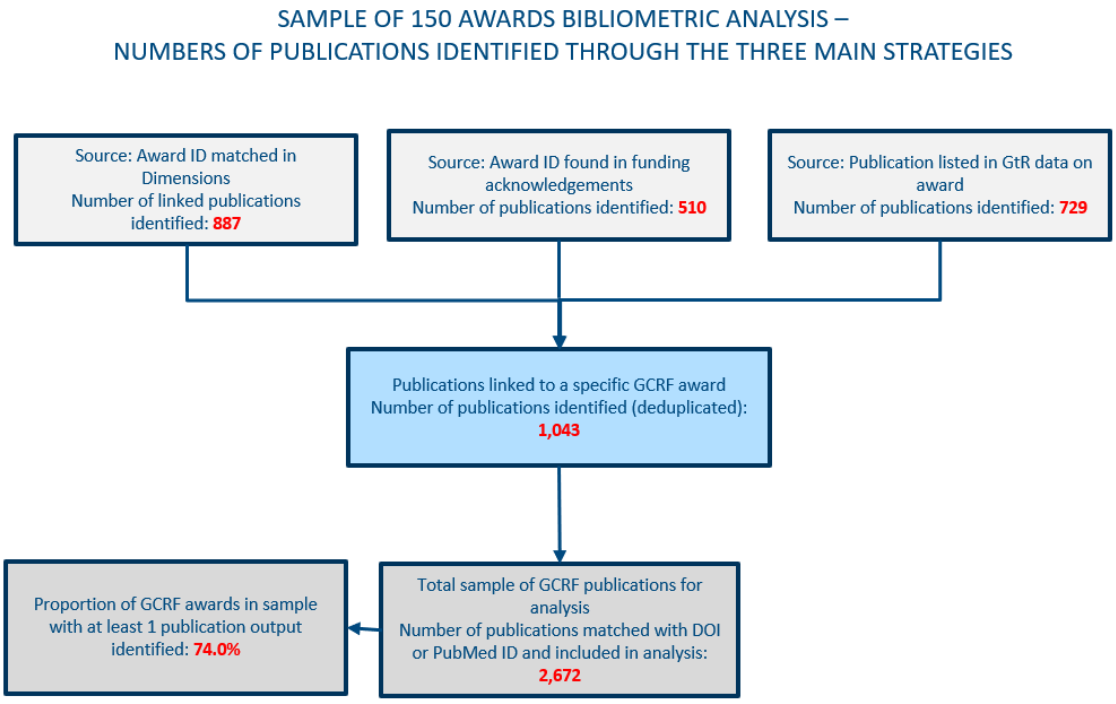


Figure 12. Overview of bibliometric dataset for the sample of 150 awards

[39] In Figure 11 and Figure 12, DOI stands for 'Digital Object Identifier'.



RQ++ award assessment method

The RQ++ assessment was carried out by evaluators from across the evaluation consortium – Itad, RAND Europe, the African Institute for Development Policy (AFIDEP) and Athena – between August 2022 and February 2023. As the overview diagram (Figure 15) illustrates, the RQ++ assessment comprised several stages:

- **Training and piloting:** During the scoping phase (April–May 2022), there was a process of refining the adapted GCRF RQ++ instrument with DSIT and the evaluation team.
- **Data collection:** The sample of 150 awards was divided across the evaluation team. Evidence sources were compiled for awards from project documentation, GtR (if applicable), project websites and other sources for outputs, and combined with bibliometric data science and survey data. One interview per award was conducted, due to resource constraints. This was usually the PI, although for some awards the co-investigator (Co-I) was interviewed, and for others it was possible to conduct group interviews. The single award-level interview is an acknowledged limitation.
- **Award-level assessment:** The award-level assessment involved two steps.
    - First, the contextual factors were analysed and rated. Although context does not directly affect the quality rating, it is important in analysis to understand what contextual factors affected the research process in different contexts. Figure 13 shows the rubric for 'Maturity of the research and innovation field' as an illustration of one of the four contextual factors rubrics rated in the assessment.[40]

[40] The other three dimensions of context are data environment, organisational environment and operational environment (see Figure 5).

Assessors consider the evidence, assign a rating and provide a rationale for their rating that sets out the underlying evidence.

Figure 13. Specific rubric for the contextual factor 'Maturity of the research and innovation field'

Contextual factor 1: Maturity of the research and innovation field			
1. Mature field	**2. Established field**	**3. Emerging field**	**4. New field**
▪ Well-established and recognised theoretical and conceptual frameworks in use. ▪ A substantial body of conceptual and empirical research or innovation. ▪ Discernible knowledge-sharing outlets (journals, conferences, curriculum). ▪ A vibrant community of experienced researchers/innovators.	• Theoretical and conceptual frameworks in development but generally recognised. • A body of conceptual and empirical research/innovation that reflects significant growth. • Discernible knowledge-sharing outlets (journals, conferences, curriculum). • An ample community of active researchers/innovators who associate easily with the field and are connected to each other.	• Theoretical and conceptual frameworks gradually being recognised and still debated. • A growing but not ample body of conceptual and empirical research/ innovation. • Discernible knowledge-sharing outlets emerging. • An emerging group of active researchers/innovators who associate naturally with the field and are starting to connect to each other.	• Very limited theoretical or conceptual frameworks being debated or rapidly changing and largely unrecognised. • Scarce empirical or theoretical body of research/innovation. • Few dedicated journals or academic programmes. • Few active researchers/ innovators seeking to be recognised and connected.

- Second, the RQ dimensions were assessed and rated. As outlined earlier, RQ is rated on an eight-point scale, using a rubric that defines quality at each level, from lowest to highest quality. Assessors consider the evidence, assign a rating and provide a rationale for their rating that sets out the underlying evidence. Team workshops were held to cross-check, both to moderate scoring and for quality assurance.

Figure 14. Specific rubric for RQ++ dimension 2: Research and innovation legitimacy; subdimension 2.1: Mutuality in partnership

Subdimension 2.1: Mutuality in partnership								
Insufficient information to assess (IIA)	Unacceptable		Less than acceptable		Acceptable/Good		Very Good	
	1	2	3	4	5	6	7	8
Not enough information was available to make a credible assessment.	Power imbalances in the partnership were not addressed. Benefits were not mutual. The partners demonstrated little or no experience in managing partnerships.		There is some evidence the partnership was negotiated in a transparent and equitable manner, with a degree of clarity and mutual recognition over management capacities, roles, responsibilities and benefit sharing. Problems were encountered over the life of the partnership, and these are not adequately addressed. Other forms of knowledge are considered to a limited extent. Learning was not mutual.		There is evidence the partnership was negotiated in a transparent and equitable manner, with a good degree of clarity and mutual recognition of management capacities, roles, responsibilities and benefit sharing, and that it was freely agreed by the partners. Other forms of knowledge are considered and usually taken into account. Benefits accrue to most partners. Structures and processes to sustain the partnership throughout were largely implemented throughout the project, and benefits were mutual.		There is clear evidence the partnership was negotiated in a transparent and equitable manner, with a high degree of clarity and mutual recognition over management capacities, roles and responsibilities. There is evidence of fair sharing of benefits, costs and outcomes, freely agreed by all partners. There is evidence of significant co-design, where all forms of knowledge are taken into account. Benefits clearly accrued to all partners. Structures and processes to sustain the partnership throughout were effectively implemented, and there is evidence of benefits to all partners.	

RQ++ synthesis method

The **synthesis stage** brought the award assessments and bibliometric analysis together to answer the overarching EQs for this stage of the GCRF evaluation:

'*How are GCRF's investments working and what has been achieved?*'

'*What results has GCRF produced or contributed to, and what has worked in transforming research outputs to outcomes?*'

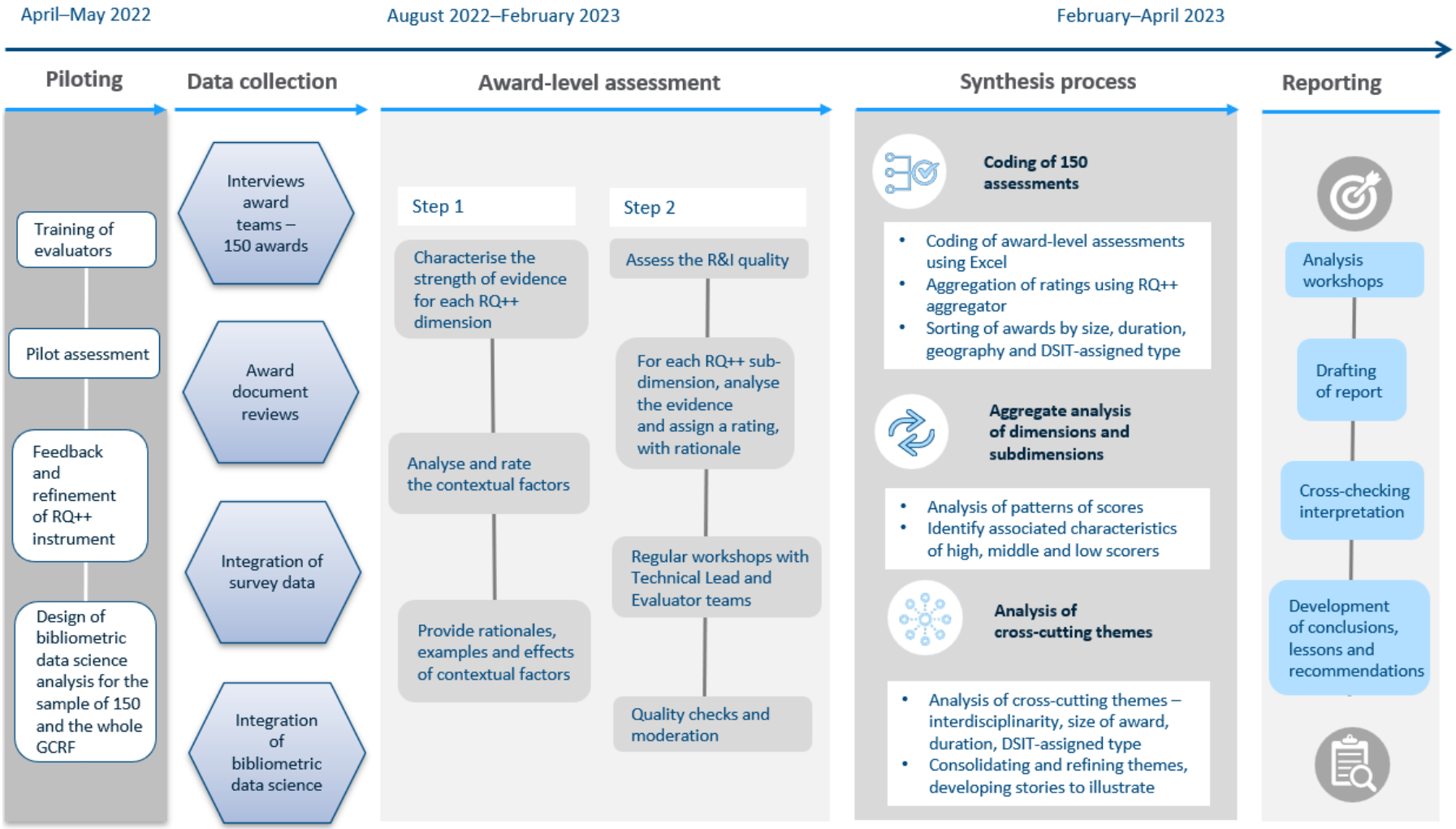
The synthesis was conducted by the core GCRF evaluation team.[41] The synthesis method used the RQ++ rubric as the integrating framework and followed systematic techniques from qualitative analysis, including: identifying the relevant themes from the coded source material; exploring the relationships between them; translating the themes back into all the sources; testing the themes against the evidence; juxtaposing findings and reconciling contradictions in the findings and evidence.[42]

First, the 150 award assessments were coded using Excel, and ratings across the sample were aggregated. Awards without an interview due to non-response were analysed separately. The awards were categorised by size, duration, geography and broad type. Second, the team conducted an aggregate analysis of the RQ++ dimensions and subdimensions, identifying patterns and factors associated with high, middle and low-scoring awards. Insights were

[41] The core team included the RQ++ Technical Lead, the GCRF Team Leader and the GCRF Project Manager.
[42] Gale, N.K., Heath, G., Cameron, E., Rashid, S. and Redwood, S. (2013) Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Medical Research Methodology 13:117. Available at: https://doi.org/10.1186/1471-2288-13-117; Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. Qualitative Research in Psychology 3:2, 77–101. Available at: 10.1191/1478088706qp063oa

captured using analysis tables. Emerging cross-cutting themes were analysed – interdisciplinarity, contextual factors and the associations between scores and characteristics of awards. The team cross-checked interpretations through workshops, consolidating and refining themes. Illustrative stories were identified. Finally the team drafted findings, refined interpretations again, and developed conclusions, lessons and recommendations.

Figure 15. Overview of the RQ++ assessment and synthesis



Limitations & mitigations

The limitations faced in this evaluation are summarised in the table below, together with the mitigation measures the team adopted. Two types of limitations are noted: first, those in the data science analysis; second, those in the data collection process.

Limitations in the bibliometric data science analysis

Limitation	Mitigation
Bibliometric analysis relies on publications, so those awards which do not produce publications outputs that can be identified in Dimensions will generally not be included. Therefore, for example, awards that are intended to support meetings or networking will not be well covered by this analysis.	**Mitigation:** The number and value of networking awards is small compared to the rest of the portfolio, and so the impact of this is minimal.
Although the analysis can identify publications linked to GCRF, they can only be assigned to specific awards where the publication acknowledges the specific grant number, not where they simply acknowledge GCRF.	**Mitigation:** We have used a number of strategies to identify GCRF awards (see above) and have cross-referenced to the DSIT Tracker as much as possible. This has enabled us to link over 12,000 publications to approximately 1,000 grant IDs, which represents about one-third of the GCRF portfolio. The data that is less granularly associated with GCRF is still valid for the purposes of the results analysis, representing 2,379 publications.
Although most projects were highly interdisciplinary, most journals are disciplinary in nature and publications do not capture the full extent of the interdisciplinary nature of the work that was conducted.	**Mitigation:** Distribution of Fields of Research (FoRs) for awards was used as a proxy for interdisciplinarity. The qualitative analysis included a reflection on the full range of disciplines involved in each project; this was obtained through proposals and interviews.
Data available in GtR is likely to be incomplete and is self-reported, without any additional quality control and with a risk of significant under-reporting. (Over-reporting is also possible, but experience suggests this is much less common.)	**Mitigation:** For this reason, this data is used in this analysis only to a limited extent as one source of evidence regarding the outputs produced from research. At the individual award level (i.e. for the sample), GtR provides an additional source of evidence which researchers can use when reaching their RQ++ assessment, triangulating against the wider evidence from project documentation, online resources, and interview and survey data. As with all these sources of evidence, the level of

	information provided by GtR to support RQ++ analysis will differ significantly between awards.
Non-formal publications are recorded inconsistently in GtR.	**Mitigation:** In interviews, researchers were asked about non-formal publications and outputs, which yielded more information.
Coverage of LMIC publications and authorship is limited due to global data availability.	**Mitigation:** According to Visser *et al.* (2021) and Guerrero-Bote *et al.* (2020), Dimensions has a much broader coverage than both Web of Science and Scopus, especially in terms of Open Access. Since developing countries tend to publish more in Open Access and local journals (Basson *et al.* (2022)), they will therefore be more likely to be indexed in Dimensions. Dimensions, being less Western-centric than Scopus and Web of Science (Basson *et al.* (2022)), is therefore a better choice in terms of coverage for a global study.

Limitations in the qualitative data collection process

Limitation	Mitigation
Fewer than ideal number of interviews per award for RQ+ assessments – two to three interviews are ideal because of the process nature of some aspects of the assessment and the importance of context in understanding the research and its findings. This is particularly important in the assessment of international partnerships that cut across cultures.	**Mitigation:** The original plan was to conduct 200 assessments and only 50 interviews. Based on consultations with experienced users of RQ+ in the design phase, it was recognised that interviews are central to each assessment. With DSIT approval, we revised the sample to 150 awards with one interview per award, which was the maximum that could be managed within the assessment resource and time frame. To ensure a mix of user perspectives, we sought a mix of UK and LMIC interviewees across the portfolio and used group interviews where possible. The survey data for the award, which disaggregated PI and Co-I responses, provided an additional data point to compare perspectives.
For 18 awards, it was not possible to obtain an interview despite repeated attempts. For these awards, the lack of interview resulted in a much higher IIA rate. Between 16 and 18 included at least one IIA, and almost all included multiple IIAs (only	**Mitigation:** The awards without interviews were separated from the remaining 132 awards with the full dataset and were analysed separately. However, given the lack of assessment in the rubric, only main characteristics were summarised.

two had one IIA). Consequently, we can say that the assessments without an interview are much less reliable and do not merit detailed attention. This highlights that multiple perspectives are normally needed to achieve a well-rounded and thorough assessment.	The primary qualitative analysis is based on the 132 awards with interviews.
In terms of data management issues internal to GCRF, some end-of-project dates were not kept up to date. Therefore, despite careful sampling and selection, RQ++ assessed some awards that had received no-cost extensions, resulting in limited assessments, as the research was not yet complete in some cases, and in others the findings were not yet public.	No mitigation possible.

5 Findings

This section of the report responds to the aims of the RQ++ assessment:

- assess whether excellent research is being undertaken by GCRF award holders
- assess whether this research is of high quality against more development-oriented standards (RQ+)
- capture emerging results from across the fund to explore the links between RQ and results.

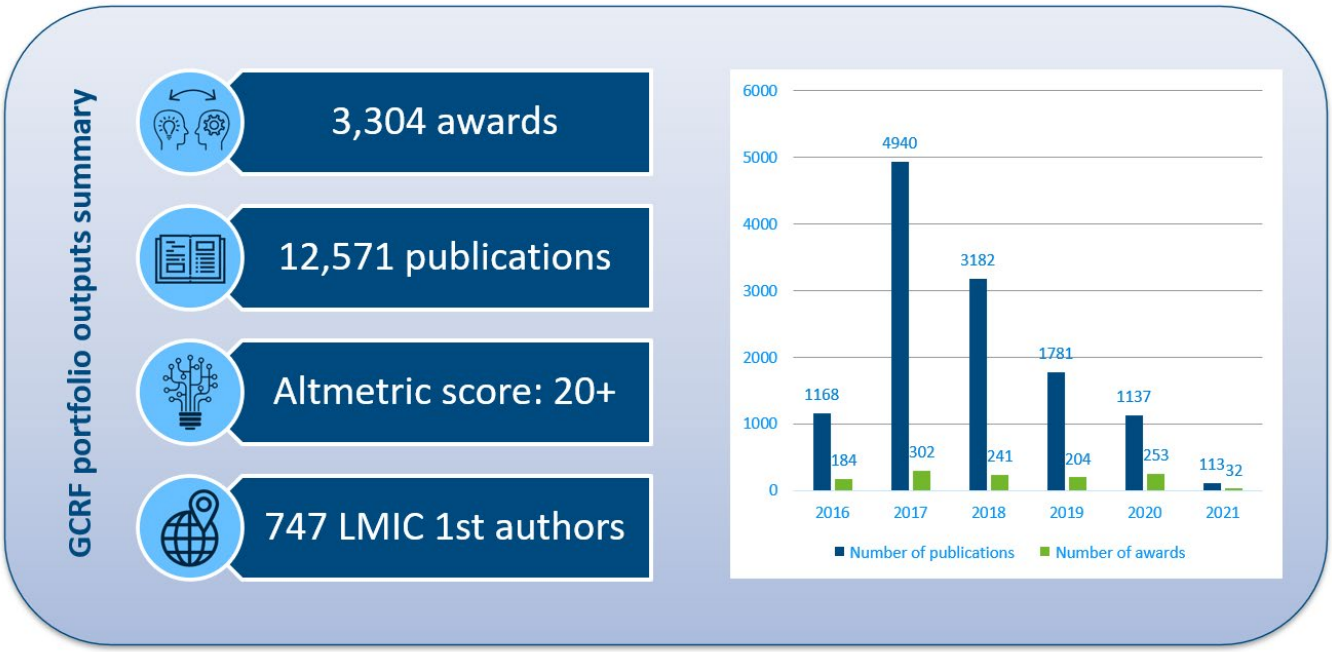
Following a brief overview of the RQ++ assessment results for the sampled awards, which will include a summary of the bibliometric analysis across the whole GCRF portfolio, this section will explore each of the contextual factors and dimensions of RQ++ in depth.

RQ++ assessment findings – overview

On the whole, GCRF awards have seen strong performance against the RQ++ standard, with a high preponderance of high-quality research that is well positioned for the next stages of GCRF's pathway to impact, where R&I is taken forward to application and use. The sample awards are performing well, not only against conventional measures of research excellence but also in some key components of ODA research excellence.

How did the GCRF portfolio as a whole perform?

Figure 16. GCRF portfolio outputs summary



Source: Digital Science (2023).

Looking specifically at the bibliometrics around high-quality R&I, publications linked to GCRF awards performed well, with a higher-than-average number of citations, compared to other articles published in the same year and field of research.[43] From the bibliometric analysis it also becomes clear that publications are receiving attention, indicating engagement with networks. Across the GCRF portfolio we see that publications rank highly in terms of Altmetric indicators (score: above 20).

Despite this high performance, there are areas where improvements could be made. Regarding research legitimacy, only 16.2% of the publications associated with awards were co-authored by LMIC researchers, with 4.7% having an LMIC first author. This is a very low proportion and it undermines GCRF's ambitions to promote fair benefit sharing as part of equitable partnerships. Specific efforts will be needed to boost LMIC authorship.

How did the sample of 150 awards perform?

Based on both qualitative and bibliometric evidence, the sample performed well across the four dimensions of RQ++. These summary findings will be unpacked in more detail in subsequent sections.

Scientific rigour: GCRF-funded research has been well selected, and most is rigorous and fit for purpose across fields of different levels of maturity. Awards scored more highly in supportive contexts. New areas of research tended to have lower scores.

Research legitimacy: most research was regarded as legitimate and took account of the insights of the intended users. Engagement with the affected community was a critical factor in success in this dimension. Projects involving at least one pre-existing partnership also tended to perform better. Consideration of equity, diversity and inclusion (EDI) was a weakness.[44]

Research importance: the majority of awards demonstrated relevance, and almost all awards demonstrated some originality. Where awards scored well on originality, this stemmed either from new and emerging fields or from the application of the approach in a new setting. Basic science awards were strong on originality.

Positioning for use: sampled awards have demonstrated good practice in positioning for use across a range of different contexts. A thorough analysis of context and stakeholder needs was common across awards that scored the best. Being part of a coherent and ongoing programme

[43] Field Citation Ration (FCR) is a citation-based measure of scientific influence of one or more articles, calculated by dividing the number of citations an article has received by the average number received by articles published in the same year and in the same FoR category.[43] An FCR value of more than 1.0 shows that the publication has a higher-than-average number of citations. The average FCR per year was calculated for 12,321 publications associated with GCRF awards. Looking across the awards, we see that across the years 2016–21 the mean FCR was above 1, indicating that the publications associated with those awards have a higher-than-average number of citations compared to what would be expected (Figure 26 on page 62).

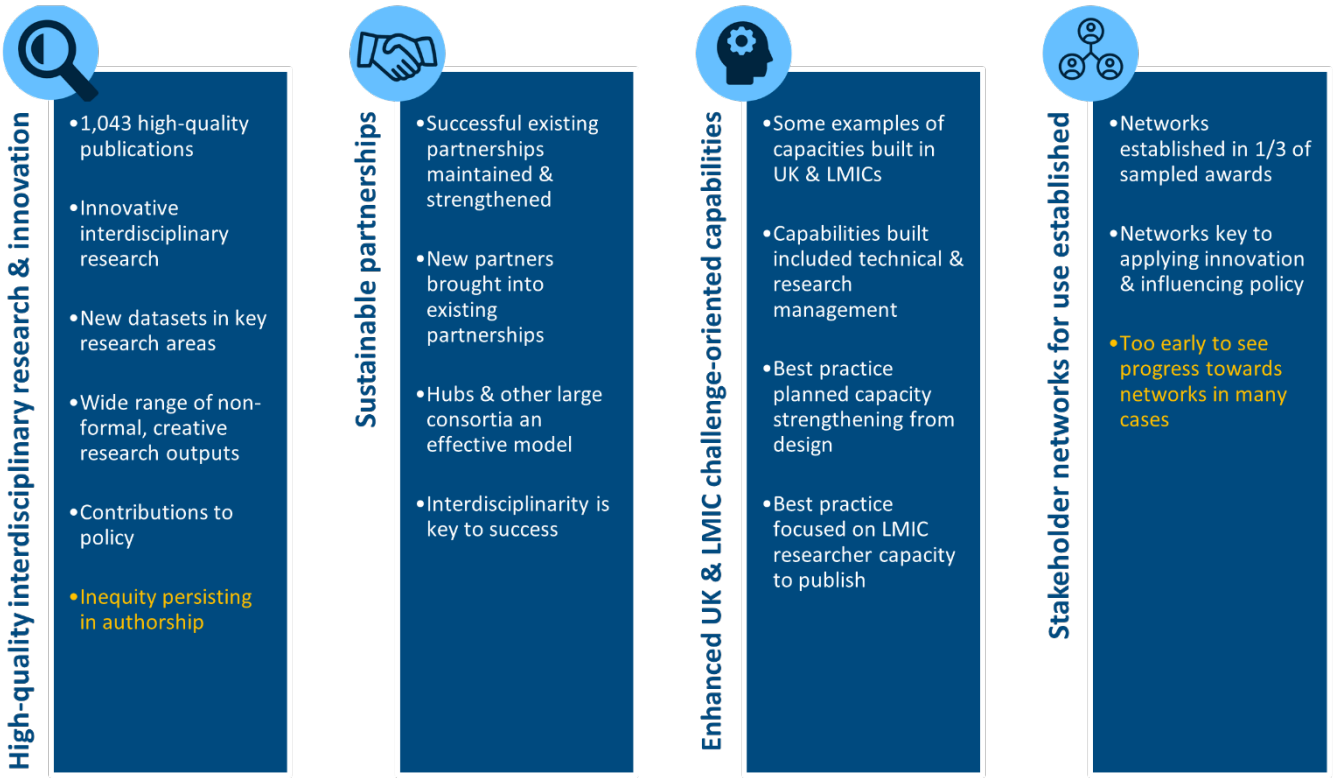
[44] In the RQ++ rubric, the highest scores for EDI align with EDI-transformative research/innovation. EDI-transformative R&I unpacks social inequalities, provides space for addressing intersectionalities to learn, and engages with people across the socioeconomic spectrum to change the norms that enable inequalities. The RQ++ rubric assesses that a project is 'EDI-transformative' if these considerations are addressed in its rationale and methodology and if it includes a rigorous analysis of root causes, gender power relations and intersectionality (multiple vulnerabilities experienced by individuals or groups, such as race, class, sexual orientation and ethnicity, alongside gender) as well as shared management and decision making.

of work is associated with strong positioning for use. The best positioning for use also correlated with a broad range of non-formal research outputs.

The sample also demonstrated clear evidence of progress towards the four result areas outlined in the GCRF ToC. Figure 17 presents an overview of the main achievements in each area:

- high-quality research, interdisciplinary R&I, positioned for use
- sustainable partnerships across geographies and disciplines
- enhanced challenge-oriented capabilities established in the UK and LMIC partner countries
- stakeholder networks for use established across research, policy, practice, civil society and business.

Figure 17. Overview of results achieved in the sample



RQ++ contextual factors

RQ++ definition: Contextual factors

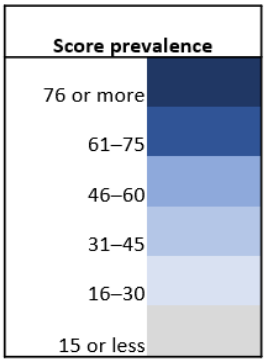
Key contextual factors that have significant potential to affect the quality of R4D – such as the maturity of the FoR, the organisational and operational contexts in which research is undertaken, and the strength of the data environment – are considered as part of the RQ++ assessment.

Summary:

None of the contextual factors were clearly associated with a pattern of higher or lower scores across the RQ++ rubric. On the whole, the operating environment was largely stable; where it was weak, organisational environment was strong, and vice versa. Although many LMIC data environments are generally not strong, much of the research relied on primary data and contributed datasets to the countries where they were operating.

Figure 18. RQ++ context ratings for the sample

	Mature field	Established field	Emerging field	New field	IIA
Maturity of the field	36	31	49	16	0
	Empowering	Supportive	Unsupportive	Restrictive	IIA
Organisational R&I environment	29	89	11	3	0
	Stable	Moderately stable	Unstable	Volatile	IIA
Operating environment	20	64	41	7	0
	Flourishing	Developed	Limited	Weak	IIA
Data environment	18	61	47	3	3



Significance of the RQ++ context ratings for the sample

None of the contextual factors were clearly associated with a pattern of higher or lower scores across the RQ++ rubric. This is unsurprising and is consistent with earlier findings in this evaluation, as the GCRF awards are skewed towards well-resourced research, which usually requires strong institutions to win the awards through the rigorous processes they face.[45] In addition, these organisations have the resources to manage unexpected challenges that emerge.

[45] See BEIS (2021) Stage 1a: Synthesis Report of Evidence on Integration of Relevance, Fairness, Gender, Poverty and Social Inclusion in Funded Activities. Available at: https://www.gov.uk/government/publications/global-challenges-research-fund-gcrf-stage-1a-evaluation

Maturity of the field had a limited influence on RQ++ scores, with a roughly even distribution of awards working in mature or established fields and those working in emerging or new fields. There was an even proportion of awards working in mature or established fields, although quite a few of these were immature fields in LMICs. Generally, GCRF awards that were working in new fields tended to achieve lower scores in RQ++; this could be because in new FoRs much attention must be paid to building the field, e.g. developing datasets and frameworks, as well as to addressing the issue at hand.

Bibliometric indicators can be used to look at the contextual factors within the sample. Within the Dimensions database, 88 of the 150 individual grants can be linked to established FoRs.

Maturity of the field

Compound annual growth rate (CAGR) is a measure which can be used to calculate the mean annual growth rate of a research field. Here it was calculated across a five-year period (2017–21). For the 40 or so research fields identified for the sampled awards, the average CAGR was 7.1, and therefore any field above that score is considered 'fast-moving'. Several fields fall above this cut-off, including Public Health, Health Services and Systems, Education Systems, and more technology-focused fields such as Artificial Intelligence and Machine Learning. This analysis supports the rating of the sampled GCRF awards as spread between mature and emerging fields.

Existing capacities for partnered research

For this analysis we measured the degree of collaboration between LMIC and high-income country (HIC) researchers and between LMIC and UK researchers. This involved taking the resulting publications from the sample of the GCRF grants, extracting the LMIC, HIC and UK researchers from these publications, and checking if any pair (LMIC–HIC or LMIC–UK) of researchers involved in the publications had already published something together. We can see that UK and HIC researchers outnumbered LMIC researchers significantly (see Table 1). In terms of collaboration of the total number of LMIC researchers, 193 were in collaborations with HICs, representing 39.5% of the LMIC researcher population.

Table 1. LMIC, HIC and UK researchers

Researcher group	Numbers	Percentages
LMIC researchers	488	17.2
HIC researchers	1839	65.0
UK researchers	1198	42.3
LMIC researchers in LMIC–HIC collaboration	193	39.5
HIC researchers in LMIC–HIC collaboration	268	14.6

Source: Digital Science (2023).

Operating environment was largely stable or moderately stable across the sample. In cases where it was seen as unstable, the most common issues that were raised were the impacts of Covid-19 and, to a lesser extent, the budget cuts. In a small number of cases some political instability was cited, as well as power cuts, which were sufficiently frequent to affect lab research. In the seven cases where the operating environment was identified as volatile, serious violence and armed conflict created threats to personal safety. Most of these took place in countries with known instabilities.

Organisational environment was not a strong influence in this sample. Most of the sampled awards were working in reasonably developed organisational contexts. This is unsurprising, as the GCRF portfolio as a whole is skewed towards well-resourced LMIC institutions, which are likely to have the resources to manage unexpected challenges that emerge. The organisational research environment and operating environment tended to balance each other, i.e. where one was weaker the other was usually stronger, and the teams managed the challenges. The average score on these two aspects of environment was towards the higher end, from supportive to empowering organisational environments (1.7/4 across 132 awards, with 1 being the highest score) and in stable or moderately stable operating environments (2.2/4). Three awards received the lowest score for a weak organisational environment and seven received the lowest score for operating environment; this was caused by civil war or natural disasters. In the one case where there were both weak organisational and weak operational environments, the project enjoyed limited success.

The data environment was relatively strong across the board, with an average score of 2.1/4. Many projects focused on primary data collection, but we see examples where that led to improvements in national data systems, contributing to an improved data environment for future research.

The data environment dimension of RQ++ attempts to measure the accessibility of data on research funded and carried out. As a proxy, we considered that countries that had data in Dimensions were countries where the data was easily accessible. If Dimensions did not have access to the data, either the data was not accessible or it was under copyright. However, this data provided only limited insights, as for the years 2016–21 Dimensions had data for 40 countries. Therefore, by our proxy, only these 40 countries can be considered to have a good-quality data environment. In this list, countries that feature top in terms of data accessibility include the United States (US), the UK, Canada, Australia and Switzerland. India features in 16th place and South Africa is in 40th place. Although this is only illustrative, it provides some context for the number of new datasets produced as outputs by the awards in the sample.

Dimensions of RQ++

RQ++ analysis is broken into five key dimensions, each with subdimensions. Each dimension is discussed in turn. There is a short definition of the dimension, a table that summarises the

scores that were achieved and a discussion of the key findings. One or more awards are used to illustrate the points being made. A short 'so what?' section follows. After all the dimensions have been discussed, there is a synthesis of key findings and contributions to the key EQs. Recommendations for future award programmes are presented in conclusion.

Dimension 1: Scientific rigour

RQ++ dimension 1 definition: Scientific rigour

Scientific rigour is an assessment of the quality (technical merit), appropriateness and rigour of the design and execution of the research or innovation as judged in terms of commonly accepted standards in its field of work. The RQ++ assessment took the PO decision to fund an award as an assessment of the quality of the research design; the assessment here focused on rigour in implementation.

Summary of key points:

GCRF-funded research has been well selected and is mostly rigorous and fit for purpose. Work in new areas of research tended to have lower scores, but only four awards scored 'Less than acceptable'.

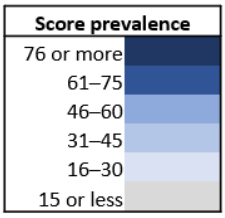
How did the GCRF portfolio perform as a whole?

We used bibliometric indicators to look at how well GCRF awards were performing across conventional metrics such as Field Citation Ratio (FCR) and Highly Cited Publications (HCPs). Analysis of these indicators can be found in the section on dimension 5 later in this report.

How did the sample of 150 awards perform?

Figure 19. RQ++ ratings for scientific rigour

Scientific Rigour					
	Unacceptable	Less than acceptable	Acceptable/Good	Very good	IIA
Methodological integrity	0	5	82	45	0



Due to the rigorous commissioning processes applied by the POs, scientific rigour of the GCRF awards was found to be high across all fields of work and across research methods at different levels of maturity. As such, there were no discernible patterns across award sizes, duration, types or POs, and there was no distinction between basic science awards and other awards in terms of scientific rigour.

Only five (3.8%) awards scored 4 ('Less than acceptable'), and none scored below 4. These low scores were attributed to the fact that the award had received a no-cost extension

and was therefore not complete at the time of assessment; in some cases, data quality and availability were challenges.

Eight awards had no LMIC partner. This represents 5% of the sample. Assuming the sample is somewhat representative of GCRF as a whole, this could represent as many as 125 awards to projects that did not meet the minimum requirements of GCRF. This demonstrates a weakness in the commissioning process.

What factors are driving good performance?

Generally, the highest-scoring awards were associated with supportive contexts. 13 projects scored 8 ('Very good') on methodological integrity, and all had high scores on the conditions in the organisational research environment, operating environment and data environment. This suggests that a conducive environment facilitates the development of good-quality methodology.

Good methodological integrity was seen across fields at different levels of maturity. Awards that scored 7 or 8 (n=45) came from different levels of maturity of the FoR. This too suggests that the commissioning process ensures robust methodologies.

What factors emerged as barriers to good performance?

This high scoring across levels of maturity did not extend to the newest FoRs that were supported; only one of the 12 projects in new FoRs scored 7 or 8 on methodological integrity. This is not surprising, as the focus in new FoRs is both on the problem at hand and on development of methods appropriate to that field.

Projects not being finished and problems of data availability/quality were the most commonly cited reasons for lower scores. That the work was ongoing made it difficult to comment on methodological integrity. Work was delayed by a range of factors, the most often cited of which were Covid-19 and reorganisation following budget cuts.

So what?

In planning the assessments, we considered that the commissioning process would lead to strong research protocols. The overall quality of the research bears out that assumption. Working through POs with strong research experience helps ensure that the research commissioned with GCRF funds is awarded to well-designed activities with potential to achieve their longer-term outcomes.

Dimension 2: Research legitimacy

RQ++ dimension 2 definition: Research legitimacy
Research legitimacy assesses the extent to which the results have been produced by a process that took account of the concerns and insights of relevant stakeholders, was deemed procedurally fair, and was based

on the values, concerns and perspectives of that audience. Research legitimacy is assessed against mutuality in partnerships, fairness, EDI and addressing potentially negative consequences.

Summary of key points:

Most research was regarded as legitimate and took account of the insights of the intended users. Engagement with the affected community was a critical factor in success in this dimension. Projects involving at least one pre-existing partnership also tended to perform better.

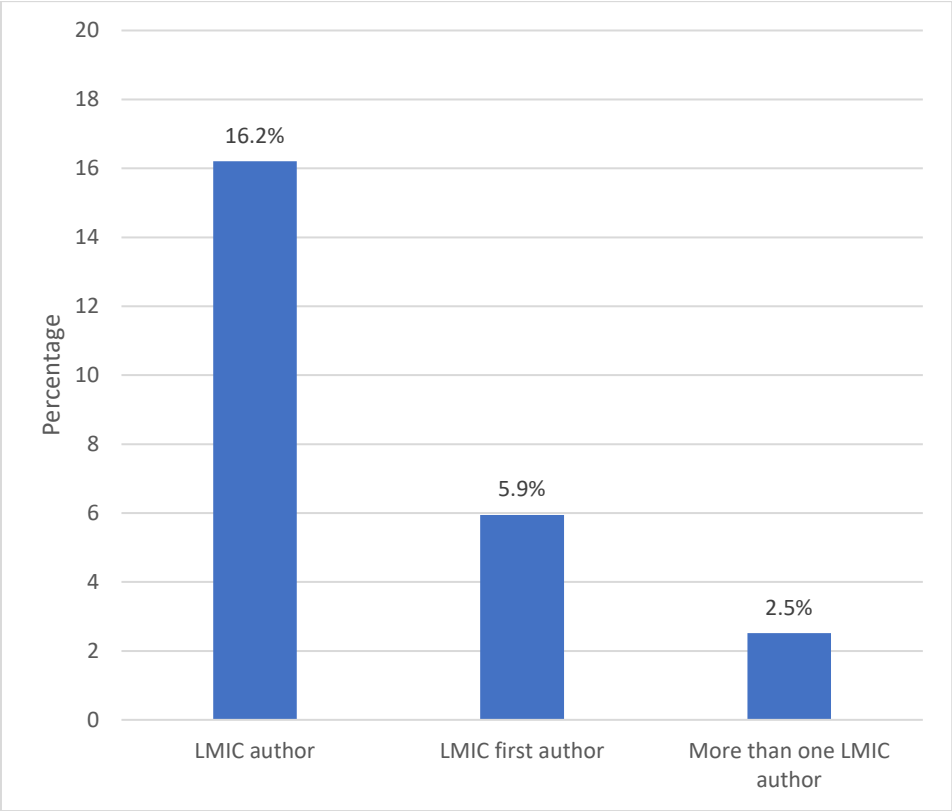
The weakest aspect of legitimacy across the sample was consideration of EDI, despite some attention to gender concerns. A number of awardees noted that the control of resources by the UK partner was inherently inequitable. A poor rating in legitimacy reflected poor engagement with local partners and poor understanding of local context, and is correlated with a poor rating in positioning for use.

How did the GCRF portfolio perform as a whole?

Bibliometric data can be used to explore aspects of research legitimacy, although it was only possible to do so at the portfolio level for this dimension. Here we have used, as the primary bibliometric indicator, author information from publications associated with GCRF awards. By looking at the degree to which the publications are associated with, or have first authorship by, LMIC researchers, it is possible to make some broad inferences about LMIC researcher engagement in authorship as an indicator of fairness.

12,571 unique publications were associated with the portfolio of GCRF awards. Of these, 2,037 publications (16.2%) were associated with LMIC researchers, 747 publications (5.9%) had an LMIC researcher as first author, and 316 (2.5%) included researchers from more than one LMIC (Figure 20). These figures are much lower than we in GCRF would hope; GCRF has prioritised equitable partnerships and fairness of process and benefit sharing. However, there is potential for these proportions to grow as more awards move to produce publications. Nevertheless, specific efforts will be needed to boost LMIC authorship.

Figure 20. Percentage of publications with LMIC authorship in the GCRF portfolio (n=12,571)



How did the sample of 150 awards perform?

Figure 21. RQ++ ratings for research legitimacy

Research Legitimacy	Unacceptable	Less than acceptable	Acceptable/Good	Very good	IIA
Mutuality in partnership	4	8	64	49	7
Fairness	3	13	57	49	10
Equity, diversity and inclusion	6	54	45	23	4
Addressing potentially negative consequences	0	9	60	37	26

Score prevalence
76 or more
61–75
46–60
31–45
16–30
15 or less

On most subdimensions of legitimacy the sample rated well, particularly in ensuring mutuality in partnerships. Three subdimensions scored over 70% as ‘Good’ or ‘Very good’; EDI scored only slightly over 50% as ‘Good’ or ‘Very good’. Because projects were reviewed by POs with processes in place for proposal assessment, the proposals included an ethics component that considered potential negative consequences of the award. The emphasis on partnership in the GCRF design showed an especially strong result, with 85% (113/132) of awards scoring ‘Good’ or ‘Very good’.

Basic science award scores were weaker in this dimension, due to the lab-based nature of much of the research. On the dimension of partnership, basic science awards scored well in terms of ongoing partnerships, as most awards were to existing partnerships. Some of these partnerships added new partners, and in many cases the continuation of the partnership would depend on new funding. In one case the partnership was seen as HIC only, and in one case no partnership was identified. Exceptionally, a basic science project in Uganda, which was investigating the production of biogas using water hyacinth, was strong on considerations of gender. The team saw great value in community engagement in the research, placing significant emphasis on gender inclusivity. A prime motivator behind the research was the benefits of a local energy source with regard to reducing travel (by women) in search of firewood.

Some awards did not contribute to equity in the research ecosystem. GCRF is intended to engage with HIC and LMIC researchers in partnership. As noted elsewhere, seven awards had no partners in LMIC countries. Most partnered awards were seen as reasonably strong on equity, with few exceptions.

What factors are driving good performance?

An important finding that cut across the sample was the importance of existing relationships and programmes of work to success within the GCRF awards. The relatively short duration of most awards meant that the researchers who had already worked together could move more quickly into the heart of their research question. Projects that formed part of a long-term research partnership, slated to continue with new funding after GCRF, also scored well.

Goodwill and relationship building played an important role. In almost all awards (barring some examples cited earlier), there was a strong interest and incentive in forging solid partnership and a will to work together. For example, one award programme that normally operated only in the UK moved half of its awards to be given in African institutions of higher education, as part of demonstrating its commitment to building a strong partnership and focus on local needs and interests. That programme intends to continue this practice, and the network that emerged, after the end of GCRF funding. In another award in Uganda, the UK partner university funded a one-year extension of the project so that the PI would have the time to work with Ugandan partners to support peer-reviewed publication of their work.

A further key factor in 'Good' or 'Very good' ratings on legitimacy was noted as being engagement with the relevant local community and integrating local views and knowledge into the award. A solid understanding of local contexts went hand in hand with the active engagement of local partners and the will for strong partnerships. Local understanding meant much more potential for carrying out research that could be used.

What factors emerged as barriers to good performance?

Some of GCRF's structures and processes were noted as inequitable by award holders. UK control of resources and decision making made it harder for LMIC researchers to participate equitably. The majority of PIs in the sample of 150 awards were UK-based, with

the exception of the FLAIR fellowship programme.[46] Of the 13 FLAIR awards in the sample, all had Africa-based PIs. UK institutions largely control and disburse finances and tend to lead on decision making and dispute resolution processes. The management of disputes in the UK puts LMIC partners at a disadvantage in terms of access as well as understanding of how to engage with the dispute process. That non-academic institutions could not be classified as partners in the same way as academic institutions tended to position them as second-class citizens.

Award holders noted these as unnecessary stumbling blocks in the development of a fair and equitable partnership. They would like to see more sharing of the control of resources than GCRF typically permits and less time devoted to the HIC partner to overcome the negative perceptions this left with partners in LMICs. This affects multiple subdimensions of legitimacy: it limits strength of partnership by giving more power to the UK partner; it also risks fairness in considerations of local knowledge and potential displacement of local priorities; finally, it negatively affects EDI by defining an unequal partnership from the start. It should be noted that most projects indicated they had addressed and overcome this deficit, but it was seen as a barrier.

Projects that rated poorly noted weak engagement with the LMIC partners and a poor understanding of local context. In contrast with the awards that were highly rated, poorly rated awards indicated limited involvement of the LMIC partners and a priority on HIC interests. HIC partners appeared to demonstrate low understanding of or interest in LMIC contexts.

Covid-19 made establishing new partnerships more challenging. It made it much harder to build new relationships, because face-to-face meetings became impossible. Most teams that were active during the pandemic struggled through this and were able to meet late in the research cycle. They intend to build outputs, both formal publications and informal outputs, beyond the time frame of the research funded by GCRF.

Spotlight on research legitimacy: locally embedded research for peace education in post-conflict settings

A research project conducted in Rwanda focused on the effectiveness of locally embedded humanities and social science research in supporting learners and teachers in post-conflict settings. It examined the role of peace education in promoting inclusive teaching pedagogy that bridges the gap between informal family-based discussions and formal/non-formal educational settings. The project emphasised the importance of incorporating Rwandan voices and locally embedded research in informing interventions, supporting education as a source of information, and promoting sustainable peace.

The project contributed to an empowering outcome by promoting gender equity within the research team, ensuring equitable Global South–North partnership, and amplifying Rwandan voices as leaders in the project. The team collaborated with the Aegis Trust,

[46] There is one other GCRF programme – the UKRI–ARUA (African Research Universities Alliance) programme – that directly funded Africa-based PIs; however, no awards from this programme were included in the sample, as the programme has not concluded.

adhering to the UKRI criteria of equal intellectual engagement and equitably distributed financial resources. The project demonstrated a commitment to gender equity and local leadership by including Rwandan researchers in key roles, facilitating their participation in workshops and supporting their publication efforts.

The research findings, led by Rwandan voices, resulted in a series of draft discussion papers, The Landscape of Peace Education in Rwanda, which explored challenges associated with peace education and emphasised the importance of gender-sensitive pedagogy. The project's empowering outcome was its significant contribution to education as an essential source of information for conflict prevention interventions, with Rwandan researchers taking the lead. Overall, the project underscores the crucial role of locally embedded research, equitable partnerships and the amplification of Rwandan voices in facilitating long-term positive impacts in post-conflict settings.

An area of general weakness across the awards was limited consideration of EDI.[47] Almost 45% (59/132) scored 'Less than acceptable' or 'Unacceptable' on this subdimension. This was particularly true for basic science awards. Just over 10% rated 'Very good' on this subdimension, and fully one-third of the sample rated as poor in achieving EDI. One-quarter of the awards gave consideration to gender (see 'Spotlight on research legitimacy' above) as one dimension of EDI but were silent on the other dimensions. There was some argument, with regard to lab-based projects, that they did not need to consider EDI, despite the fact that the ultimate application was intended to be in LMICs. A counterargument is that EDI is an important consideration for all types of research.[48]

This weakness is reflected in some other aspects of fairness – notably the extent to which benefits were shared equitably among researchers. LMIC researchers were significantly less likely to be lead author in formal publications. As has been noted previously, the bibliometric analysis of the sample analysed author information from publications associated with the sample and the degree to which these publications are associated with LMIC authorship. 1,043 publications were identified with the sample of 150 awards, involving 488 researchers from LMICs (around 17% of all collaborators) and 87 LMIC researchers as first authors (approximately 16.5% of all authors). Although this is much higher than the rate across the fund as a whole, this is nevertheless a very low rate for a fund which is founded on equitable partnerships and fair benefit sharing. More dedicated effort to promote LMIC authorship will be needed in the remaining term of the fund.

So what?

[47] EDI is used in the RQ++ assessment to understand how the research, in both its composition and its research, has considered the differential impacts on a range of often marginalised groups, and whether and to what extent it reflects the diversity of groups that may be affected by or benefit from the research.
[48] Hussain-Gambles, M, Atkin, K. and Leese, B. (2004) Why Ethnic Minority Groups are Under-Represented in Clinical Trials: A Review of the Literature. Health and Social Care in the Community 12(5): 382–88. Available at: https://doi.org/10.1111/j.1365-2524.2004.00507.x; Bodicoat, D.H., Routen, A.C., Willis, A. *et al.* (2021) Promoting Inclusion in Clinical Trials – a Rapid Review of the Literature and Recommendations for Action. Trials 22:880. Available at: https://doi.org/10.1186/s13063-021-05849-7

Projects that rated poorly on legitimacy tended to also rate poorly on positioning for use. Where the success factors noted above were absent, it is unsurprising that this is the case, but it gives insights that could be of value in selection processes.

The lack of consideration of EDI among the basic science awards is concerning. Basic science awards are usually excluded from RQ++ assessment because they are not designed for direct application, e.g. they are unlikely to include an external engagement strategy. However, even basic science awards should consider EDI in their design. Most of the research awards supported by GCRF would most likely have differential impacts and effects on men, women, people with disabilities and visible minorities. Without considering how evidence is gathered and the impacts it may have on different groups, there is a risk of increasing the disparity among groups in a society. In the study referenced above, Hussain-Gambles *et al.* note that people from ethnic minorities are frequently underrepresented in randomised control trials (RCTs). And in a recent review, Bodicoat *et al.* (2021)[49] reviewed the literature to understand why there continues to be a lack of inclusion in clinical trials in spite of policies in the US and UK (among other countries) among health research authorities to promote EDI, arguing very clearly that these are important in all clinical trials and other lab-based research, with the US National Institute on Minority Health and Health Disparities (NIH) noting: 'To account for the diverse lived experiences and exposures of various populations, clinical research should be appropriately **inclusive** of racial and ethnic minority groups, as well as other populations experiencing health disparities, including sexual and gender minority or socioeconomically disadvantaged populations.'[50]

Dimension 3: research importance

RQ++ dimension 3 definition: research importance

Research importance refers to the perceived importance of the knowledge and understanding that is intended by the research or innovation to the key intended users. It is defined in terms of the perceived relevance of research processes and products, the needs and priorities of potential users, and the contribution of the research to theory or practice. It is assessed through a consideration of both originality and relevance.

Summary of key points:

[49] Bodicoat, D.H., Routen, A.C., Willis, A. *et al.* (2021) Promoting Inclusion in Clinical Trials – a rapid review of the literature and recommendations for action. Trials 22:880. Available at: https://doi.org/10.1186/s13063-021-05849-7

[50] National Health Service (NHS) Health Research Authority (n.d.) 'Maximises inclusion, equity and diversity'. Available at https://www.hra.nhs.uk/planning-and-improving-research/best-practice/people-centred-clinical-research/maximises-inclusion-equity-and-diversity/; National Institute for Health and Care Research (NIHR) (2023) 'Equality, diversity and inclusion'. Available at: https://www.nihr.ac.uk/about-us/our-key-priorities/equality-diversity-and-inclusion/?ref=image; NIH (2023) 'Diversity and Inclusion in Clinical Trials'. Available at: https://www.nimhd.nih.gov/resources/understanding-health-disparities/diversity-and-inclusion-in-clinical-trials.html

The majority of awards demonstrated relevance, and almost all awards demonstrated some originality. Where awards scored well on originality, this stemmed either from new and emerging fields or from the application of the approach in a new setting. Basic science awards were strong on originality. Awards that performed well tended to operate in moderately stable operating contexts.

How did the sample of 150 awards perform?

Figure 22. RQ++ ratings for research importance

Research Importance					
	Unacceptable	Less than acceptable	Acceptable/Good	Very good	IIA
Originality	0	5	95	32	0
Relevance	0	1	50	81	0

Score prevalence
76 or more
61–75
46–60
31–45
16–30
15 or less

From the perspective of originality, 127/132 (96%) scored either 'Good' or 'Very good' on research importance; however, the others, while building on existing and unresolved problems (such as garment workers' rights, young people and mental health), also considered importance. This reflects, again, the strong selection processes followed by the POs. In terms of relevance, within the sample all awards (132/132) were linked to at least one SDG to which the findings would contribute, suggesting that at project inception, relevance to the SDGs is prioritised.

Basic science awards were strong on originality in a range of fields, such as removal of CO2, disease treatments, and eco-friendly construction materials based on local products. Only two of 25 basic science awards in the sample were identified as being in new fields of study, but 11 were identified as being in fields that were emerging, particularly in the LMIC contexts in which they were being applied.

Originality may stem from a new and emerging field or from the application of the approach in a new setting where it was previously unknown. Approximately half were working in new and emerging fields and half in an established or more mature field where tools or techniques were applied in a new context.

What factors are driving good performance?

Innovation and importance are not synonymous. Just over half of the most highly rated awards were working in established fields but were either addressing a long-standing challenge or bringing the field to new settings in LMICs.

The majority of the projects were operating in moderately stable operating environments. They faced minimal security challenges, although some challenges were experienced due to Covid-19. A small number of the high scorers were working in volatile environments with active security risks. These had relatively strong organisational contexts,

with the commitment and experience to manage in challenging situations. Only one project had both weak operating environment and weak organisational environment and was not successful overall; aside from a new and still weak organisation in the lead, in its countries of operation it was beset by multiple challenges, including civil war and natural disasters.

So what?

PO selection processes clearly considered research/innovation importance in award selections. This appears to have played an important role in the overall success of awards. Importance is found not only in tackling new, untouched issues but also in following up on the more intractable problems faced in development.

Relatively stable organisational and operating environments are important to success. Where one is weak, it is important that the other is relatively strong.

Dimension 4: positioning for use

RQ++ dimension 4 definition: positioning for use

Positioning for use is an assessment of the extent to which the research has been designed, carried out, managed and delivered in such a way that the probability of use and influence is enhanced. It considers how well the knowledge is accessible and shared and whether the evidence is timely and actionable.

Summary of key points:

Sampled awards have demonstrated good practice in positioning for use across a range of different contexts. A thorough analysis of context and stakeholder needs was common across awards that scored the best. Being part of a coherent and ongoing programme of work is associated with strong positioning for use. The best positioning for use also correlated with a broad range of non-formal research outputs. Basic science projects performed well if they were clearly inspired by a problem and use scenario and were then followed up with more applied research to test the original findings.

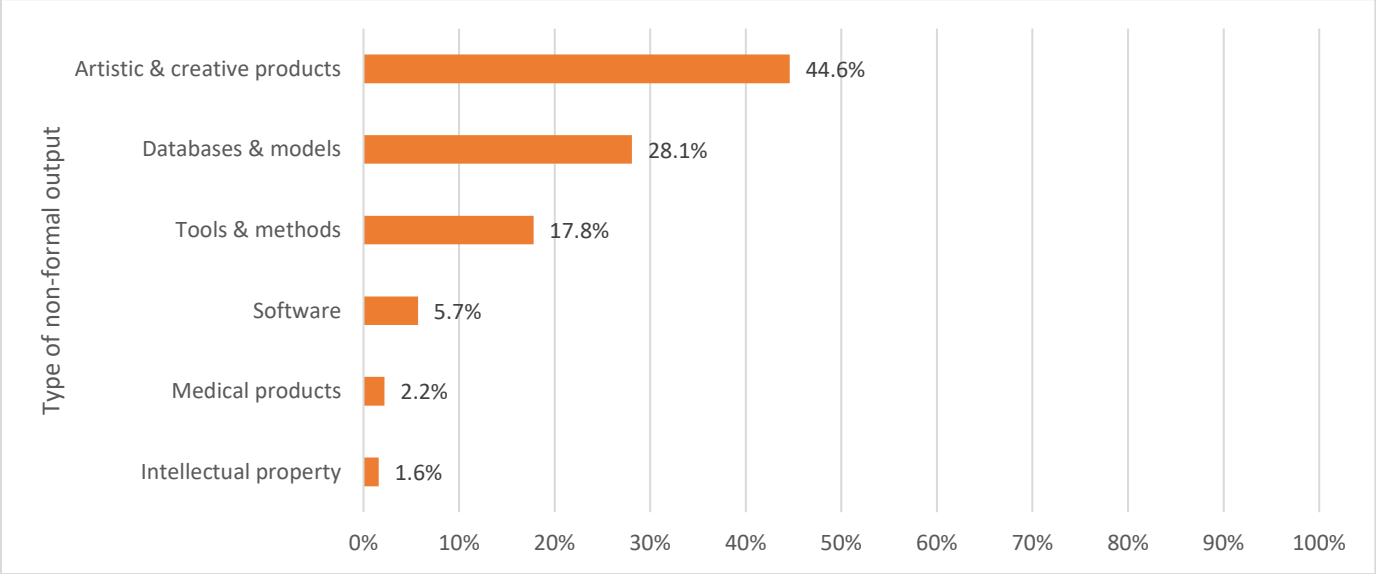
How did the GCRF portfolio perform as a whole?

Bibliometric data can be used to explore aspects of positioning for use. Here it is the associated publications, associated non-formal outputs and links to Open Access publications and data which serve as the primary indicators.

Looking across the awards from the GCRF portfolio, we see that just over one-fifth of the 3,304 awards reported non-publication outputs (21.9% – 724 awards out of 3304). These included a range of different outputs, such as (i) artistic and creative products, (ii) databases and models, (iii) intellectual property, (iv) medical products, (v) software and (vi) tools and methods.

The 724 awards were linked to 4,999 unique non-formal outputs. Figure 23 shows their distribution.

Figure 23. Distribution of non-formal outputs (n=4,999)



The extent to which the GCRF portfolio of awards is linked to Open Access publications was explored using four levels of Open Access (green, gold, hybrid and bronze).[51] Of the 11,589 publications that were able to be categorised in terms of their accessibility, only 12.6% of those were classified as 'closed'. The majority of GCRF awards were therefore Open Access.

How did the sample of 150 awards perform?

Figure 24. RQ++ ratings for positioning for use

Positioning for Use	Unacceptable	Less than acceptable	Acceptable/Good	Very good	IIA
Knowledge accessibility and sharing	1	8	52	60	11
Actionability and timeliness	1	8	75	32	16

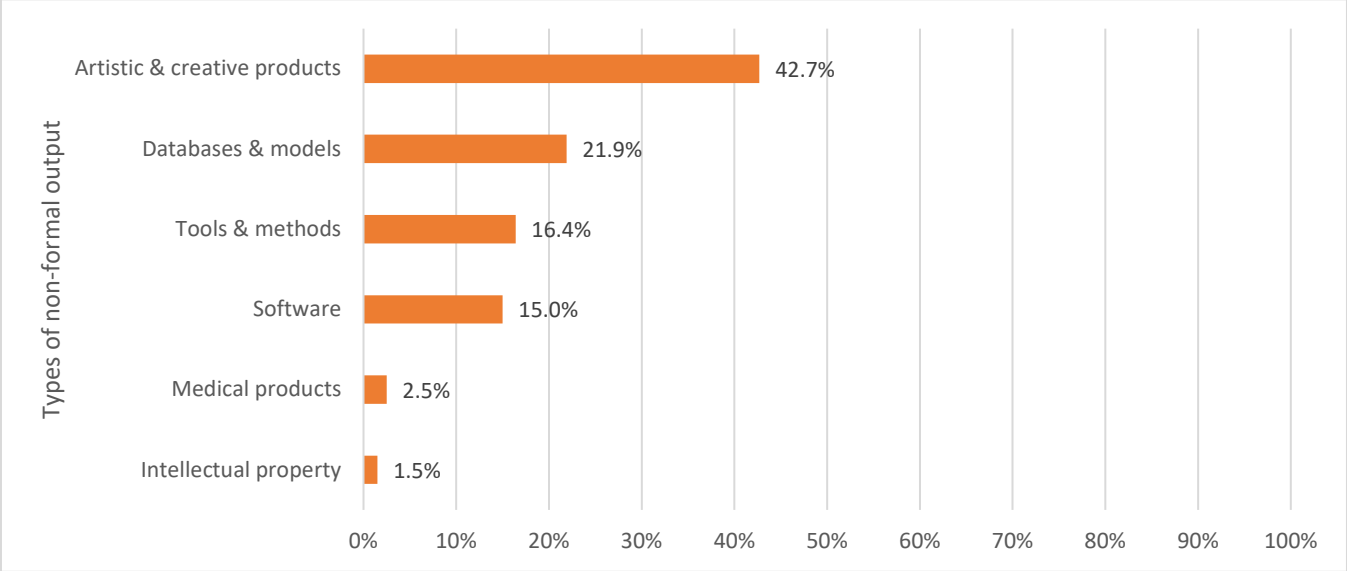
Score prevalence
76 or more
61–75
46–60
31–45
16–30
15 or less

Sampled awards have demonstrated good practice in positioning for use across a range of different contexts. Average scores were 6.2 and 6.1 for the two subdimensions of positioning for use. As illustrated in Figure 24, very few were rated as 'Less than acceptable' or

[51] Categorisation is based on unpaywall.org. Green articles are published in toll-access journals but archived in an Open Access archive, or 'repository'. These repositories may be discipline-specific (such as ArXiv) or institutional repositories operated by universities or other institutions. Green articles may be published versions or preprints, and can have any licence or no licence. Bronze articles are free to read on the publisher's website without a licence that grants any other rights. There may be a delay between publication and availability to read, and often articles can be removed unilaterally by the publisher. Hybrid articles are free to read at the time of publication, with an open licence. These are usually published in exchange for an article processing charge (APC). Gold articles have all the same characteristics as hybrid articles but are published in all Open Access journals, which are in turn called 'gold journals' or just 'OA journals'.

'Unacceptable' (9/132, or under 7%) in either subdimension. Even where awards faced more challenging operating environments, they were able to successfully position for use. For both the portfolio and the sample, the bibliometric findings confirm that GCRF awards are performing well on positioning for use through non-formal outputs. The award sample can be associated with a range of different outputs, such as (i) artistic and creative products, (ii) databases and models, (iii) intellectual property, (iv) medical products, (v) software and (vi) tools and methods. The sample of awards was linked to 274 unique non-formal outputs. Figure 25 shows their distribution.

Figure 25. Distribution of non-formal outputs across the sample (n=274)



Knowledge accessibility and sharing were achieved more successfully than actionability and timeliness; 60/132 (45%) were rated 'Very good' on knowledge accessibility and sharing, with an additional 52/132 (39%) rated as 'Good'; 32 (25%) were rated 'Very good' on actionability and timeliness, with an additional 75/132 (57%) rated as 'Good'. Awards were stronger at making the research accessible, but less strong at timeliness and actionability; that is, awards were better at communicating the research results, but less good at doing so in a timely manner. This is a common challenge in research, where research questions are asked at the time of need but the research takes time to carry out, and the moment can pass without the question being answered.

Fellowship awards with their focus on individual capacity strengthening for early career researchers (ECRs) did not score as well on the criterion of positioning for use. However, some fellowship awards in FLAIR did score well in positioning for use because of their focus. For example, one award, which was launched to investigate the link between biodiversity and ecosystem services and the related climate-induced impacts, was able to pivot from its original intent to contribute to a focus on climate change and infectious disease (Covid-19). To date, this fellowship award has produced 14 co-publications, has made contributions to the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report, and has been used in other studies that are leading to tools for conservation management. Smaller fellowship awards did not score as well, suggesting that positioning for use may require specific resources and support.

What factors are driving good performance?

A thorough analysis of context and stakeholder needs was common across awards that scored the best. Understanding the issues and sociopolitical contexts was important in the design, delivery and outputs of the research that was best positioned for use. This was combined with the flexibility to meet stakeholder needs as the project unfolded. In terms of basic science awards, those that were clearly inspired by use tended to score well, as their results were intended to directly inform broader bodies of work rather than being a priority to the quest for fundamental understanding.[52] For example, one study was part of the ongoing development of the 100 Million Cohort study in Brazil[53] for tracking and understanding demographic patterns in the country.

Being part of a coherent programme of work is associated with excellent positioning for use. Signature investments were overly represented among the programmes that were best at positioning for use. This suggests that the support from being part of a larger programme (intentionally designed to prioritise stakeholder engagement and use) and part of a cohort is important.

Awards that were strong on positioning for use reported a significant number of non-formal research outputs, such as games, theatre, music, policy inputs, diagnostic tools and research tools. Although Researchfish and GtR (the main sources of data on the set of awards) were limited in their coverage of non-formal publications, they did note non-formal outputs. Approximately 25 grants in the sample note non-formal outputs recorded in the bibliometric data, but more than 70 (74/150, or 49%, as against 20% reported in the databases across the whole of GCRF) reported non-formal outputs in the interviews and documents provided during assessment. For example, one project developed a toolkit on mental health to support prison workers in Guyana; another developed a tool for early warning of dengue outbreaks that has been built into national guidelines in Vietnam. Another award developed evaluation guidance for arts-based reconciliation projects that has been adopted by the United Nations Development Programme (UNDP); and theatre was used in one research project to reach a largely illiterate population in an area of Afghanistan. Awards received lower scores where outputs were poorly tailored to intended users or where they only mentioned peer-reviewed articles.

Spotlight on positioning for use: development research project focusing on non-academic outputs to meet user needs in Uganda

The Skills Acquisition Uganda project aimed to analyse whether volunteering by displaced persons in Uganda helped with skills acquisition and employability, with the goal of reducing inequalities experienced by displaced youth. The project mapped young volunteers, identified factors that shaped participation in volunteering, conceptualised relationships among forms of volunteering, and assessed the impact of volunteering by

[52] Stokes, D.E. (1997) Pasteur's Quadrant: Basic science and technological innovation. Washington, DC: Brookings Institution Press.
[53] Centre for Data and Knowledge Integration for Health (Cidacs). https://cidacs.bahia.fiocruz.br/en/plataforma/cohort-of-100-million-brazilians/

refugee youth on employability and achieving meaningful work. The project focused on producing outputs that would meet the needs of users rather than prioritising academic publications.

Based on survey data and focus groups, the research team designed two games to support conversations about youth volunteerism among the youth as well as their community settings. The games were well received by policymakers in Kampala and sparked considerable debate on policies surrounding displaced youth and volunteerism. The lack of research in the area of volunteerism and youth employment in refugee communities makes this project highly relevant. The project results contribute to the SDG on employment. The results are presented in accessible language on the project website, and there is clear intent for actionability. The partners remain actively engaged in follow-on to publish the results of the research in peer-reviewed journals to complement the non-peer review publications already available. The project deliberately worked with two lesser-known universities in Uganda to expand the pool of qualified researchers with experience in this area of research. The engagement of Ugandan young refugees as advisory board members and researchers in both the non-academic and academic outputs was central, as was ensuring recognition of them for their efforts. Overall, the project produced strong outputs focused on community development, with originality in ensuring that results are presented in ways that are accessible to the community of interest.

So what?

Strong connections with the context within which the research is taking place, and the ability to connect effectively with the potential users of the research in a language and style that meets their needs, appear to be central to the effective positioning of research for use.

Related to this, although formal peer-reviewed publications remain important for validation and advancing knowledge, other forms of evidence sharing are essential to meet the needs of different audiences, e.g. policy papers looking at how the evidence can shape policy, guidelines for use of a product or approach, street theatre to share evidence with a broader audience, or games that stimulate a debate or discussion with a stakeholder group.

Positioning for use may sometimes require anticipation of problems before they emerge in order that sufficient time is available to conduct the research. This calls for taking the risk of allocating resources to address anticipated issues which may or may not emerge.

In assessment it is important to be clear on the purpose of the investment. A fellowship that does not conduct problem-driven research to address a particular problem may still be positioned for use if it produces researchers who use the capabilities they acquired to engage in problem-driven research in the future.

Dimension 5: research and innovation results

R&I results are identified against the four result areas from GCRF's ToC:

- high-quality interdisciplinary R&I, positioned for use
- sustainable partnerships across geographies and disciplines
- enhanced, challenge-oriented capabilities
- stakeholder networks for use.

'Results' is an added dimension of RQ+, and this is the first time it has been integrated into a set of assessments. Adding the results analysis has been found to be important in helping to identify what works in partnered research that involves both UK and LMIC researchers and their institutions. That said, not all awards in the sample had been closed, so results remain partial in 2023. Additional results can be expected in 2024 and 2025.

We discuss each GCRF results area in turn in the following subsections. We first discuss what has been achieved in the specific result area and then explore the factors associated with higher-scoring and lower-scoring awards.

High-quality research, interdisciplinary research and innovation, positioned for use

RQ++ dimension 5 definition: high-quality R&I

High-quality interdisciplinary research and cross-sectoral innovation provide new insights and knowledge for translation into policies, practice, products and services. High quality is determined largely by an assessment of the first four dimensions of RQ++, together with evidence of emerging and actual results. R&I that has been designed, delivered and promoted in ways that help address key development challenges is considered to be high-quality research. Interdisciplinarity is promoted because most development challenges are not monodisciplinary in nature and solution. Some exceptions may apply, but these should be clearly identified and justified.

Summary:

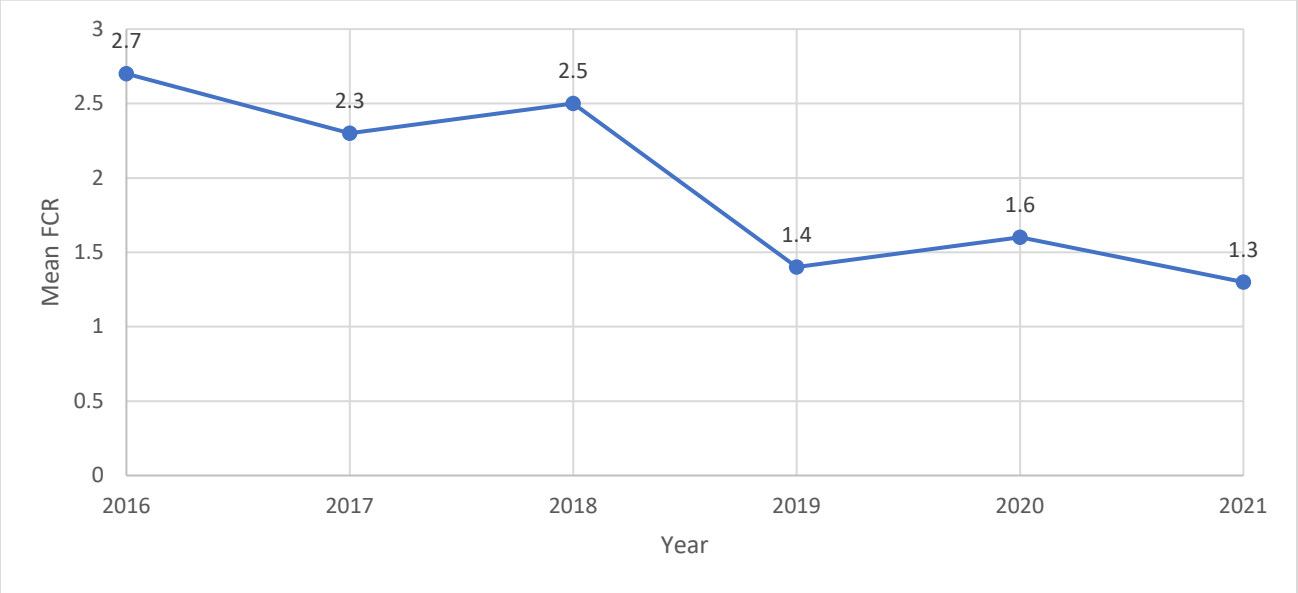
Overall quality in the awards is considered to be 'Good' to 'Very good', putting the awards on track towards their long-term outcomes. The bibliometric analysis shows examples of very high-scoring publications when looking at bibliometric indicators of high-quality research. Interdisciplinarity was very high across the sample, evidenced through the numbers of fields and experts brought together within awards. New datasets were often created in new and emerging fields; some awards contributed to expand existing datasets to new countries. Non-traditional outputs played an important role in many initiatives. Datasets contributed to policymaking processes, and continue to do so. Some awards did not contribute to equity in the research ecosystem.

What has the GCRF portfolio as a whole achieved in this result area?

Bibliometric data can be used to explore the extent to which there is high-quality research. Here, the FCR and HCPs serve as the primary indicators. FCR is a citation-based measure of scientific influence of one or more articles, calculated by dividing the number of citations an article has received by the average number received by articles published in the same year and in the same FoR category.[54] An FCR value of more than 1.0 shows that the publication has a higher-than-average number of citations. HCPs are those which rank in the top 1% per year within the same FoR.

The average FCR per year was calculated for 12,321 publications associated with GCRF awards. Looking across the awards, we see that across the years 2016–21 the mean FCR was above 1, indicating that the publications associated with those awards have a higher-than-average number of citations compared to what would be expected (Figure 26).[55] 147 awards had HCPs (with 399 publications).

Figure 26. Mean Field Citation Ratio across years 2016–21 (n=12,321)



Looking across the GCRF portfolio, awards were associated with a wide range of FoRs. The top three FoR associations for awards included Development Studies (792 awards), Clinical Sciences (215 awards) and Public Health (213 awards). To gain a picture of interdisciplinarity of the awards, we can look at where awards are associated with multiple FoR groups. From this we can see that some FoR groups typically occur together (see Table 2).

Table 2. The top five FoR groups associated with one another across the GCRF portfolio

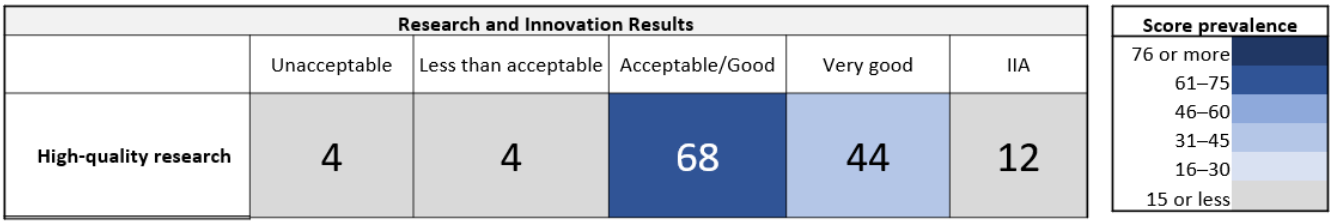
Field of Research A	Field of Research B	Number of Awards
Clinical Sciences	Medical Microbiology	137

[54] https://dimensions.freshdesk.com/support/solutions/articles/23000018848-what-is-the-fcr-how-is-it-calculated-
[55] Note that 'year' refers to the start year of the award, not the publication year.

Environmental Management	International and Comparative Law	43
Education Policy, Sociology and Philosophy	Education Systems	41
Health Services and Systems	Public Health	33
Reproductive Medicine	Public Health	30

What has the sample of 150 awards achieved in this result area?

Figure 27. RQ++ scores for high-quality research results



GCRF-funded research is delivering some highly credible research and, importantly, does so alongside delivering development results. Only 8/132 awards (6%) have scored 'Less than acceptable' or 'Unacceptable'. Overall scores in the first four dimensions are good, and are reflected in the products intended and produced in the body of GCRF awards. Publication in peer-reviewed journals is one indicator of quality as assessed by peers. Looking at the sample of awards, we see examples of very high-scoring publications when looking at bibliometric indicators of high-quality research. We see that within the sample, the top 10 articles have an FCR of between 84.49 and 589.58, with the top three articles having very high values: 589.58, 428.33 and 264.44. In addition, when looking at HCPs within the sample we find 23 publications within the top 1% of their year within an FoR. Together these results suggest that awards within GCRF are producing high-quality peer-reviewed work.

Creating new or expanded datasets was an important achievement across a number of awards. This widened access to data in LMICs and increased the availability of data in new and emerging fields. In some instances where data was not available, the projects were able to create datasets that could be used on an ongoing basis in the participating countries. For example, datasets collected on mHealth technology in Nigeria, Uganda and Zimbabwe expand on global data with the development of country-specific foci. Half of the new datasets (9/18) were created in new and emerging fields of study, adding importantly to the data available for further study in these new fields. Importantly, more than half of these (5/9) were created by basic science grants, demonstrating an unexpected value-add of basic science awards.

Datasets contributed to policymaking processes, and continue to do so. As a result of some awards, the datasets continue to be used by policymakers, such as around flood

monitoring in Mexico and mathematical modelling of schistosomiasis in Uganda in use in the Ministry of Health.

Non-traditional outputs played an important role in many initiatives. According to the bibliometric data review, 20 awards (13% of the sample) have, to date, produced non-traditional outputs, many of which have been used successfully. However, the RQ++ assessment noted non-traditional outputs associated with 74 awards (49%) in GCRF. Awards that are still ongoing may produce others. These include: visual arts and exhibitions (using photovoice to document evidence); using theatre to raise awareness of an issue in a community; games developed based on survey data to stimulate debate in an affected community as well as among relevant policymakers; other policy inputs and tools for analysis and diagnosis; commercial innovations.

Spotlight on interdisciplinarity: Indigenous wells and biocultural heritage in northern Kenya and southern Ethiopia

This collaborative research project between archaeologists and pastoralist community organisations investigates the long-term history of Indigenous water management and well digging in northern Kenya and southern Ethiopia. The project aims to provide comparative archaeological evidence on the cultural histories of wells and water management, train researchers from pastoralist communities in community archaeology and cultural heritage management, build a network of community researchers and academics, and ensure cultural heritage registration and safeguarding policy compliance.

The research team combined archaeology, social sciences, geoarchaeological science and community-based approaches to align with GCRF priorities. The multidisciplinary team of archaeologists, geographic information systems specialists, historians, museum specialists, community members, anthropologists and artists worked together using a co-creation approach. This enabled Africa-based scholars to take a critical leadership role in the project, co-designing and executing it with community-determined values, procedures and priorities.

The project trained community members in the principles and practices of community archaeology and helped communities understand their cultural heritage, enabling them to negotiate the changing environment and development projects in the region. The project has awakened communities' sense of rights to resources in communal lands and has enhanced engagement with county and national governments in development projects and policy formulation processes.

The project's findings were shared widely through conferences, publications, exhibitions, and data repositories accessible to researchers worldwide. The research has collected both archaeological and ethnographic data, enhancing the National Museums of Kenya's capacity in terms of records and site identification. The project has had a visible impact on the communities of northern Kenya, who are now more aware of the government development agendas and their rights to resources in communal lands.

What factors are driving good performance?

Interdisciplinarity was a core feature of the majority of awards, including basic science awards. A majority of awards brought together fields and researchers who had not worked together in the past. The qualitative analysis showed that for 85 sampled awards where it was possible to distinguish different disciplines, nine involved two or more disciplines, 28 involved four or more, and 13 involved five or more. One award in the sample involved experts from 15 distinct disciplines. The highest-scoring awards combined between four and nine disciplines.

For example, a network supported by two POs brought together biotechnology, social sciences and commercial technology providers to drive innovation in water, sanitation and health around sustainable water solutions in Africa. By working with communities, they have developed solutions which are now being shared and implemented more broadly. To date they have produced 20 blogs, 21 research papers and 19 other outputs, including new tools and methods for building sustainable water solutions for use in remote settings. Another project has bought together engineering, chemistry, psychology and law to develop and assess low-cost technologies for safe drinking water in Latin America. The team worked with local communities. Results are presented in 50 publications (primarily peer-reviewed). The project delivered tools and resources to support long-term sustainability through community-based household water treatment and safe supplies, together with capacity building with local non-governmental organisations (NGOs) on maintenance of these systems. Interdisciplinarity appears to have been an important factor in success because of the systems perspective this brought to what was often a system change problem, such as perspectives on prisons in a country. In many cases this was the first effort to work across disciplines. Interdisciplinarity is positively correlated with research that rates highly for importance, positioning for use and capacity building.

Publications alone do not reflect the extent of interdisciplinarity. Perhaps because of the disciplinary nature of most journals, the data science fully captures only a portion of the interdisciplinary awards and only some of the disciplines that are relevant to the journal in which they are published. The qualitative assessment identified a much wider range of interdisciplinarity; of 112 reporting interdisciplinary status in documentation and interviews, the median was four disciplines and the mode was three. Only four reported one discipline. As many as 15 disciplines were reported in one project, but the most common was three (30 awards), followed by four (reported in 26 awards) and five (17 awards).

Rigorous selection methods contributed to the high rate of high-quality awards, although these were focused more on scientific rigour than other dimensions, such as equity. The POs were experienced in research proposal assessment, and they applied their processes with adjustments for the specifics of the GCRF programme. However, generally there was still more emphasis in selection on scientific rigour than on the other dimensions important for ODA research, and this is reflected in the lower scores seen in, for example, EDI.

Awareness of the needs and interests of key stakeholders was paramount. Consistently across the dimensions of RQ++, awards that have taken community into account, and have

explored and understood the context in which they are working, score better than those that do not do these things.

Tailoring outputs to the needs and interests of potential users makes a positive difference. Awards that took time to understand the needs and expectations of their intended groups of users scored more highly. This applied across different types of user group – researchers with a need for better or more complete datasets, policymakers with a need for evidence to understand the implications of policy choices, and communities with a need to understand how evidence is relevant to their lives.

Sustainable partnerships across geographies and disciplines

RQ++ dimension 5 definition: sustainable partnerships

Partnerships are important to addressing global challenges because of the differential impact of challenges on different countries and regions. Respectful partnering promotes a deeper understanding of the challenge and its differential impacts, creating a foundation for equitable responses. As challenges are usually not monodisciplinary it is expected that, in most cases, the response will call for interdisciplinary collaboration. Challenges frequently extend beyond the life of a single funding cycle, so partnerships are expected to sustain over time. Sustainability explores the likelihood of the work continuing beyond the life of the award, alignment of interests and purposes among partners, clear value to all parties, operating principles and infrastructure of interaction, communication, and technical collaboration.

Summary:

Partnerships frequently built on ongoing relationships and have been successfully developed in most projects that intended to do so. Interdisciplinarity is important to successful partnerships. Hubs and other large partnerships were very successful. Some partnerships have successfully integrated new partners into the group.

What has the GCRF portfolio as a whole achieved in this result area?

Using the list of co-authors associated with GCRF publications, we looked at the degree to which there were pre-existing relationships within the authorship, and then also at where these relationships were sustained.[56] In terms of pre-existing relationships, there were 896 awards for which at least two of the authors from the resulting publications had collaborated on a prior publication.

What has the sample of 150 awards achieved in this result area?

[56] Note that we can only look at publications with up to 10 authors for the analysis. This is because where publications have more than 10 authors, subgroups might be formed, which makes the analysis more difficult.

Figure 28. RQ++ scores for sustainable partnerships results

Research and Innovation Results					
	Unacceptable	Less than acceptable	Acceptable/Good	Very good	IIA
Sustainable partnerships	2	10	54	55	11

Score prevalence
76 or more
61–75
46–60
31–45
16–30
15 or less

Partnerships have been developed successfully in most projects that intended to do so. A small number of projects did not intend to develop partnerships, as they were fellowships that were largely about supporting individual Fellows. More than 100 partnerships were successfully developed. 63 of those have already obtained funding to continue the partnership, and 45 are seeking additional funding as they want to continue. In an exception, where a patent is held in the UK, only the HIC partners remain involved; the African partner was engaged primarily as an information provider, not a partner. In two cases where the partnership continues, it continues with the local implementation partners but the academic partner is no longer involved. In one case, work on labour law remains active with the local trade union and the UK partner. In one case, the partnership shifted from Mexico to Hong Kong for the next phase of work. In Mexico, the government was actively engaged in the work on flood risk monitoring and has integrated it into flood management on one river; Hong Kong saw it as having potential there and works with the HIC partner on adaptation to their setting. The GCRF promotion of partnerships to achieve R4D goals appears to be making an important contribution.

Partnership takes many forms. One partnership continued through affiliation of the researcher from the LMIC country with the UK university. As outlined above, some have continued but have not included the academic partner. In still others, the innovation behind the partnership has attracted interest from another country that has either joined or taken over the partnership. Some follow-on activity is new research and some has been created from the results of the research, such as a team that has the funds now to develop a game on slavery, based on their research, as a device for awareness raising and policy influence. When looking at post-award partnerships, there were 992 awards for which at least two of the authors collaborated further on at least one publication.

What are the factors driving good performance in this result area?

Partnerships that built on existing relationships were more likely to perform well and obtain further funding. They were better able to integrate new partners into the research team. A significant proportion of the partnerships built on existing partnerships and relationships. This held both among those that have achieved new funding and those that are optimistic about the likelihood of obtaining further funding. This was also true of basic science awards. 36 award holders noted the ongoing nature of the partnership as a key to success. Of these partnerships, seven have successfully integrated new partners into the group. A number of research areas outlast the funding of one research area and build on what the team has already done.

Hubs and other large partnerships were very successful. The Hubs devoted time and resources to developing strong team relationships and to establishing processes to support equitable partnerships. One Hub developed 34 new funded partnerships. Another large award on youth employment and entrepreneurship developed regional Hubs that continue to drive efforts to engage more youth in productive employment.

Engagement of the local community of interest is often a key characteristic. The involvement of the local users has been important, not only in defining the problem but also in terms of design and implementation. For example, in one project on rice cultivation in Vietnam the original intention was to leverage additional flooding to enhance production. However, through the community's engagement in the design and assessment, it was recognised that the negative consequences for the community outweighed any possible benefit to rice production.

Clarity in roles and relationships was a further enabling factor, whether through regular informal communication or formal partnership agreements. Memoranda of Understanding (MOUs) can be an important device to support partnerships. One interview noted the importance of an MOU in partnership design and delivery in maintaining clarity on roles and relationships.

Interdisciplinarity plays an important role. As noted elsewhere in this report, development problems are multidisciplinary, and so addressing them is aided by an interdisciplinary approach. Many of the successful partnerships built on this.

What factors emerged as barriers to good performance in this result area?

Political upheaval was associated with risks to partnership. In spite of political upheaval in several regions that has limited the possibility for active research, it was not a barrier for all; for example, one project group continues to engage in joint writing based on their research already conducted.

In addition, as previously noted in the research legitimacy findings, structural barriers in the administration of GCRF placed more control and leadership in the hands of UK partners.

Enhanced challenge-oriented capabilities established in the UK and LMIC partner countries

RQ++ dimension 5 definition: enhanced challenge-oriented capabilities
Individual and institutional capabilities to address challenge-oriented problems call for capacities to work in respectful partnerships across countries and disciplines; they also call for infrastructures that support equitable and fair partnership, and for partnerships that share decision making as well as action. These include administrative and decision systems (management, decision making, fund raising, financial

management and fairness, and technological and information management systems) as well as communications that are equitable and fair.

Summary:

High-scoring awards have, in the main, approached capacity strengthening as a specific objective and strategy. Capacity building of many types, as both technical and research management capabilities, figured in the majority of GCRF awards. The high-scoring awards also show that capabilities were built in the UK as well as in LMICs. Lower-scoring awards typically took a less intentional approach to capacity strengthening. In high-scoring awards, raising the capacity of LMIC-based researchers to publish was extremely important. New laboratories and other facilities have been built to strengthen research infrastructures. There are examples of capacity strengthening and network capacities between community organisations, NGOs, commercial and academic organisations, as well as with policymakers in support of the application of findings.

What has the GCRF portfolio as a whole achieved in this result area?

Bibliometric data can be used to explore the degree to which there is centrality of LMIC partners within the co-author networks of GCRF publications. We created a co-authorship network of publications from the GCRF portfolio and calculated the eigenvector centrality of researchers (higher values meaning that researchers are more central). On average, researchers from HICs were 23 times more central than the researchers from LMICs. This implies that they are more likely to be lead authors and more likely to publish more publications.

What has the sample of 150 awards achieved in this result area?

Figure 29. RQ++ scores for enhanced capabilities results

Research and Innovation Results					
	Unacceptable	Less than acceptable	Acceptable/Good	Very good	IIA
Enhanced capabilities	1	15	69	34	13

Score prevalence
76 or more
61–75
46–60
31–45
16–30
15 or less

Overall, there has been good performance on enhanced capabilities for challenge-oriented research across the sample, with similar results between basic science and other awards. Overall, the sample has performed well against this result area, with 34 awards scoring the highest rating (‘Very good’) and 69 scoring ‘Acceptable/Good’ (78% ‘Good’ or ‘Very good’). One award was rated as ‘Unacceptable’ and 15 awards (12% combined) were rated as ‘Less than acceptable’. Awards from the FLAIR fellowship programme – the only signature programme to mandate LMIC leadership and award funding directly to LMIC researchers – performed excellently across RQ++ dimensions, following through to good performance in

terms of enhanced capabilities. The value of support to ECRs may not be fully realised immediately but will influence the trajectory of many careers.

There were some awards (13/132) where it was not possible to assess capacity strengthening, due to delays in their completion or where issues arising from Covid-19 and budget reductions had cut short capacity building efforts.

For ECRs, training and experiential learning have focused mainly on high-end technical skills and network development, as well as skills in academic writing, writing for grant proposals and mobilising further funding. Important experience in international research grant management was also mentioned for ECRs. For example, in one partnership, led by an African university, the goal was to strengthen the research space for civil engineering in Africa through academy–industry partnerships. In a pan-African initiative, they successfully introduced a practical component to engineering education that benefits both the universities and industry. The network intends to continue post-GCRF.

FLAIR supports ECRs in Africa to build leadership skills in research to build research careers in African institutions. Some of the 13 FLAIR awards in our sample have already been discussed around their specific contributions, but an important assumption behind FLAIR is the importance of building African research capacity for the long term. This will take time to manifest but is already signalled in some awards, such as one (highlighted earlier – see 'Dimension 4: positioning for use') on the contributions made to the IPCC. Nine of the 13 projects were classed as basic science projects. Because of the laboratory nature of much of the work and because of the costs of research equipment associated with basic science research, they were particularly affected by both the ODA budget cuts and the Covid-19 pandemic. One partnership in Nigeria expressed limited confidence that the partnership would continue, attributing this in part to limited relationship development due to Covid-19. Others had to scale back their plans to adjust to the budget cuts and limits imposed by the pandemic; that said, there is strong interest in continuing the partnerships.

In terms of EDI, many laboratory-based projects did not consider it, which is concerning (as argued earlier). However, one laboratory-based innovation was focused explicitly on the supply of drinking water for people in rural and remote communities. In addition to the device for water purification, the team unexpectedly worked with a local engineering services company to co-develop a power supply. The Fellow was appointed as an International Committee member to the International Conference on Science and Sustainable Development in 2022 – early recognition of his leadership potential.

LMIC researchers have gained technical skills in specific methods, data collection and analysis techniques and working with datasets, as well as soft skills in terms of stakeholder engagement and network development. Raising the capacity of LMIC researchers to publish was extremely important. According to Amarante *et al.*, just 16% of articles in development journals were authored by researchers based in LMICs in the period 1990–2019.[57] This is in line with the proportions observed for the sample, although it is higher than for GCRF as a

[57] Amarante, V. Burger, R., Chelwa, G. *et al.* (2022) Underrepresentation of Developing Country Researchers in Development Research. Applied Economics Letters 29(17): 1659–64.

whole. A large number of projects noted the contribution of LMIC authors to their publication record. For example, one project received a follow-on grant from the UK university so that the necessary time for publication by LMIC authors was covered. Another raised the publication rate of Africans on the Rwandan genocide, resulting in 25 published articles by African authors, as compared with only 13 by African researchers over the past 25 years.

Spotlight on enhanced capabilities: African Career Accelerator: developing high-level training and mentorship for African scientists

The African Career Accelerator project, also known as the Crick Africa Network, was initiated to empower outstanding African scientists and address the knowledge, skills and research facility shortages in Africa. By fostering collaboration and engagement among research institutes in South Africa, The Gambia, Ghana and Uganda, the project aimed to intensively develop the careers of highly talented African researchers through targeted training and mentorship, thus nurturing a new generation of leaders at key African research institutions. The project demonstrated resilience and adaptability amid challenges such as the Covid-19 pandemic, and it also emphasised capacity strengthening for researchers and institutions, focusing on poverty and health in Africa.

The project's empowering outcomes were achieved by engaging African researchers, facilitating the integration of their findings into recommendations and guidance, and enabling high-quality research contributions. Interdisciplinary research flourished, as did partnerships and collaborations established through the network. Additionally, the project's design considered sustainability, with commitments to continue supporting the Fellows in their home institutions and links to funding programmes, ensuring ongoing progress.

As a result of the African Career Accelerator project, Fellows achieved significant milestones, including publishing 59 papers, establishing a biotech startup and carrying out the first human genome sequencing in Africa. It has also led to Fellows returning to Africa from the UK and assuming leadership positions in health policy at their institutions. The project's success in empowering African scientists through intensive training and mentorship has led to increased research capacity, interdisciplinary collaboration and impactful research outputs. Ultimately, the project has laid a strong foundation for sustainable advancements in health research across Africa, benefiting both the scientific community and the broader population.

The higher-scoring awards also show that capabilities were built in the UK as well as in LMICs. In the UK, strengthening of capacities to work across cultures, in specific contexts, with specific vulnerable groups and marginalised communities in LMICs was highlighted. Interdisciplinary working in international consortia was also highlighted as an important mutual capacity among the high-scoring awards.

Although the focus in the sampled awards was mainly on individual capacities, there are examples of organisational and group capacities being supported. Among the higher-scoring awards, there are examples of institutional research and grant management capacities

being improved at LMIC partners, including ethics oversight, supporting ECRs and financial management in international consortia. There are also examples of specific institutional technical capacities, methods, tools and instruments, e.g. monitoring flood risks in Mexican, South African and Nigerian institutions, and a new labour law research unit in Mauritius. New laboratories and other facilities have been built to strengthen research infrastructures, and new datasets to support future research have been created; these are shared with other institutions. New research groups have been formed, e.g. in South Africa, with new postgraduate and undergraduate teaching. One project chose to work with lesser-known institutions in Uganda to expand the pool of qualified researchers; these researchers are now publishing more papers than before.

What are the factors driving good performance in this result area?

High-scoring awards have, in the main, approached capacity strengthening as a specific objective and strategy and have seen good results from investing time and effort into it. The primary focus has been on ECRs in the UK and LMICs in the majority of cases, but it has also extended to building local community capacities to sustain the benefits of awards.

An intentional approach to capacity strengthening led to more positive results. Lower-scoring awards typically took a less intentional approach to capacity strengthening, with less positive results and some missed opportunities. On the whole, lower-scoring awards ('Less than acceptable'/'Unacceptable') did not approach capacity strengthening as a priority or have an explicit strategy. Skills and knowledge among ECRs did happen through learning by doing or through informal learning, but there was less evidence of mutual capacity strengthening. In fact, there were three examples where the LMIC partners were involved mainly in data collection and not higher-level design or analysis, and so they had limited opportunities to enhance their capabilities.

Size of award and duration of award are only slightly associated with higher-scoring awards in this dimension, suggesting that awards of a range of sizes can promote capacity enhancement effectively. The high scorers were slightly more clustered around the high to highest quintile. The higher-scoring projects tended to be 2–5 years in duration, and the lowest scorers tended to be 1.5–3 years; but the pattern is not strong here. However, it does suggest that higher-value awards may have had more resources and time to give strategic attention to strengthening capacities than shorter, smaller awards. One strategy used by higher-scoring projects (around 22% of the sample) was to work with lesser-known universities rather than the main well-known universities in a country, in order to strengthen the research base across more institutions.

Awards from signature investments had a strong focus on capacity development, which is reflected in higher scores in this result area. Signature investments were well represented in the high and good scorers on enhanced capabilities. Only one signature investment received a low score, which was due to Covid-19 disrupting the specific activities. Signature investments had good ratings for mutuality in partnerships and fairness, which were associated with higher scores for enhanced capabilities (see next points), but these were in line with scores across the sample as a whole.

Basic science awards scored broadly in line with expectations on enhanced capacities – more of a focus on researcher capacities than on application capacities among wider groups of stakeholders – with some notable exceptions. 32 awards were basic science, which would not normally be included in an RQ+ assessment, as they are not designed to be use-oriented. Nevertheless, nine of 32 basic science awards in the sample scored highly and may be classified as 'use-inspired basic research',[58] due to projects being conducted as collaborations with LMIC researchers and involving strengthening capacities among user-side stakeholders as well as among researchers. Others were concerned mainly with capacity results that involved enhanced capacities of post-doctorate researchers and ECRs in techniques and also in grant administration and proposal writing. This is in line with expectations for basic science awards, where the emphasis is on enhancing capacities of researchers to develop the next stage of the basic science. Only three of the high scorers contributed to capacities to a wider range of stakeholders within user-side institutions and agencies.

Research legitimacy is an important differentiator, confirming the association between good performance in mutuality and fairness in partnerships and good results in terms of enhanced capabilities. High ratings for mutuality in partnerships and fairness are positively associated with high scores for enhanced capabilities. Generally, high scorers for enhanced capabilities also had 'Very good' or 'Good' ratings for mutuality in partnerships and fairness. As scores dropped for capabilities, they also dropped for mutuality in partnerships and fairness. Fairness was slightly less well rated overall than mutuality in partnerships. This positive relationship is anticipated by the findings of the earlier stages of the evaluation, which found equitable partnerships to be a strength in GCRF awards, and also found that equity in partnerships often incorporated a dimension of mutual capacity development.

Fairness in the design and implementation of projects and in sharing of benefits is less embedded in GCRF awards but is still an important dimension. However, EDI ratings did not relate clearly to good scores in this result area. These findings suggest that it is worthwhile to invest the resources, time and effort to establish truly equitable partnerships that prioritise mutual capacity development, as this is associated with good performance in terms of enhanced, and potentially durable, capabilities in LMICs and the UK.

Positioning for use ratings are positively associated with high scores for enhanced capability results. This suggests that these relationships are not linear but are mutually reinforcing. High scores for enhanced capabilities are strongly aligned with high scores for knowledge accessibility and sharing and for additionality and timeliness. The nine awards with the highest scores for enhanced capabilities also received majority 'Very good' scores for positioning for use. As scores dropped for capability results, they also dropped for this dimension. The association suggests that a strategic focus on capacity strengthening is merited, as it builds an important pathway to impact.

Enhancing research and publication capacities in LMICs has the potential to improve LMIC researchers' contributions in future, enhancing their presence and prestige in the

[58] Stokes, D.E. (1997) Pasteur's Quadrant: Basic science and technological innovation. Washington, DC: Brookings Institution Press.

research community while simultaneously ensuring strong consideration of the contexts in which they live as central to the research.

Stakeholder networks for use established across research, policy, practice civil society and business

RQ++ dimension 5 definition: stakeholder networks for use

Stakeholder networks for use or replication are established across research, policy, practice, civil society and enterprise in partner countries internationally and in the UK. Use of findings is the goal of challenge-oriented R&I. The global or multinational nature of development challenges calls for networks to promote and support use. Networks will include stakeholders together with researchers or innovators, who are engaged in promoting and advocating for use. Networks rise and fall according to need, and network membership changes over time.

Summary:

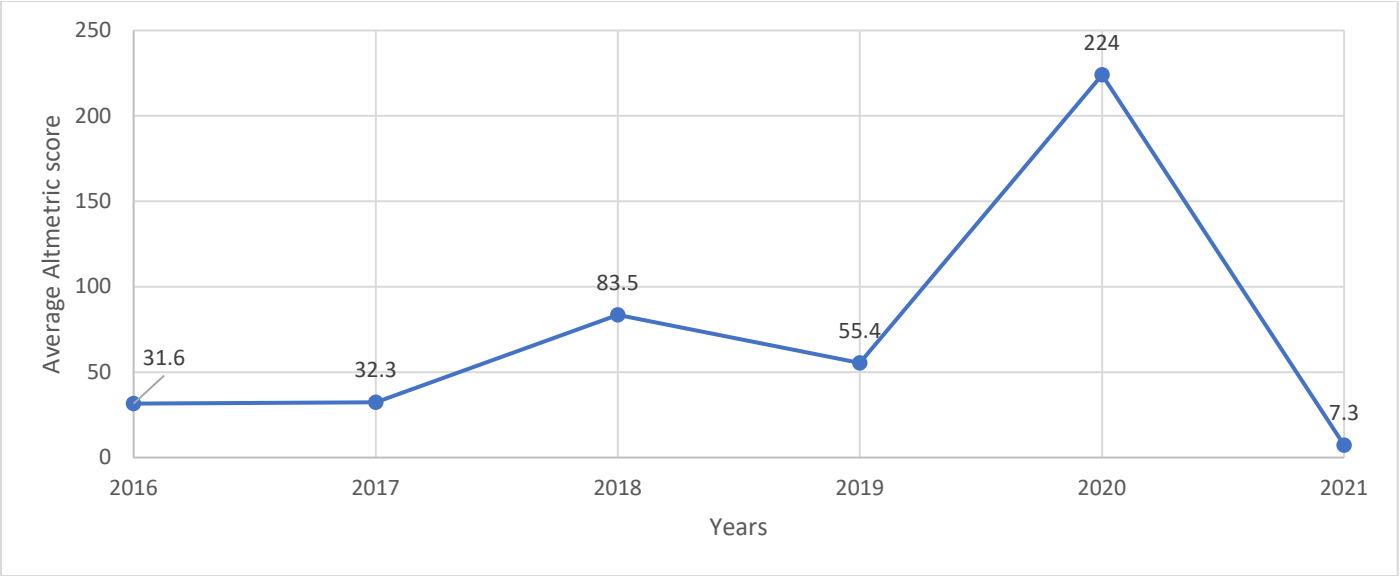
Networks have been established in over one-third of the awards. As networks take time to develop, however, it is too early for many awards to have created networks. Networks played an important role in applying innovations as well as influencing policy.

What has the GCRF portfolio achieved as a whole in this result area?

Bibliometric data can be used to explore the extent to which research outputs have achieved attention, providing a proxy for engagement across a network. However, the data is fragmented across different possible indicators and sources, and does not provide a holistic view of engagement. We have therefore used different indicators as proxies to indicate the patterns associated with stakeholder engagement and network creation. The Altmetric Attention Score for a research output provides an indicator of the amount of attention (social and traditional media, policy documents and patents) that the output has received. In general, a score above 20 means that the publication received more attention than its contemporaries, and a score of 0 means the article received no attention. Of the publications linked to GCRF awards, 1,219 awards had a publication that attracted attention as tracked by Altmetric, which corresponded to 9,946 publications with a positive score. We can see that for awards with start years between 2016 and 2020 the average score was above 20, indicating a high level of attention when compared to other publications (Figure 30).[59]

Figure 30. Average Altmetric score across publications (n=9,946)

[59] Note that 'year' refers to the start year of the GCRF award. There are limited publications for GCRF awards started in 2021, and there is limited time for those publications to receive attention; this may explain the drop in score.



Looking at the Altmetric scores for the sample, we find that the top 10 scoring publications have high scores, with the top three having scores of 9,233, 1,892 and 1,317.

We can also look at policy attention relating to the GCRF portfolio as a proxy for engagement and use of networks. We found that 887 publications associated with the GCRF portfolio have been cited in a policy document from across 254 awards.

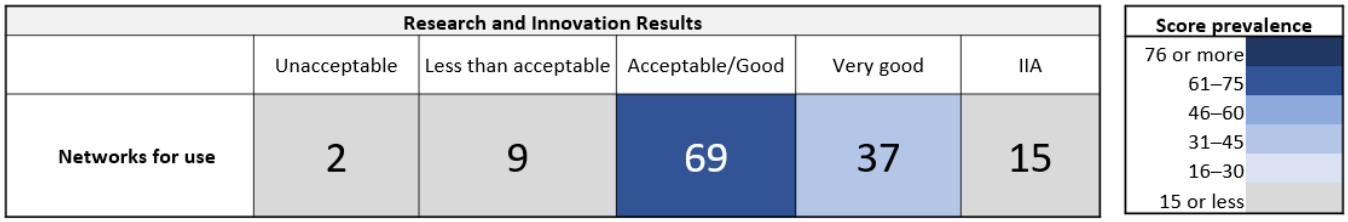
We can also use GtR to look at the degree to which awards have participated in engagement activities, which help to seed networks. There were 9,726 engagement activities associated with 375 awards. Table 3 highlights the different types of activity.

Table 3. Types of engagement activity

Engagement activity	Number of awards participating in engagement activity (n=375)
A broadcast, e.g. TV/radio/film/podcast (other than news/press)	88
A formal working group, expert panel or dialogue	216
A magazine, newsletter or online publication	105
A press release, press conference or response to a media enquiry/interview	123
A talk or presentation	276
Engagement-focused website, blog or social media channel	149
Participation in an activity, workshop or similar	315
Participation in an open day or visit at research institution	56

What has the sample of awards achieved in this result area?

Figure 31. RQ++ scores for networks for use results



Networks are classified as 'Good' or 'Very good' in 106/132 (80%) of awards. Only nine awards were classified as networks at launch. This suggests a strong response to the networking objective of GCRF over the life of the fund. Some of these awards have been in the technology sectors; others have been in agriculture, such as seaweed value chains, or issues such as women's economic empowerment. Of the nine classified as networks, four have received funds to continue. The others are actively searching and are optimistic that they will be able to continue. Seven awards resulted in important use of the results. Three awards resulted in networks among the HIC partners alone, although these all focus on issues relevant to LMICs (e.g. schistosomiasis, tuberculosis). A further three awards had no network intent. Only one award noted that it was completely unsuccessful, largely because of the negative results from the research.

There were examples of strengthened relationships and networks with communities and research users in policy and practice. Some projects involved the training of local partners and community members on technical implementation to sustain interventions; in one project this has led to several follow-on projects getting funded. This kind of capacity building seems to have helped deepen networks that span professions and sectors for future work, e.g. data collection and analysis capacities within non-academic partners. Among the innovation-focused grants, innovation Hub-type models provided seed funding and mentorship to researchers and social entrepreneurs – a modality that helped to bridge sectors.

There are examples of network capacities between community organisations, NGOs and commercial and academic organisations also being strengthened, e.g. around food security in the Caribbean region, environmental pollution and non-communicable diseases in Asia, youth employment in Nigeria, Kenya, Ghana and South Africa, and household water treatment solutions in Mexico, Brazil and Colombia.

Nevertheless, it is too early for many awards to have created networks for use. 23 assessments indicate significant promise that a network for use will develop. In some cases, intellectual property has not yet been registered or findings have not yet been published. A further 14 indicate that a network is possible, if a little uncertain at this stage. 16 indicated that it is too early in their programme to have any sense of potential networks for use. In the case of basic science awards, most indicated limited progress on this front, either because further research was needed prior to the consideration of networks for use or because the potential was at a very early stage. As with the sample as a whole, some basic science awards were not yet completed, so no work had been done on moving to use.

Networks have played an important role in applying innovations. For example, we see innovations in developing tracking systems for vector-borne diseases, monitoring floods and tracking dengue at the national level. Innovations in mobile water quality monitoring and technologies for cheaper green energy are both very promising. There is strong potential for development of networks to support uptake and use in the near future.

Networks have also been applied against other issues. Youth unemployment is a central issue in Africa, with the most rapidly growing youth population in the world and with already high levels of unemployment. One interdisciplinary African-led network across six African universities has already stimulated the creation of nine new businesses, and it continues to operate as a network and support African university professors to increase their capacities in interdisciplinary research. In Latin America, a health-focused network has received new funding to create an innovation Hub. A network of 14 initial members, led by an Ecuadorian PI, was established to build new collaborative links to support Venezuelan research in vector-borne diseases in light of the collapse of the Venezuelan health care and health research infrastructure. The network brings together clinicians, epidemiologists, molecular biologists, entomologists and social scientists; it also trains ECRs. The network was also able to identify additional resources to respond to Covid-19. This network built on several pre-existing networks among the partners and continues to operate as a network, actively seeking additional resources.

Some networks have influenced policy in a number of areas. For example, education policy has been improved through the research and engagement of networks; women's economic empowerment has benefited from the experience in networks; and, through a health monitoring app, one network contributed to the management of the long-haul trucking industry in terms of health risks.

What are the factors driving good performance in this result area?

Networks are most effective where they meet the interests and needs of all members. This was noted as a key factor in 33/38 awards that scored at the highest level (7–8). Bringing in the relevant potential user at an early stage and throughout the research contributes significantly to success. This was seen in the most successful networks across a range of stakeholders: policymakers, entrepreneurs, a local community and other researchers.

Partners who are well connected to the relevant community are therefore a key ingredient in supporting successful networks. Networks for use require connections with user communities. Partners who have these relationships in place are well placed to introduce a relevant innovation to those groups. Where those relationships are not in place, it will take longer to build a network.

It helps to ensure a clear intent to network – a further key driver of successful networks. Where there is intent, active steps are taken throughout the programme to work towards a successful network. Not every such network is successful, but the rate is much higher with intent.

Timing is also vital for networks, both in allowing them time to develop and mature and in capitalising on opportunities as they arise. Among the networks that scored as ‘Good’ (5–6), the biggest category of achievement is ‘Not yet’, with optimism that the network would make major achievements if it continued. A risk realised in one case is that while waiting for the implementing partner, the findings were overtaken by events and other innovations, so potential relevance was lost.

6 Conclusions, what works, and recommendations

Summary of key points

Conclusions:

On the whole, GCRF awards have seen good progress, with a high preponderance of high-quality research. The sample scored well against conventional quality standards. Overall, the sample also scored well against RQ++ criteria. There were some evidence limitations that future RQ++ assessments should avoid; RQ++ should include more interviews with all key partners.

We see good progress against all four result areas in the GCRF ToC. Examples have also been cited that contribute to short-term impacts, such as conceptual and attitudinal change, technological solutions being put to use, and good progress towards change in R&I capabilities. Challenges remain in sustaining progress in light of the budget cuts, which have also adversely affected the UK's reputation as a research funder.

What works:

The rigorous assessment processes in place across the POs awarding the grants resulted in a high-quality set of awards. Many of the research awards built on a larger and/or preceding programme of researcher-led work. The most successful awards engaged the stakeholders throughout the process, supporting a deep understanding of the problem in context, which played a key role.

Intentionality in plans and implementation was important to success. Interdisciplinarity proved important to success in addressing development challenges. Highest-scoring awards made extensive use of non-formal publications to reach their key stakeholders. Both applied and basic science awards can be use-inspired and, as such, can be assessed using RQ++.

Clear recognition of and respect for the important roles of all partners' contributions were key to promoting fairness, but funders' systems can get in the way. Partnerships were strongest where mutual learning took place. There is a positive association between good performance in mutuality and fairness in partnerships and results in terms of high-quality R&I, enhanced capabilities and stakeholder networks for use. However, EDI was a weakness across the sample. Barriers to equity are of key importance, because where awards performed poorly in RQ++ dimensions relating to fairness and EDI, they tended to perform similarly poorly in positioning for use. Investing time and resources and putting the right systems in place to establish equitable and fair partnerships are key to catalysing pathways to impact.

Recommendations:

1. Continue what is working well.
2. Improve the priority given to EDI.
3. Improve the priority and gathering of non-academic outputs.
4. Where supporting networks, allow more time.
5. Treat a research funding programme as a learning network.
6. Consider using RQ++ criteria in calls, selection and assessment processes.

Conclusions

The RQ++ assessment focuses on the quality, positioning for development impact and early outcomes of GCRF-funded R&I. This assessment draws conclusions about the performance of GCRF at the midpoint of its expected pathway to impact and ToC.[60] The RQ++ assessment responds to two MEQs:

'*How are GCRF's investments working and what has been achieved?*'

'*What results has GCRF produced or contributed to, and what has worked in transforming research outputs to outcomes?*'

In order to reach conclusions about these questions, this section will first outline the major trends in performance observed across the portfolio. It will then examine key drivers of good performance and factors influencing areas of poor performance. The team then shares reflections on applying an RQ++ approach to a challenge research fund.

How well have GCRF awards performed? What are the trends in performance that we can see? What evidence is there of progress in translating outputs to outcomes?

On the whole, GCRF awards have seen strong performance against the RQ++ standard, with a high preponderance of high-quality research that is well positioned for the next stages of GCRF's pathway to impact, where R&I is taken forward to application and use. The sample is performing well, not only against conventional measures of research excellence but also in some key components of ODA research excellence.[61] As noted in the findings

[60] See Annex 1 for GCRF's ToC, which sets out its pathway to impact.
[61] Excellent ODA R&I has technical merit (i.e. it is methodologically sound and has empirically warranted conclusions), but goes beyond this to include building in the foundations for development impact: an integral focus on EDI and promotion of fairness and equity in international partnerships. ODA excellence also involves active positioning for use, policy and development relevance by producing actionable knowledge and mobilising stakeholder networks for uptake. See BEIS (2021) Stage 1a: Synthesis Report of Evidence on Integration of

above, there are few low-scoring projects, and most of the completed projects in the sample have indicated actual or potential contributions to development.

Interdisciplinary working was strong in the GCRF awards and appears to have played an important role in success. The qualitative analysis showed that for 85 sampled awards where it was possible to distinguish different disciplines, more than half involved four or more disciplines, and the highest-scoring awards combined between four and nine disciplines. The challenges GCRF awards face are complex and not monodisciplinary, and it therefore makes sense that the research was interdisciplinary. This is not well captured in the formal publications (highly ranked journals tend to be within a discipline) but was captured in research design and emerged during interviews.

Capacity strengthening scored well across the board in our sample. Particular strengths included contributions to building data systems in LMICs. Projects did this both through their primary research to build new datasets and through strengthening existing datasets. Although some projects noted weak existing datasets in some LMICs, the majority were focused on primary data collection, and teams already had or were able to develop good capacities for this work.

GCRF has contributed effectively to establishing and sustaining research partnerships. Partnerships are not static, nor are they short-term. About 80% of the partnerships established with, and supported by, GCRF funding intend to continue their collaborations. Two-thirds of those have already identified new funding sources to allow them to continue. This clearly supports the GCRF decision to require partnerships.

GCRF has been less effective in building sustainable networks, however, largely because of the time needed to achieve this outcome. Short projects have difficulty establishing new networks. Networks take time, and new networks were seldom created within the 18–24 months of the majority of awards in the sample. They are best implemented through existing networks and partnerships. Exceptions can be seen where a network develops as an offshoot of an existing collaboration, receiving the necessary support in the process. If a network is part of the goal of an award, a longer period of time will be needed for that award.

These assessments demonstrate success in all four result areas in the GCRF ToC. The assessments demonstrate high quality and, already, some translation of results into policy and practice. A significant number of interdisciplinary partnerships have been forged, and some already have resources to continue post-GCRF; for fellowships in particular, but across most awards, capabilities have been enhanced for partnered research between HICs and LMICs, and some networks for use show promise. In all of these areas, significant efforts will be needed to sustain the progress that has been made and further advance the promotion and use of research results. The work shows promise in achieving the long-term impacts of GCRF, but this is not inevitable, and it will require ongoing efforts from both the research funding community and the researchers themselves. Success factors such as interdisciplinarity,

Relevance, Fairness, Gender, Poverty and Social Inclusion in Funded Activities. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055522/gcrf-evaluation-1a-synthesis-report.pdf

partnership, capacity/leadership strengthening and supporting Hub-type models appear to be paying dividends that could be built on going forward.

Progress has also been made against the short-term outcomes in the ToC. This is demonstrated through the application of both technological and policy solutions in some instances as well as through changes in innovation capabilities in the research community. Some replication and amplification is also seen in the research partnerships that have successfully obtained new funding to continue the work started (or, in some cases, extended) with GCRF support. Enhancing the UK's research reputation has been seriously set back by the significant budget cuts sustained by GCRF, and much effort will be needed to rebuild that reputation. These emerging outcomes will be explored further in the next stages of the evaluation.

What are the drivers of good performance?

Some aspects of GCRF structures and processes enabled the areas of good performance identified.

The evidence demonstrated the importance of the POs' strong commissioning processes in producing high-quality R4D. The approach to funding through the national research funding organisations has shown itself to be a strong mechanism for the funding of research. The awards that have been completed have published in high-quality journals, and some of the ongoing awards have also already published. The awards have also demonstrated originality and relevance to the needs of countries where the research was taking place.

Although the commissioning processes in GCRF ensured that researchers defined the research priorities (in line with the Haldane principle), **the priority given to researchers and research institutions in the UK and other HICs was seen by researchers (both from HICs and LMICs) as unfair** and as minimising the roles of LMIC researchers in research that directly affects the development of their countries. Most research teams made significant efforts to overcome these disparities; but without clear principles supporting leadership from institutions and researchers in LMICs, the challenge remains.

When the principle of LMIC leadership is applied to a programme, it has the potential to increase the quality of ODA research. The FLAIR fellowship programme awards – the only signature programme to mandate Global South leadership – performed excellently across RQ++ dimensions. Although the sample may be too small to draw a firm conclusion, it does point to the programmes led by researchers in LMICs. This is largely because of two factors – the deep understanding of context held by the LMIC researchers, and ownership of the research challenge and emerging results.

Developing an understanding of context through meaningful engagement with relevant communities likewise emerged as a key enabler of good performance in the sample. Where local partners were actively engaged from design through to delivery of results, the use of the evidence and how well it was fit for purpose were stronger. This was the case in research that partnered with local communities, the private sector, NGOs or other

organisations. Their engagement both increased ownership and likely use of the results, and it supported a better understanding of, and a better fit with, the local context.

Where researchers and communities defined real-world challenges and designed context-appropriate research solutions, there was a greater likelihood of research outputs being translated into use. In research where there was a clear intention to contribute to addressing a challenge, there was more likelihood that this would be achieved. This was especially clear across the basic science awards, where those with an intent and a plan to contribute to development achieved more than those that were more focused on knowledge generation activities, including both applied research and use-oriented basic research. Basic research is not well suited to assessment with RQ++.

Thinking beyond the peer-reviewed journal articles and presenting research findings in creative ways facilitated this process of positioning for use. Academic outputs support the work of other scientists and provide legitimacy to the research, but successful projects also made use of other media – such as video, street theatre, games, policy papers and blogs – to reach specific audiences. Non-academic outputs were of use not only to local communities but also to policymakers and others. Despite this, non-academic outputs were significantly under-documented, with evidence of them often emerging only in interviews.

High-scoring awards carried out this work through strong partnerships – an important expectation in GCRF-type awards. Awards which were part of an ongoing research and development effort, and where people had previous experience in working together, were able to start work more quickly and effectively. Goodwill across a team made a difference, and in almost all cases teams worked well together. Clarity in roles and responsibilities was also an important characteristic. Teams that defined their roles had an easier time working together, whether through formal mechanisms such as an MOU between institutions or through informal, regular communication.

Capacity building was identified as a key component of effective partnership, acting not as an inhibitor of strong research but as an important element of partnered research.

What are the reasons for poor performance?

It was also possible to identify the factors influencing areas of poor performance.

GCRF stakeholders all faced significant challenges caused by Covid-19 and by budget reductions. Despite many pivoting and adapting their research in an agile way, many award holders reported unmet objectives because of this double hit taken by the projects. Many projects remained theoretical in focus, due to lack of access and resources for the necessary fieldwork. Some shifted their priority to Covid-19 and away from original priorities; although this meant they made an important contribution in a crisis, it also meant that the resources for the original research were no longer available.

A second factor that emerged strongly as a barrier to excellence in ODA research was the structural imbalance of GCRF's model, which worked against fairness. By putting UK institutions in charge of resources and UK systems in charge of redress procedures, GCRF

processes mitigated against equity and fairness for LMIC researchers and institutions. One further challenge noted was that LMIC partners in academic institutions are classified as partners but those not in academic institutions are not, which reduced the sense of ownership by those partners.

Similarly, a lack of understanding and attention to issues of EDI was noted as a common weakness across the sample. Basic science projects tended not to consider EDI; many others mention it, but no evidence was found of implementation keeping this front and centre.

These barriers to equity are of key importance because where awards performed poorly in RQ++ dimensions relating to fairness and EDI, they tended to perform similarly poorly in positioning for use. The assessment demonstrated how closely related these two dimensions are; equity needs to be central to ODA R&I if it is to achieve excellence.

Although there were clear benefits to the freedom afforded to researchers to define and direct research priorities, there were problems arising from the lack of strong programme and fund identities – chiefly the consequent lack of cohort and network building. No one talked about GCRF itself as a network, so potential synergies were lost. The research across GCRF had many commonalities in terms of the approaches, challenges and opportunities. Exchange and learning across POs and research teams could have strengthened individual activities and could also have provided learning on collaboration and partnership across the programme.

What are the takeaways from applying RQ++ to the GCRF portfolio?

In developing these conclusions, the team also reflected on the RQ++ approach itself and its utility in assessing research funds such as GCRF.

As the IDRC also found when using it, RQ+ is a solid quality assessment tool for development-oriented research with a clear use and user in mind. The addition of basic research to the sample indicated that it makes no difference if the research is applied research or use-oriented basic research; what makes the difference is the directness of the link to application and use.

Conducting one interview per award due to available resources constituted a limitation. With the involvement of multiple partners in some projects, the conducting of several interviews would add significant value to the assessments, especially from LMIC partners. This limitation somewhat reduced the level of confidence in the findings. This was particularly the case where the subdimensions were process-oriented and therefore less likely to appear in formal publications, and where it was not possible to gather varying perspectives across the team.

Data issues limited our assessments, particularly with respect to non-academic outputs. Non-academic outputs are poorly captured at present. Although the data systems captured 20 awards with non-academic outputs, the individual award assessments captured more than 60. At present, including non-academic outputs in GtR and Researchfish is voluntary, and the

incentives are too weak to ensure their capture – academic outputs contribute to career advancement, whereas non-academic outputs do not.

Data management issues affected the selection of the sample. The sample was intended to include only closed projects so that the likelihood of some outputs would be higher (with some exceptions for longer awards). However, because the end dates appear not to have been updated in the data systems, a number of selected awards were incomplete. This may have been higher than normal due to Covid-19-related delays, but it is an issue that will affect others in looking at the data for a range of issues.

Recommendations

Recommendations for future ODA R&I funds

As there is no new commissioning envisioned for GCRF, the focus of recommendations is on learning for future ODA R&I funds.

1. Continue doing what works well. *For DSIT and POs.*

- **Maintain rigorous PO commissioning processes.**

  These have played an important role in ensuring a strong portfolio in GCRF. However awards are administered in future, DSIT and POs should sustain the current strong and rigorous commissioning processes; addition of RQ++ criteria could strengthen these still further (see final recommendation).

- **Ensure that researchers and their LMIC partners continue to define and shape priorities while building programmatic approaches to create coherent portfolios.**

  PO commissioning processes should continue to ensure that researchers define and shape priorities, but POs should make more effort to promote leadership among LMIC researchers. This does not negate the potential for a more programmatic approach towards building bodies of evidence and cohorts of award teams to create synergies for impact.

- **Continue to ensure interdisciplinarity to tackle complex development challenges.**

  The RQ++ assessment clearly demonstrates GCRF's unique value-add in creating space for innovative interdisciplinary work to address complex challenges, often fostering new collaborations across disciplines and research teams. Any new fund should continue to ensure interdisciplinarity.

- **Continue to build on and extend existing bodies of work to drive longer-term R&I efforts to address development challenges.**

  Where the GCRF award built on past work and expected to contribute to ongoing work, performance was strong. Many of the development challenges research teams are addressing cannot be solved in 18–36 months, and so many awards are part of a larger

programme of work that the partners are implementing. Fund managers should continue to exploit synergies and build on existing bodies of work.

- **Promote engagement of partners, stakeholders and intended beneficiaries in the design and conduct of ODA R&I.**

  The most successful research engaged the stakeholders and intended beneficiaries, not just in sharing the evidence but also in problem identification and the conducting of research. Co-creation was seen as a positive approach across multiple stakeholder groups – local communities, policymakers and the private sector. Closely related to this is the importance of ensuring a deep understanding of the context in which the research is taking place.

- **Actively incentivise appropriate non-formal publications as part of evidence sharing.**

  Non-formal research outputs have been important in ensuring the usefulness and utility of research to potential user groups. The highest-scoring awards contained not only formal peer-reviewed publications but many and varied non-formal publications as well. Fund managers should actively encourage appropriate non-formal publications as part of evidence sharing. As noted below, better capture of these is important, and incentives for their generation are needed.

- **Maintain mutual capacity strengthening as an intentional and integral strategy.**

  Where learning and capacity strengthening were intentional and affected both LMIC and UK partners, programmes tended to be stronger. Maintaining capacity strengthening should be integrated into future programmes.

2. Areas for improvement. *For DSIT and POs.*

The RQ++ assessment of GCRF noted several areas where improvements could enhance future award schemes.

- **Learning across award programmes should be promoted.**

  DSIT and POs should treat a research funding programme as a network in itself.

  The opportunities for learning cut across the POs as well as the research programmes themselves. The opportunity to share experiences, successes and frustrations adds value to the research endeavour. Fostering the development of cohorts of award holders and facilitating networks between them would add significant value and enhance collaboration. Longer grant periods are encouraged for the successful establishment of networks as well as being a requirement for a continuity plan.

- **DSIT, POs and programmes should actively promote EDI in all R&I.**

  Funds should offer clear guidance on integrating EDI considerations in different fields and types of research. POs should include appropriate EDI criteria in the commissioning process.

EDI is central to building strong and continuing partnerships and to ensuring that research reaches the most vulnerable and marginalised members of society. Without this consideration, gaps will remain and many groups will be left out of progress. Because the assessment found this to be a weakness across the sample, particularly in basic science awards, guidance should be developed to support POs' and researchers' understanding of EDI. This should be based on existing best practice in the field.

- **As part of EDI, POs and programmes should adapt their processes to promote LMIC leadership of research projects in both academic and financial terms.**

  Requirements within GCRF created unnecessary barriers, notably the control of most funds by UK partners, the requirement from most POs that PIs were UK-based, and the inappropriate designations of some partners that made them appear less than full partners. To achieve equity in ODA R&I, these structural barriers should be removed to the extent possible, drawing on the example of positive outliers within the sample, such as the FLAIR programme.

- **POs and programmes should actively encourage the engagement of relevant non-academic stakeholders throughout the research process, from problem definition to use and uptake.**

  The most successful projects engaged the stakeholders, not just in sharing the evidence but in understanding the problem, in designing the research and in its implementation. This engagement is hampered where non-academic partners cannot be identified as full partners in a relationship.

- **POs and programmes should incentivise researchers to record better data on non-formal outputs being produced.**

  The highest-scoring awards contained not only formal peer-reviewed publications but also many and varied non-formal publications; at present these are poorly captured. Whether it be street theatre to send messages to a local community, a policy paper for decision makers, or some other form, acceptability, accessibility and appropriateness to the intended audience are central. Non-academic outputs are frequently central to policy and practice influence so that evidence is translated into the common language of the users, be they policymakers, practitioners, community groups or the private sector. Each of these has its own approaches and ways of knowing, and researchers need to tap into these. Incentives to improve the capture of these are needed.

- **Improve programme data management**

  Some of the gaps in current programme data, e.g. duration information, affect many aspects of programme management as well as the application of the RQ++ approach. DSIT and POs could usefully update data more regularly, not only for evaluation purposes but also for programme management purposes.

- **Ensure that basic science grants intended for funding through a development research programme have a clear use case from design.**

  For the first time, an RQ+-based assessment included some basic research in its sample. What emerged is that as long as the research is use-inspired, it is possible to

conduct an appropriate assessment using RQ+ tools. Pure basic research oriented to the quest for fundamental understanding would not be well served by assessment using RQ+.

- **Consider using RQ++ criteria in calls and in selection and assessment processes.**

  The RQ++ assessments have identified both strengths and gaps in the research that has been supported. If these aspects are captured in the design stage of programming, the likelihood of success should be even higher. It is reasonable to address evaluation criteria in selection processes so that expectations are clear to all parties. Fund managers and POs need to collaborate to ensure that this is implemented effectively.

The next and final stage of the GCRF evaluation takes place over 2023–25. The evaluation will examine how GCRF's awards are moving into use to promote development outcomes in LMICs. Two outcome evaluation modules will be implemented. The Research Into Use module includes a series of case studies in five LMICs in Africa and Asia, and will explore how clusters of GCRF awards working in the same sectors are contributing to development outcomes. The UK Capacity module assesses the extent to which GCRF has contributed to the UK R&I community's capacities for partnered international ODA research.

List of annexes

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