Department for
Science, Innovation
& Technology

Evaluation of the Global Challenges Research Fund: Research Into Use Synthesis Report

Synthesis of Evidence on GCRF's Research-Into-Use Outcomes in Low and Middle Income Countries (LMICs)

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Please refer to the Table of Contents on page 4,5 for a full overview of the report.

Evaluation Consortium Partners

The evaluation team for the RIU case studies included several partners from the consortium. Itad, as contract lead, has provided technical and project management leadership. RAND Europe, as joint contract manager, also provided technical design and delivery inputs. Teams from Itad, RAND, AFIDEP and Athena Infonomics led case study data collection and analysis. Matter of Focus led development of the pathways to impact that formed the foundations for the case studies.

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Acronyms

AI	Artificial Intelligence
AMR	Antimicrobial Resistance
AV	Agrivoltaic
BEIS	Department for Business, Energy and Industrial Strategy
DSIT	Department for Science, Innovation and Technology
ECR	Early Career Researcher
EDI	Equity, Diversity and Inclusion
GCRF	Global Challenges Research Fund
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ISPF	International Science Partnerships Fund
KII	Key Informant Interview
LMIC	Low and Middle-Income Country
LTO	Longer-Term Outcome
MEQ	Main Evaluation Question
NGO	Non-Governmental Organisation
ODA	Official Development Assistance
PI	Principal Investigator
PO	Partner Organisation
R&I	Research and Innovation
RIU	Research-Into-Use
SDG	Sustainable Development Goal
STO	Short-Term Outcome
ToC	Theory of Change
UK	United Kingdom (of Great Britain & Northern Ireland)

UKRI	UK Research and Innovation
UKSA	UK Space Agency
UN	United Nations
VfM	Value for Money

Glossary

Antimicrobial Resistance: When bacteria, viruses, fungi, and parasites no longer respond to antimicrobial medicines, making infections harder to treat and increasing the risk of disease spread, severe illness, and death.

Agrivoltaic: The dual use of land for solar energy production and agriculture, combining solar panels with agricultural activities to optimize both energy and crop production

Awards: Under GCRF, a research, networking or other type of grant provided by a Partner Organisation to a UK university (or research organisation) collaborating with partners from low and middle income countries. The award is used to support cutting-edge research and innovation that addresses global challenges.

Capacity Building: This refers to the process of developing and enhancing the abilities, skills, and resources of individuals, organizations, and systems to conduct, manage, and utilize high-quality research and innovation activities. This may involve training and education, infrastructure development, and institutional support.

Capacity Strengthening: This goes a step further than capacity building (which implies something new), by focusing on the sustainable enhancement of existing abilities and resources. This involves the long-term development of research and innovation capabilities; and, sustainable practices that ensure continuous improvement and adaptation.

Early Career Researcher: A researcher who has completed a PhD (or has equivalent research experience), and is typically navigating the transition from doctoral studies to establishing themselves as independent scholars. Different UK research councils and academies have slightly different criteria to define the timeframes and stages of ECRs.

Equity, Diversity, and Inclusion: A framework promoting the fair treatment and full participation of all people, especially those historically underrepresented or discriminated against based on identity or disability.

Impact: The lasting or significant changes in people’s lives, positive and negative, produced by an intervention, either directly or indirectly, intended or unintended.

Low and Middle-Income Country: Countries classified by the World Bank based on gross national income per capita, typically facing significant development challenges.

Longer-Term Outcome: The sustained impact or changes resulting from a project or intervention, observed after a significant period.

Non-Governmental Organisation: An independent organization that operates without government control, often focused on humanitarian, environmental, or social issues.

Official Development Assistance: Government aid provided to low and middle income to promote their economic development and welfare. It is directed towards countries and territories on the OECD's Development Assistance Committee list of ODA recipients. Outcome: The short- and medium-term effects of an intervention's outputs, including changes in the institutional and behavioural capacities for development conditions that occur between the completion of outputs and the achievement of impacts.

Output: The products, services, processes, both tangible and intangible, that arise from the intervention. Outputs may also include changes from the intervention that contribute to the achievement of outcomes, e.g. changes in knowledge, skills or abilities produced by the activities.

Principal Investigator: The lead researcher responsible for the design, conduct, and reporting of a research project.

Partner Organisations: The organisations within the UK research system through which funds are allocated by DSIT under GCRF. This includes UK Research and Innovation, the research councils, academies, higher education funding councils, and the UK Space Agency.

Research and Innovation: Research is the process of creating new knowledge, while innovation is the application of that knowledge, often leading to new products, services, or processes. Research and innovation may be 'new' by being applied to new sector or field, not necessarily new to the world.

Research Into Use: This refers to the process of research uptake, whereby research findings are taken up and applied to relevant practices, policies and/or products and technologies.

Research Systems Strengthening: This goes beyond individuals and organisations and focuses on systemic changes that embed research and innovation capacity within the broader organizational and societal context.

Sustainable Development Goals: A set of 17 global goals established by the United Nations to address various social, economic, and environmental challenges by 2030.

Short-Term Outcome: Early changes resulting from a project or intervention, typically observed within a short period.

Theory of Change: A comprehensive description (both narrative and diagrammatic) of how and why a desired change is expected to happen in a particular context. This includes identifying the causal pathways, as well as the assumptions that underly these pathways.

Value for Money: The optimal use of resources to achieve intended outcomes, which requires maximising the impact of each pound spent. The 4Es framework defines VfM in terms of: Economy: Ensuring that inputs are purchased at the lowest cost for the desired quality. Efficiency: Achieving the maximum output for a given level of input. Effectiveness: Ensuring

that the outputs achieve the desired outcomes. Equity: Ensuring that benefits are distributed fairly, particularly to the most disadvantaged.

Executive Summary

This Synthesis Report explores how the Global Challenges Research Fund (GCRF) supported the application of research and innovation (R&I) in policy and practice from five cluster case studies across India, Kenya, Vietnam, Lebanon and the Southern Indian Ocean region. It sets out the practical outcomes achieved by GCRF projects working in these regions and the factors associated with success. This evidence supports learning for future funds, promoting best practice to achieve effective impact pathways.

GCRF Evaluation Overview

The Global Challenges Research Fund ran between 2016 and 2025 and has now closed. It was a £1.5 billion R&I fund overseen by the United Kingdom's (UK's) Department for Science, Innovation and Technology[1] (DSIT)[2] and predecessor Departments who commissioned this evaluation of the fund by Itad. It was implemented by 17 of the UK's R&I funders, who commissioned R&I as partner organisations (POs).[3] This evaluation examines the fund's progress from activities to impacts by gathering evidence to test its Theory of Change (ToC). The evaluation has been conducted in three stages over a five-year period from 2020 to 2025.

The final stage of the evaluation (running from 2023-2025) focuses on the outcomes arising from GCRF's research and innovation being taken up and applied in LMICs. Outcomes of interest include R&I contributing to a change in policy or practice and/or attitude and behavioural change.[4] The primary users of the evaluation are DSIT ODA teams and the UK POs that fund R&I. Secondary users will include other UK government funders of ODA R&I, and those interested in international R&I partnerships.

This Synthesis Report combines evidence and analysis from the 'Research Into Use' (RIU) case study clusters to answer the overarching evaluation question: **"What results has GCRF**

[1] Formerly the Department for Business, Energy and Industrial Strategy (BEIS).
[2] £1.5 billion between 2016 and 2021 was the budgeted investment; this does not reflect the subsequent budget changes and actual spend. See 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
[3] GCRF is delivered through 18 POs, including: the seven Research Councils; Innovate UK; the Research Council's umbrella organisation, UK Research and Innovation (UKRI); the four National Academies; the UK Space Agency (UKSA); and the four higher education funding councils. These POs manage and disburse finding 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 and (in England) by Research England.
[4] Kundill Kemp, G. (2017) Guidance Note: Research-into-Use in CARIAA. Available at: http://hdl.handle.net/10625/56601

produced or contributed to, and what has worked in terms of transforming outputs to outcomes, and outcomes to impacts?"

To identify and analyse changes that GCRF may have contributed to in lower- and middle-income countries (LMICs), five case study clusters (four country-based, one regional), comprised of 36 research grants (known as awards) were conducted under five overarching themes:

1. Food security and agricultural sustainability in **India** – nine awards
2. Marine and coastal governance in the southern **Indian Ocean region** – nine awards
3. Clean, safe, resilient water supply in **Kenya** – six awards
4. Young people's access to education and employment in **Lebanon** – six awards
5. Socio-ecological resilience to climate change impacts in **Vietnam** – six awards

The RIU case studies were selected on the basis of a review of GCRF's portfolio, the GCRF ToC and a literature review that identified common theories of how R&I contribute to real-world change, as well as consultations with DSIT analysts. [5] In each case study cluster, the analysis explores the pathways from R&I to outcomes and ultimately to real-world impact in each context. The case study clusters were implemented in parallel from April 2023 to June 2024.

Synthesis Findings

The report findings focus on outcomes and impacts of the Fund, the factors associated with positive results, and recommendations arising from this.

Overall, awards are achieving faster progress towards real-world impact than was anticipated in the GCRF ToC[6], with longer-term outcomes (LTOs) already emerging in four areas: policies, practices, R&I capabilities, and to a lesser degree, market development. Given the complex systemic processes shaping these outcomes, this represents an important contribution by GCRF-funded awards towards real-world impacts on complex global challenges.

Longer-Term Outcomes

Policy improved through the use of GCRF-supported evidence

GCRF R&I contributed to improved policy design and implementation in all five case studies at national, state and local levels – a key step in GCRF moving towards real-world impact at scale. For example:

[5] 45 awards were sampled, including one multi-award Hub in the Indian Ocean region. Some limitations in researchers' willingness to participate and contextual challenges meant that evidence was obtained and analysed for 36 awards in total. See the methodology section for more details.
[6] See Annex 1 for the GCRF ToC.

- In India, GCRF evidence helped catalyse state government investment in sustainable agriculture and improved livelihoods.
- In Kenya, research influenced policy and regulatory change, including enhanced risk assessment procedures for livelihood and natural resource management and evidence-informed ‘suitability maps’ to inform new regulatory approaches to fisheries development in Lake Victoria.
- In Southern India Ocean (South Africa), decision makers made use of GCRF-related evidence in the development of marine economy management plans and incorporation of evidence into international ocean governance processes.
- In Vietnam, we saw increased use of evidence within policy processes on disaster risk management and impacts on rural livelihoods.
- In Kenya and the Southern Indian Ocean, GCRF projects enhanced the inclusion of poor and marginalised communities in decision-making processes. Achievements included the legal recognition of customary rights to resources and livelihoods and boosted participation of vulnerable communities in policy processes that affect their lives, access to natural resources and livelihoods. Inclusion of vulnerable communities with precarious livelihoods in policy processes is significant, as it lays a foundation for policies to potentially respond to their needs in the future.

As policy impact typically unfolds over a longer-term time period, it is important to investigate the mechanisms behind early and successful policy influence for future learning. Researchers who took an active role working with active civil society partners and other embedded stakeholders were able to overcome institutional-level obstacles, such as timing issues, electoral cycles and changes in policy agendas. Responding to a stated demand for the research by relevant government actors and working with policy actors to catalyse demand and build user-side capacities was also fundamental in achieving policy impact at a quicker pace.

Innovations supported improvements in practices and implementation approaches

Evidence from India, Vietnam, Kenya and Lebanon indicate that GCRF awards are supporting the adoption of technological innovations and influencing improvements in practices and implementation approaches, at both small and wider scales. For example, pockets of change have been seen in specific settings such as Indian farmers improving water management practices via improved water use scheduling and community coordination, while in Vietnam, the uptake of an app for real-time monitoring improved rice crop quality. These show potential for lasting impact for the current users, but there is not yet evidence for this adoption to be more widespread. In Lebanon there was some evidence of GCRF influencing practice through one award team’s ability to respond to new needs arising from the crisis there. The team were able to share their learning about including disabled students in education settings, a topic which sadly became of increasing importance, given the port explosion and increase in violent conflict in Lebanon.

Uptake of GCRF-funded novel methodologies and techniques show promise for lasting impact and international replicability. Examples include (i) applying various mapping methodologies in

Vietnam and southern Africa and (ii) the water hyacinth detection techniques developed under an Indian award but applied in Kenya. Strong demand for technology outside the original testing context was also evident in the Indian Ocean example of novel tracking devices for small boats. Authorities from several other nations in sub-Saharan Africa, including Mauritius, Senegal, Zanzibar, Namibia, Mozambique, the Seychelles and the Gambia, have expressed an interest in trialling the innovation in their respective counties. The scale of this expansion provides an indication of wide demand for the solutions developed through the GCRF award and their relevance and applicability to multiple contexts.

Markets and value chains strengthened

Although there is less evidence in this outcome area relative to others, mainly due to a smaller number of market-facing awards in the sample, evidence from India and Vietnam did demonstrate how small research and networking grants stimulate value chains, further scaling innovations. Outcomes included enabling digital platforms tailored for smallholder farmers to access market information, manage logistics, or extend the shelf life of perishable goods. These awards worked by developing commercially relevant innovative technologies or innovative business models to enhance the participation of low-income producers in a value chain, thereby strengthening market access and value chains.

R&I capabilities strengthened in low and middle income countries

Almost all awards evidenced cross-country collaboration and new opportunities for employment and career progression. GCRF awards provided training in new skills, opportunities to learn-by-doing and knowledge exchange that directly benefited researchers and contributed towards the successful research within the awards themselves. For example, opportunities for knowledge exchange between researchers were provided in one Indian Ocean award through establishing a training centre to support increased research and technical marine science skills.

Evidence for improved R&I capabilities (skills, networks and infrastructures) comes from examples of collaboration networks established across countries and greater opportunities for career progression and employment for researchers, particularly early career researchers. R&I capabilities have also been developed outside the higher education sector, extending to partners operating in the systems that GCRF seeks to influence as a means to increase uptake and demand for R&I-led practice. For example, a non-governmental organisation (NGO) in Lebanon enhanced their research and advocacy practice through collaboration with a university partner. In Vietnam, interdisciplinary collaboration between the university and private sector sparked the creation of an enterprise to manufacture and market rice protein snack products. Capacity strengthening of award holders (in both the UK and LMICs), wider research teams and non-academic partners, can support lasting change. The networks created or sustained through GCRF awards have supported institutional learning and collaboration and acted as a conduit to bring in resources and further funding to the partners. Table 1 below summarises key achievements observed in each cluster case study.

Table 1: Overview of research-into-use case study clusters and key achievements

Country	Cluster theme	Key achievements observed in the cluster
India 	Food security, nutrition & sustainability	• Co-produced mobile app for tracking invasive water hyacinth adopted by local communities and flower waste collection established as a local enterprise in Telangana and Kerala. • Improved efficiency and enhanced cold storage solutions for agricultural products in various states, supported by small-scale farmers' adoption of mobile apps for reducing post-harvest losses during transportation. • Evidence and media engagement by projects influenced policy changes to support sustainable agriculture and improve livelihoods, plus government investment by various state governments in Andhra Pradesh, Telangana, Odisha and Orissa helped to scale results.
Kenya 	Clean, safe, resilient water supply	• Local communities adopted innovations and improved practices, including more efficient water and natural resource mobilisation in dryland regions of the north and south; sustainable use of lake sites for fish farming; combined micro solar generation and irrigation systems. • Evidence and engagement with decisionmakers led to policy and regulatory change, including enhanced risk assessment procedures for livelihood and natural resource management; evidence-informed 'suitability maps' to inform new regulatory approaches to fisheries development in Lake Victoria. • Networks formed during these projects have helped to generate follow-on resources for initiatives related to water and food security.
Indian Ocean 	Marine & coastal ecosystems & economies	• Evidence, advocacy by NGOs and legal challenges led to policy changes, including marine economy management plans and incorporation of evidence into international ocean governance processes. • Combined scientific and social science evidence strengthened advocacy efforts for the recognition of customary rights, including integration of small scale fishers' rights and livelihoods into marine spatial planning policy. • Contributions to adoption of ecosystem-based approaches to ocean governance and facilitating women's involvement in ocean governance processes.
Vietnam 	Socio-ecological resilience to climate change impacts	• Innovative solutions adopted by farmers and government agencies to boost resilience, including weed risk assessment tools, climate-resilient rice varieties, and advanced flood modelling systems. • Increased use of evidence within policy processes on disaster risk management and impacts on rural livelihoods. • Contributions of new methods for hazard maps taken up in other regions, e.g. tropical cyclone impact forecasting in South Africa.
Lebanon 	Young people's access to education & employment	• Crisis context prevented the emergence of longer term outcomes, but foundations established, including multi-stakeholder networks and equitable international partnerships to support outcomes in the education sector. • Capacity building of non-academic actors on key issues, e.g. disability awareness in media professionals. • Uptake of research findings by local actors, e.g. use of disability inclusive design by architects and designers involved in reconstruction of Beirut port.

Optimising impact potential: what has worked?

Across the case studies, contextual challenges and political constraints were the strongest factor associated with minimal progress in achieving short-outcomes (STOs) and LTOs. STOs refer to early changes resulting from GCRF awards, within a short time period, and LTOs refer to longer-lasting, more sustained changes. The analysis showed four key factors which contributed positively to achieving STOs and LTOs.

GCRF's flexible funding was a key enabler of impact

Opportunities for funding to develop and scale research and innovation is a major global gap identified through the case studies. GCRF was consistently seen as unique in providing a range of flexible funding types, from network and partnership development grants, through early career support, and fully-fledged research funding, with embedded impact activities. Interviewees highlighted that there were few funding opportunities like this.

Effective ways of working

GCRF researchers and innovators navigated contextual and political challenges through a series of common ways of working: iterative stakeholder engagement, responding to opportunities to amplify change; building networks to position credible evidence or innovation for take-up; and new capabilities mobilised to amplify change.

For example, as observed in India, Vietnam, Indian Ocean, Kenya and Lebanon, tools, guidelines and data that had been co-produced with stakeholders were more aligned with the concerns of decision makers and communities and responded better to local conditions, and were more likely to be seen as credible. Award holders built relationships with key decision makers, learning how to tailor findings to their priorities, and how to capitalise on opportunities to influence decisions.

Networks are critical for mobilising findings in dynamic contexts

Agile networks, both new and existing, were also key to navigating dynamic policy contexts. For example, in the Indian Ocean case study, GCRF-supported researchers and their network of partners in South Africa were able to respond to the window of opportunity presented by the nationwide marine spatial planning process, mobilising evidence, champions and legal challenges to successfully support the integration of small-scale fishing communities' customary rights to livelihood and food security as considerations in the policy process.

Reciprocal capacity strengthening is a driver of impact

Mobilising mutual capacity strengthening helped to advance outcomes, where both UK and LMIC partners developed skills and infrastructures. For example, in India, collaboration between UK research institutes and local researchers brought together different expertise to develop algorithms for thermal data processing and training students in advanced techniques. Vietnamese partners were able to leverage the reputation of UK institutions to give them access to new networks and key stakeholders, which was important for uptake of their innovation. Involving local researchers, institutions and organisations helped to tailor

technological innovations to the relevant market and value chain and to create demand for and interest in the tools and services.

Lessons and recommendations

Lessons

The case study cluster evidence highlights how a strategic and impact-focused approach is needed to establish the foundations for development impact from the start. Six key lessons have been identified for future funds and programmes.

1. Clustering awards working on the same issue in the same country is crucial for coordination, sharing learning on complex issues such as EDI, and achieving critical mass for greater impact within country systems.

GCRF was not designed around strategic clustering of awards working on similar challenges within the same geographies or contexts. A portfolio approach was considered through the establishment of the Challenge Leaders, but ultimately this was not successful.[7] The RIU case study evaluation retrofitted coherent portfolios within thematic and country contexts to gain holistic insights into how pathways to impact worked (or not) in different contexts. This also provided evidence on what impacts could have been achieved, had a more strategic approach to coordinating awards been taken.

Award holders brought together by the evaluation noted that earlier coordination by funders could have helped with combining efforts, promoted shared learning and amplified impact. This represents a missed opportunity to cluster and connect awards (with the exception of some GCRF programmes such as Hubs and FLAIR). Evidence shows that while individual awards mobilized significant stakeholder networks, there were limited opportunities to share learning on key impact drivers with other teams working in similar fields. In challenging areas such as EDI, teams could have pooled learning on, for example, integrating and involving vulnerable communities in the research process.

The RIU case study clusters have effectively shown post hoc that the clustering approach would enable awards to work together synergistically and achieve critical mass. The evidence from the case study clusters shows that, while the fund has achieved faster than expected progress for this stage of implementation, perhaps greater progress could have been achieved by taking a clustering approach and capitalising on the learning network potential.

2. GCRF's evaluation evidence shows that proactively managing for development impact, alongside research excellence, is closely associated with progress towards

[7] See Vogel, I. *et al.* (2024) Evaluation of the Global Challenges Research Fund: Stage 1b Synthesis report Synthesis of the evidence on programme processes and progress towards impact in GCRF's six flagship investments. Available at: https://assets.publishing.service.gov.uk/media/65b39af0a0ae1b000d5260a8/evaluation_of_the_gcrf_stage_1b_synthesis_report.pdf

impact. This involves building in the processes that drive impact right from the design phase and optimising these throughout implementation - so fund-level prioritisation and resourcing of the foundations for impact is vital.

GCRF was designed to go beyond considering research excellence alone to promote challenge-led, excellent ODA research with impact. This has not always translated into the implementation of R&I, where research excellence was at times prioritised over impact, as has been evidenced in our previous reports.[8] Nevertheless, the RIU case study clusters provide further evidence that when ways of working that support the four foundations for development impact[9] (coined as 'ODA excellence' by the evaluation) are prioritised and invested in, these actually catalyse pathways to impact and create momentum for sustainable change.

This prioritisation, along with funding, is needed from the fund level in order to ensure consistent integration of these ways of working and achievement of ODA excellence across the whole portfolio of R&I investments.

3. GCRF's flexible funding and diverse award types enabled outcomes by creating local partnerships and stakeholder networks, able to adapt to changing conditions and emerging needs. The RIU case study clusters illustrate how, in a country context, a combination of different, and flexible, funding mechanisms effectively created local stakeholder networks and systems for moving research into use in country contexts. GCRF's flexible funding, investment in local partnerships, and strategic award sequencing was a key enabler of outcomes. From a cluster perspective, diverse award types supported various R&I stages - small exploratory awards led to larger ones, while early career awards, networking awards, and capacity-building awards played crucial roles in catalysing networks and stakeholder engagement. Large-scale awards such as the One Ocean Hub case study demonstrated how strategically combining diverse grants in a mixed portfolio built interlinked research efforts, effectively moving research into use. GCRF's funding flexibility allowed teams to adapt to changing conditions and emerging needs.

4. Iterative engagement, co-production and proof of concept testing with local stakeholders are key to R&I being positioned for use, enabling research teams to respond to emerging opportunities to promote influence and uptake of their findings.

Case studies show that iterative engagement at local and national levels is vital for building contextual understanding and enhancing stakeholder receptiveness, both crucial for LTOs. Co-production with stakeholders ensures R&I products are better aligned with local conditions and

[8] See BEIS (2022) 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

[9] (i) On-the-ground insight to ensure relevant, locally aligned R&I; (ii) fairness and mutual capacity building in partnerships between UK and LMIC organisations, including non-academic partners; (iii) a focus on gender, social inclusion and poverty reduction; (iv) mobilising stakeholder networks for uptake.

decision-makers, boosting R&I credibility and fostering positive mechanisms like research engagement and relevance.

This alignment is particularly important in politically challenging environments, such as Lebanon, and is amplified by active civil society involvement. Stakeholder readiness and receptiveness are key for R&I uptake, as they build capacities and opportunities to apply, adapt, and champion research findings. Direct collaboration and co-creation with stakeholders are essential. Timing research and leveraging policy moments are also critical, but academics often lacked direct access to policymakers, underscoring the value of partnerships with influential civil society and other partners.

5. Reciprocal capacity-building relationships are crucial for many STOs - strengthening research system capacities through diverse funding mechanisms could further enhance impact potential.

Case study evidence shows how these relationships, where both UK and LMIC partners develop skills and infrastructures, built a strong foundation for interdisciplinary and innovative work. Strengthened institutional capacities can sustain interdisciplinary collaborations into the future, responding to emerging needs beyond the life of the project. However, the cross-case analysis suggests that enhancing research capacities only leads to outcomes if other enablers, like accessible funding mechanisms, are present. Funds like GCRF could invest more in institutional research capacities, which has potential for sustaining long-term outcomes.

6. Networks are critically important for scaling outcomes but were not consistently prioritised and resourced.

The case study clusters highlight many examples of how agile networks and champions are critical for navigating complex policy, practice and market environments in LMICs. The international collaboration within GCRF awards provided access to networks which brought together expertise from a range of LMIC and UK actors, often while addressing mutual skills gaps.

Given the importance of networks as a significant driver of impact at scale, the lack of a fund-wide effort to build connections and coordination between GCRF awards working in the same countries on the same issues has been a significant missed opportunity. Networks have also not always reached their full potential, especially where funding was curtailed as a result of the ODA budget. Many of the networks and partnerships that were maintained were kept alive largely through individual efforts of researchers, based on pre-existing relationships. Sustaining the stakeholder networks over time needs continued support to build shared understanding, trust and momentum towards impact.

Recommendations

Recommendations	Owners

1.1. Future funds should adopt clustering awards and building cohorts for learning and impact as a strategic management approach (avoiding the limitations of the earlier Challenge Leaders approach).[10] The UK R&I funding architecture makes this complicated because it requires coordination across different POs as well as information sharing and resources for this at programme management level. Nevertheless, the added value for impact justifies the extra effort needed.	Fund owner DSIT and POs
2.1. **On-the-ground insight to ensure relevant, locally aligned R&I:** RIU is unlikely to happen without strong in-country insights and engagement at all levels, from locally led problem identification and co-creation of solutions to local leadership and locally led networks. Future funds need to prioritise and support fair and equitable local-level engagement – a crucial driver of equitable partnerships, as well as operating as key RIU mechanisms. 2.2. **A focus on gender, social inclusion and poverty reduction:** A focus on gender, inclusion and wider EDI issues can be challenging for R&I projects to integrate, requiring specialist skill-sets to understand how to involve vulnerable communities. Our evidence demonstrates that addressing EDI issues by analysing how a project impacts on existing inequities, and implementing appropriate mechanisms can catalyse pathways to impact. It is not only an ethical choice and is worth investing in for development impact. Future funds should prioritise EDI at the fund level, with expertise and tools to support teams in: (i) integrating an analysis of gender and intersecting vulnerabilities to understand how development challenges affect different groups of people; (ii) involving vulnerable communities in the research process; and (iii) identifying some of the less tangible barriers to positive RIU outcomes. *The other foundations for development impact are covered under the specific recommendation they relate to.*	Fund owner DSIT and POs
3.1. Future funds should continue to provide and sequence a diversity of award types to allow partnership development, growth of the networks, stakeholder engagement and collaborative ways of working that have been key to catalysing outcomes. Diverse granting should be done intentionally and applied within a clustering or portfolio approach at the country level. 3.2. Future funds can strengthen the position of the UK as a research partner of choice by offering longer-term funding opportunities with more certainty of continuation, particularly in areas where there is a global gap in funding opportunities. Crucially, this should include research activities that prioritise interdisciplinary and cross-sectoral working, capacity building, networks and stakeholder engagement.	Fund owner DSIT and POs
4.1 Iterative engagement requires flexible funding that can respond to changing dynamics. Future funds should continue to prioritise stakeholder engagement from the outset and provide the type of flexible funding for communications, events, arts-based approaches, evidence advocacy and policy influencing that has proved effective in GCRF. 4.2. Proof-of-concept testing that involves and engages the end users – communities, policymakers, practitioners and businesses – supports RIU through speeding up demand for innovations, as seen in the Kenyan community solar generation example. Future funds should fund pilots and demonstrate success through quick wins to provide the foundations for successful scaling.	Fund owner DSIT and POs
5.1. Future funds should improve the fairness of R&I funding, including establishing funding that can be awarded directly to LMIC research institutions, with a focus on mutual capacity strengthening between UK and LMICs. There should be recognition	Fund owner DSIT and POs

[10] See learning brief for a more detailed look at how to achieve this [link to be included once published].

of the specific capabilities LMIC research institutions bring in terms of building and sustaining national networks which are crucial for lasting change.	
6.1 Networks and stakeholder engagement activities were key enablers; their absence appeared to stifle potential for impact. Future funds should consider including dedicated networking funding mechanisms that support these activities, including dedicated resources for stakeholder engagement activities.	Fund owner DSIT

1. Introduction

This is a synthesis report of the Research into Use (RIU) case study evidence, generated from the Global Challenges Research Fund (GCRF) evaluation.

The Global Challenges Research Fund ran between 2016 and 2025 and has now closed. It was **a £1.5 billion R&I fund overseen by the United Kingdom's (UK's) Department for Science, Innovation and Technology[11] (DSIT) and predecessor Departments who commissioned this evaluation of the fund by ITAD.**

GCRF's evaluation has been conducted in three stages from 2020 to 2025, with the final stage of the evaluation (2023-2025) examining the fund's progress by gathering evidence to test its Theory of Change (ToC).[12] This addresses the final evaluation question:

"What results has GCRF produced or contributed to, and what has worked in terms of transforming outputs to outcomes, and outcomes to impacts?"

The evaluation has twin aims of accountability and learning of how GCRF has contributed to the UK's aid effort. [13] To understand GCRF's contribution to development outcomes in lower- and middle-income countries (LMICs), five case study clusters (four country-based, one regional), comprised of 36 awards, were conducted across five overarching themes:

1. Food security and agricultural sustainability in **India** – nine awards
2. Marine and coastal governance in the southern **Indian Ocean region** – nine awards
3. Clean, safe, resilient water supply in **Kenya** – six awards
4. Young people's access to education and employment in **Lebanon** – six awards

[11] Formerly the Department for Business, Energy and Industrial Strategy (BEIS).
[12] See Section 3 and Annex 1 for the GCRF ToC.
[13] Evidence on GCRF's management and focus on the foundations for impact can be found here: https://www.gov.uk/government/publications/evaluation-of-the-global-challenges-research-fund-stage-1b-synthesis-report
Evidence on GCRF's flagship programmes can be found here: https://www.gov.uk/government/publications/evaluation-of-the-global-challenges-research-fund-stage-1b-synthesis-report
Evidence on early impacts in research quality plus assessment available here: https://www.gov.uk/government/publications/evaluation-of-the-global-challenges-research-fund-assessment-of-research-quality-positioning-for-use-and-results

5. Socio-ecological resilience to climate change impacts in **Vietnam** – six awards

In each case study cluster, the analysis explored the pathways from R&I to outcomes and ultimately to real-world impact in each context. Based on this evidence, this report aims to establish GCRF's outcomes, understand success factors and identify lessons and recommendations for DSIT ODA teams and the UK POs that fund R&I. Secondary users will include other UK government funders of ODA R&I.

2. Overview of GCRF

This section provides an overview of GCRF and the strategic and policy context.

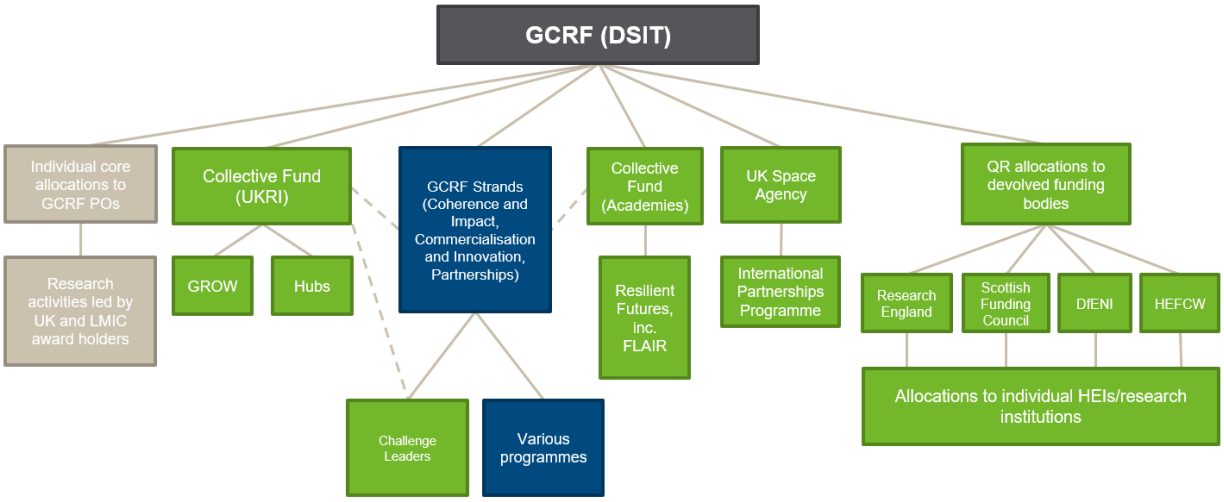
Rationale and objectives of GCRF

GCRF formed part of the UK's ODA commitment, established to mobilise international interdisciplinary R&I to address urgent and evolving global development challenges[14] as part of the UK government's commitment to the United Nations (UN) Sustainable Development Goals (SDGs). GCRF funding was managed and disbursed by Partner Organisations (POs) – the UK's R&I funders and the UK's four higher education funding bodies, as set out below in Figure 1.[15] POs commissioned a large-scale portfolio of R&I projects through their existing systems, sometimes jointly between councils and national academies. Grants and projects were implemented by UK researchers, higher education institutions and their partners in LMICs. Between 2016 and 2022, more than 3,000 grants were awarded in over 40 LMICs covering a range of development challenges, disciplines, modalities, partnerships and geographies.

Figure 1: GCRF architecture

[14]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

[15] 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, Higher Education Funding Council Wales and Department of Economy, Northern Ireland). 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.



Strategic and policy context 2023–24

Since its inception in 2016, GCRF has seen significant changes in the strategic, policy and economic context for UK science and innovation and international development, including:

- a new White Paper on international development, launched in January 2023[16]
- the creation of a new UK government department, DSIT, in January 2023, with oversight of GCRF and the evaluation
- the announcement, in March 2023, of the International Science Partnerships Fund (ISPF), a new ODA and non-ODA hybrid fund which brings DSIT's international R&D activity under one coherent approach
- the effects of the 2021/22 ODA budget reductions as a result of the Covid-19 pandemic response, experienced to some degree until the Fund's closure
- from 2024–25, three relevant ongoing reviews commissioned by the Foreign Secretary, which will shape the context for GCRF's outcomes in the UK and LMICs – one on maximising the benefits of integrated development and diplomacy, one on the UK's global impact and partnerships, and one on supporting growth through foreign policy and economic diplomacy.[17]

These changes retain a focus on the enduring global systemic challenges of the 2020s: addressing climate change, biodiversity loss and sustainable economic transformation; promoting equality and autonomy through opportunity; responding to conflict, fragile states and disasters; and strengthening food security. Ways of working continue to include mobilising

[16] FCDO (2023) International development in a contested world: ending extreme poverty and tackling climate change. A white paper on international development. Available at: https://www.gov.uk/government/publications/international-development-in-a-contested-world-ending-extreme-poverty-and-tackling-climate-change

[17] https://www.gov.uk/government/news/foreign-secretary-launches-expert-reviews-to-strengthen-uks-global-impact-and-expertise

partnerships, sharing UK expertise and strengthening local capacities in LMICs, and harnessing science and innovation for sustainable energy and economic transitions.

In this context, this report's analysis of GCRF's outcomes at country level remains highly relevant. In both the UK and LMICs, there is evidence that GCRF awards have contributed to addressing these systemic challenges. Awards have mobilised R&I communities across interconnected issues and systems and have built capacities to forge and sustain new, long-term relationships between researchers in the UK and LMIC countries. This contributes to the foundations for systemic change.

Nevertheless, the Covid-19 pandemic continued to affect GCRF awards and their impact potential until the Fund's closure. During 2022–23, most GCRF investments were significantly delayed or reprofiled by Covid-19 and the resulting ODA budget reductions. The decision was taken not to commission any new awards from 2022 onwards. GCRF spending was therefore on a declining trajectory ahead of the fund's closure in March 2025. Both of these trends have shaped the RIU outcomes analysed in this report.

3. Cluster Case Study Methodology

This section sets out the purpose and scope of this research into use study and report, within the overall evaluation and wider policy context described above. It presents the methodology for the cluster case study approach, including limitations.

Purpose and objectives

The purpose of this research into use module is to examine the outcomes that GCRF has contributed to in LMICs. To answer the evaluation question, the RIU objectives are to:

- synthesise insights on outcomes achieved across different LMIC contexts (*accountability*)
- analyse the extent and nature of GCRF's contribution to these outcomes (*accountability and learning*)
- elicit lessons for optimising the potential of future ODA R&I investments (*learning*).

Approach

A theory-based approach, contribution analysis, was selected to monitor progress along pathways in the five cluster case studies as its strengths lie in robustly testing ToC in complex environments.

Rationale and scope for examining research into use in GCRF

The GCRF ToC is the main tool for understanding whether and how GCRF's portfolio is progressing towards impact. It outlines the likely and intended pathways for the GCRF-funded R&I to contribute to real-world development results, whilst acknowledging the complex interactions of multiple stakeholders and agencies in varied innovation, policy and practice systems. GCRF's ToC is informed by a broad review of literature on how R&I are taken up and create real-world impact, ensuring representativeness and relevance to other R&I funds and programmes. The full GCRF ToC is included in Annex 1.

Scope

The overall impacts GCRF hopes to contribute towards are to: (1) progress on development challenges through the direct use and adoption of GCRF-supported policy, practice and technology innovations by development stakeholders (direct); and (2) establish new capabilities and systems for challenge-oriented, interdisciplinary R&I in both the UK and LMICs, sustained by enduring, equitable R&I partnerships (indirect).

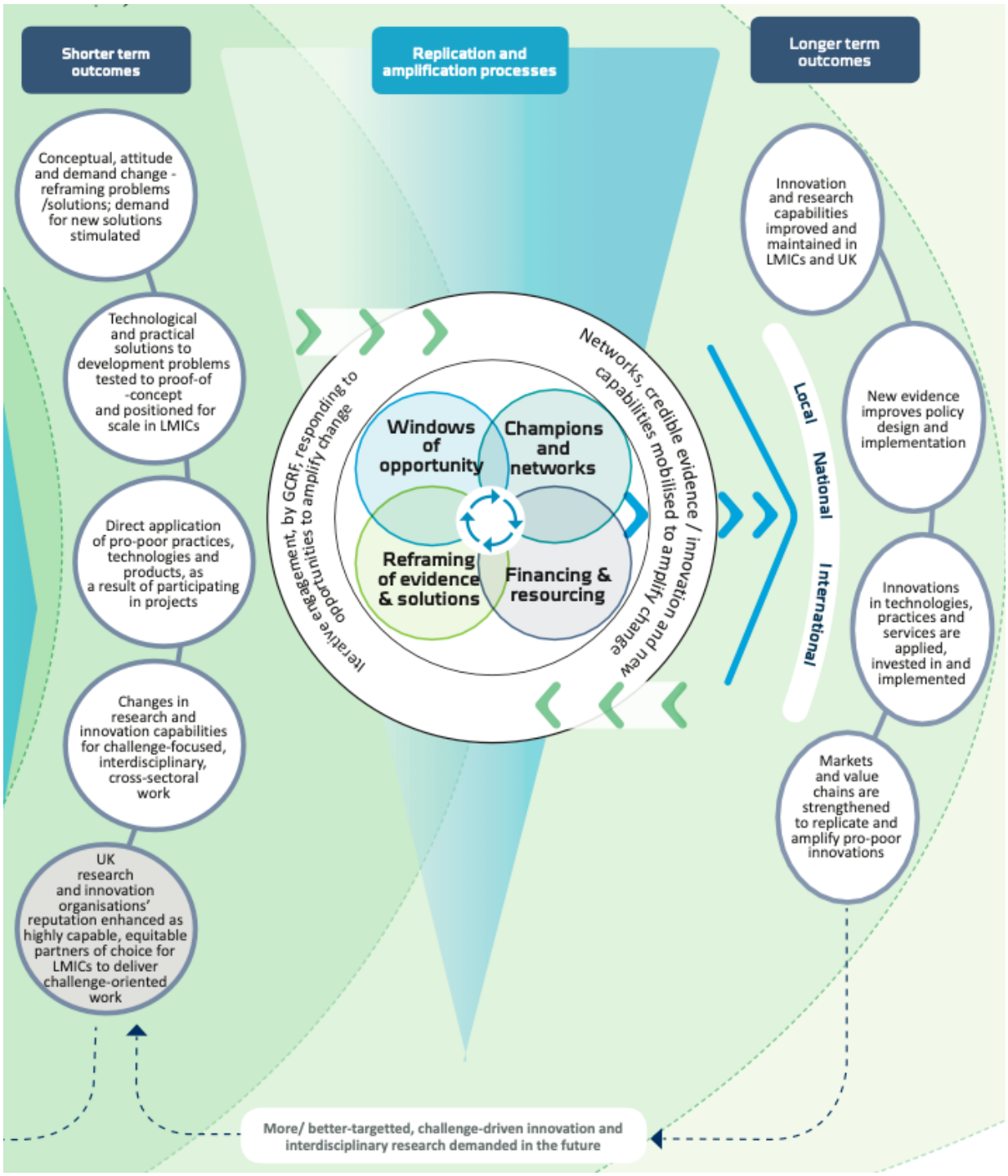
The ToC has four higher-level longer-term outcomes which provide the scope and focus of the RIU cluster case studies. The ToC anticipates that GCRF as a portfolio will establish the conditions for longer-term outcomes to emerge, working in combination over time to establish the desired development impact:

- **Policy**: New evidence improves policy design and implementation.
- **Practice**: Innovations in technologies, practices and services are applied, invested in and implemented to improve people's lives in different settings and scales.
- **Markets**: Markets and value chains are strengthened to replicate and amplify pro-poor innovations, products, technologies and services in different sectors and industries.
- **R&I**: Innovation and research capabilities (skills, systems, infrastructures) are improved and maintained in LMICs.

The dynamic factors which lead to long term outcomes are represented in the ToC as RIU processes, shorter-term outcomes and a set of interconnected "influencing conditions" for amplifying and replicating change (see Figure 2 overleaf for a summary and Annex 1 for a more detailed elaboration).

In the RIU case studies, we present and analyse evidence of GCRF's intended and unintended contributions, explained in terms of contributions towards those longer term outcomes in policy, practice, markets, and R&I. Our analysis also unpicks the complex processes and dynamics that underpin these outcome pathways, setting out how and why GCRF has contributed.

Figure 2: Overall impacts and high-level, longer-term outcomes **in the GCRF ToC**



Source: GCRF Theory of Change, 2022

Sampling clusters of case studies

The scale and diversity of GCRF – more than 3000 awards in over 40 countries, covering all SDGs – contributes to the complexities involved in the analysis, and in selecting an appropriate sample. A further complicating factor is that GCRF did not use a consistent programme model to commission R&I across contexts, as these decisions were devolved to the partner organisations (POs). This diversity meant that it was not possible to select a representative sample from the portfolio. To mitigate this, we selected five contexts which mirror the fund's heterogeneity – different geographies, sectors and themes. Within each of these, we clustered together a sample of awards from different POs and of different sizes, working on a similar theme – forming a case study cluster. Linking the case study clusters to existing theories and evidence on RIU pathways enables us to make comparisons across the cases and, more widely, to the rest of GCRF.[18]

Our selection of the case studies was based on theories of how R&I leads to real-world impact, an analysis of the GCRF portfolio, and DSIT priorities. First, we conducted a literature review to identify common theories of how RIU pathways work, as well as potential outcomes. We used this to enrich the range of pathways to real-world impact set out in the GCRF ToC. Second, we conducted an analysis of the whole GCRF portfolio to identify regions and thematic clusters to study. This review, together with previous evaluation evidence, informed the selection of case study sites and themes.[19] In close consultation with DSIT, case study themes were selected to reflect the broad range of work carried by GCRF award holders, in contexts with sufficiently large clusters of GCRF projects to investigate and from which to draw lessons on RIU within a system. Case study sites also reflected strategic priorities for the new DSIT ODA fund, ISPF. This helped ensure relevance of the findings.[20]

Evaluation questions

Module-specific questions were developed to guide the analysis of RIU pathways, as outlined in the table below.

Table 1: Evaluation framework

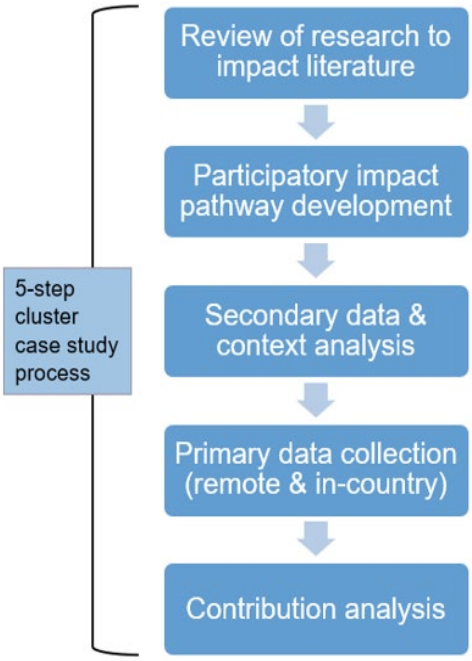
[18] NB: The full methodology is included in Annex 2.
[19] e.g. Research Quality ++ Assessment[19] (RQ++ module), fund-wide survey, process evaluations, and results assessments and other modules.
[20] The priorities of the new DSIT ODA fund are: Resilient Planet: "Leading the green industrial revolution to protect the planet" (clean energy; extreme weather and climate; agritech; environmental resilience); Transformative Technologies: "Developing responsible technologies to secure our place in tomorrow's world" (artificial intelligence (AI); quantum; engineering biology; semiconductors; future telecommunications); Healthy People, Animals & Plants: "Researching and innovating to ensure secure and healthy populations" (biosecurity and pathogen detection; global health and pandemics; genomics and digital health; antimicrobial resistance (AMR); social determinants of health); Tomorrow's Talent: "Nurturing talent to drive inclusion, research and innovation" (research capacity; research systems; research pipeline).

Overarching MEQ	Sub-Evaluation Questions
What results has GCRF produced or contributed to?	EQ 1. To what extent have GCRF awards produced short-term and longer-term outcomes within local systems? What is the evidence for this?
	EQ 2. What contribution did GCRF awards make in achieving these outcomes?
What has worked in transforming outputs to outcomes?	EQ 3. How and why did GCRF contribute to these outcomes?
	EQ 4. To what extent is GCRF research and innovation being applied and used in ways that enhance the potential for lasting impact?
	EQ 5. What lessons can be learned about the mechanisms and conditions needed to transform research and innovation outputs to outcomes and impacts?

Cluster case study methodology

Following a review of literature, evidence and the GCRF ToC, pathways to impact for each cluster were systematically developed from activities to impact. Input from the community of award holders in each context was key to capturing the intended trajectory from R&I to real-world impact in each context. The pathway within each case study was tested using primary and secondary data,[21] exploring evidence from individual awards before synthesising the awards from each cluster. An example of this can be found in Annex X. Synthesising the award-level findings as a cluster enabled us to understand the sum of GCRF results and contributions and reflect on how pathways to real-world impact operate within each specific context. The steps taken to carry out the case studies are shown in Figure 3 .

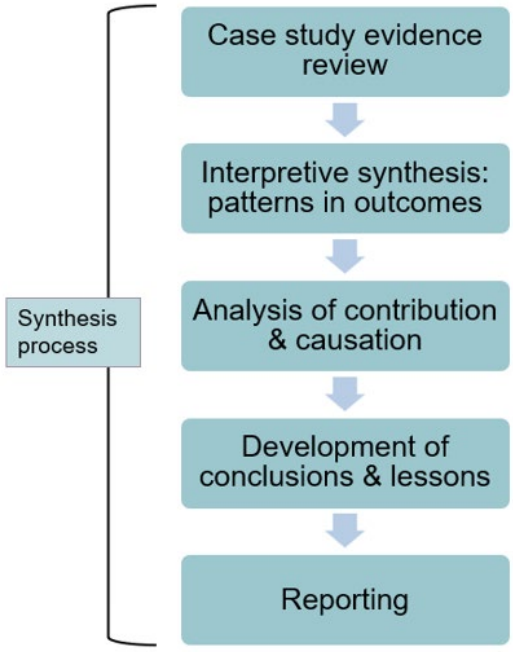
Figure 3: Steps taken to implement the case studies



[21] Interviews with award holders and their partners; review of award documentation

We then conducted the cross-case analysis, synthesising evidence from all five case studies to draw out patterns in the outcomes and the nature of GCRF's contribution. These findings determined key pathways in different R&I contexts and factors which influence them. The synthesis process involved identifying common outcomes across the contexts as well as those only partially achieved or not achieved. Pathways were mapped to explain how and why outcomes did or did not occur, with various qualitative analysis techniques used to develop initial explanations for outcome patterns. The analysis was subsequently deepened and refined, and GCRF contribution was analysed, including strength of evidence and confidence in the extent of the contribution.[22] This process is shown in Figure 3.

Figure 4: Cross-case analysis process



Challenges and mitigations

During implementation we experienced some challenges, which are listed, along with mitigations, in Table 2.

Table 2: Challenges and Mitigations

Challenges	Mitigations
Not all award holders responded, mainly due to awards having ended. Some clusters were not able to achieve the target of nine awards.	• A structured process for contacting award holders was carried out to encourage responses. POs were asked to provide additional outreach and reassurance, and the evaluation team also contacted award teams beyond the Principal Investigator (PI). • Awards were substituted where possible, but the context and theme requirements limited the options for replacements. Where an award remained non-responsive, it was excluded, and resources were reallocated to gain more depth on the responsive awards.
Limited documentation for some smaller awards.	• Interview guides were adjusted to address gaps and additional documentation was obtained from project teams and online sources to broaden the scope of information.
Some award holders were unwilling to share local partner contact details. Some award team members withheld consent to participate in key informant interviews (KIIs).	• Ethics protocols, privacy notices and consent forms were shared in advance. POs supported by reassuring award holders. In-country KIIs also yielded contacts to local partners. Additional KIIs were sought to gain additional perspectives.

[22] The rubric used to assess strength of evidence in included in annex 3. The templates used for award and cluster analysis are included in annex 4.

Increased volatility & risk of conflict in Lebanon – no in-person fieldwork was possible.	• Remote interviews were held and additional interviews were held where needed to gain more in-depth perspectives. The increasing crisis in Lebanon meant, however, that this remained a challenge.

5. Findings

This section summarises the impacts and outcomes achieved by the GCRF awards in the selected contexts and presents an analysis of the factors associated with success and how GCRF contributed (EQs 1–3).

Summary

Overall, reliable evidence from across the case study clusters indicates that awards have achieved faster progress towards real-world impact than was anticipated in the GCRF ToC. Table 3 overleaf summarises the achievements across the case study clusters.

The ToC includes an approximate timeline of anticipated outcomes and impacts. By 2024, the ToC expected to see examples of shorter-term outcomes (STOs):

- conceptual, attitude and demand change – reframing problems and solutions, and demand for new solutions stimulated
- technological and practical solutions to development problems tested to proof of concept and positioned for scale in LMICs
- direct application of practices, technologies and products that generate practical benefits to reduce poverty as a result of participating in projects
- changes in R&I capabilities for challenge-focused, interdisciplinary cross-sectoral work
- enhanced global reputation of UK R&I organisations as highly capable, equitable partners of choice for LMICs to deliver novel, challenge-oriented work.

The evidence indicates that the anticipated STOs have been achieved, with additional progress being made towards established, longer-term change, with the potential for scale. In all the case study clusters there are examples of how outcomes are combining to contribute to real-world impact at different scales, for example improvements in livelihoods at community level in Kenya and India and province-level market development in Vietnam. Examples of established change with scale potential, such as policies and practices being improved by GCRF evidence and innovations being scaled, were also observed in the case study clusters, albeit at early stages. Given the complex systemic processes shaping these

outcomes, this represents an important contribution by GCRF-funded awards towards real-world impacts on complex global challenges (see for a summary of LTOs).[23]

Progress has been driven by various RIU processes, both expected and new. Anticipated processes included collaboration between researchers and end users, while new ones involved evidence-based legal claims of customary rights. Key factors have hindered RIU processes and outcomes, notably in Lebanon, where the economic crisis and conflict have limited tangible results but provided insights into funding R&I and RIU in fragile contexts.

Building in foundations for impact from the commissioning through to implementation enhanced progress towards impact.[24] Foundations for development impact are ways of working that support: (i) on-the-ground insight to ensure relevant, locally aligned R&I; (ii) fairness and mutual capacity building in partnerships between UK and LMIC organisations, including non-academic partners; (iii) a focus on gender, social inclusion and poverty reduction; (iv) mobilising stakeholder networks for uptake.

The following subsections discuss the more embedded LTOs, which represent faster change than anticipated, and the STOs which have laid the groundwork for these. We first discuss what has been achieved in the specific outcome area and then explore the influencing factors associated with achieving outcomes, including the role of GCRF.

[23] Annex 5 sets out a summary of each cluster case study and its key findings.
[24] See earlier GCRF evaluation reports, e.g. Carden, F. *et al.* (2023) Evaluation of the Global Challenges Research Fund: Midpoint Synthesis Report: Assessing quality, impact positioning and early outcomes against GCRF's Theory of Change. Available at: https://assets.publishing.service.gov.uk/media/65b39720a0ae1b00125260b2/evaluation_of_the_gcrf__assessment_of_research_quality__positioning_for_use_and_results.pdf

Table 3: Overview of research-into-use case study clusters and achievements

Country	Region	Cluster theme	Example awards	Key achievements observed in the cluster
India 	South & Central Asia	Food security, nutrition & sustainability	Protecting Food Security in SE Asian Countries by Developing Early-Warning and Ready-Response Systems for Invasive Weed Incursions	• Co-produced mobile app for tracking invasive water hyacinth adopted by local communities and flower waste collection established as a local enterprise. • Improved efficiency and enhanced cold storage solutions for agricultural products in various settings. • Policy influence and government investment in sustainable agriculture and improved livelihoods in various states helped to scale results.
Kenya 	Eastern Africa	Clean, safe, resilient water supply	Harvesting the Sun Twice: Enhancing Livelihoods in East African Agricultural Communities through Innovations in Solar Energy	• Local communities adopted innovations and improved practices, including more efficient water and natural resource mobilisation in dryland regions; sustainable use of lake sites for fish farming; combined micro solar generation and irrigation systems. • Policy influence and regulatory change, including enhanced risk assessment procedures for livelihood and natural resource management; evidence-informed 'suitability maps' to inform new regulatory approaches to fisheries development in Lake Victoria. • Networks formed during these projects have helped to generate follow-on resources for initiatives related to water and food security.
Indian Ocean 	Southern Africa	Marine & coastal ecosystems & economies	GCRF One Ocean Hub	• Policy influence, including development of marine economy management plans and incorporation of evidence into international ocean governance processes. • Combined scientific and social science evidence strengthened advocacy efforts for the recognition of customary rights, including integration of small scale fishers' rights and livelihoods into marine spatial planning policy. • Contributions to adoption of ecosystem-based approaches to ocean governance and facilitating women's involvement in ocean governance processes.
Vietnam 	Southeast Asia	Socio-ecological resilience to climate change impacts	Improving Food Security and Adaptation to Climate Change in Northern Vietnam by Developing Rapid-Maturation Rice Varieties	• Innovative solutions developed to boost resilience, including weed risk assessment tools, climate-resilient rice varieties, and advanced flood modelling systems. • Increased use of evidence within policy processes on disaster risk management and impacts on rural livelihoods. • Contributions of new methods for hazard maps taken up in other regions, e.g. tropical cyclone impact forecasting in South Africa.
Lebanon 	Middle East & North Africa	Young people's access to education & employment	Building Futures: Aspirations of Syrian Youth Refugees and Host Population Responses in Lebanon, Greece & the UK	• Crisis context prevented the emergence of longer term outcome, but foundations established, including multi-stakeholder networks and equitable international partnerships to support outcomes in the education sector. • Capacity building of non-academic actors on key issues, e.g. disability awareness in media professionals. • Uptake of research findings by local actors, e.g. use of disability inclusive design by architects and designers involved in reconstruction of Beirut port.

What long term outcomes have been observed?

The case study clusters showed evidence of more rapid progress than anticipated towards GCRF's LTOs. Four categories of LTO were outlined in GCRF's ToC, anticipated to appear around 10–12 years after the fund's inception; the evidence suggests that these outcomes are emerging in the cluster case study settings within nine years. Although these are still at an early stage, there is some evidence to suggest that these positive changes have potential to become established and at scale. Given the volatility of global conditions since 2020, this is a notable contribution by GCRF researchers and innovators. The four LTOs relate to policy, practice, markets and R&I:

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

LTOs are described in the GCRF ToC as emerging indirectly within complex and dynamic local systems rather than being directly influenced by researchers' actions. Success is by no means guaranteed, and researchers are not expected to 'deliver' LTOs. Rather, they are accountable for building momentum and catalysing drivers for LTOs, ensuring the best possible positioning of their R&I products within local systems. This also means establishing and mobilising networks and catalysing new capacities to respond to opportunities for scaling and amplifying change in the context.

This section discusses the evidence for each of these outcomes, sharing some examples from the case studies. It provides an overview of where examples of LTOs were observed in each cluster case study and of our confidence in the evidence underpinning these.

Policy: New evidence improves policy design and implementation

GCRF R&I contributed to improved policy design and implementation in all five case studies, with national-level policy changes observed in Kenya and Southern Indian Ocean (South Africa). This is a key step in GCRF moving towards real-world impact at scale **(11 awards across four clusters).**

Although this broad outcome area is anticipated in the GCRF ToC, the evaluation was not expecting to find such clear evidence that this outcome has emerged across the case study contexts. Policymakers and decision makers are making use of GCRF-related evidence in the design of national planning processes, for example in marine spatial planning in South Africa and spatial planning for Lake Victoria in Kenya.

Table 4: LTOs and evidence confidence[25]

Country	Long term outcomes			
	Policy: New evidence improves policy design and implementation	**Practice:** Innovations in technologies, practices and services are applied, invested in and implemented on a wide scale to improve people's lives in different settings and scales.	**Markets:** Markets and value chains are strengthened to replicate and amplify pro-poor innovations, products, technologies and services in different sectors and industries	**Research and innovation:** Innovation and research capabilities (skills, systems, infrastructures) are improved and maintained in LMICs
India 	High confidence	Insufficient evidence	Sufficient confidence	High confidence
Kenya 	High confidence	Sufficient confidence	Insufficient evidence	Sufficient confidence
Indian Ocean 	High confidence	Insufficient evidence	Insufficient evidence	Limited confidence
Vietnam 	High confidence	High confidence	High confidence	High confidence
Lebanon 	Sufficient confidence	Limited confidence	Insufficient evidence	Sufficient confidence

GCRF evidence influenced policy and regulatory change in Kenya. This included enhanced risk assessment procedures for livelihood and natural resource management and evidence-informed 'suitability maps' to inform new regulatory approaches to fisheries development in Lake Victoria. In the Indian Ocean cluster, South African decision makers used GCRF-related evidence to develop marine economy management plans and incorporated evidence into international ocean governance processes. In Vietnam, we saw increased use of evidence within policy processes on disaster risk management and impacts on rural livelihoods, while in India, GCRF evidence helped catalyse state government investment in sustainable agriculture and improved livelihoods.

In the Kenya and Indian Ocean case studies, there is also evidence of GCRF R&I influencing local-level policy relating to resource management. Because building resilience in managing natural resources is increasingly important across all SDGs, this is a key contribution. For example, evidence has informed a suitability map for cage fish farming in the Kenyan part of Lake Victoria. Suitability maps help fish farmers and planners

[25] The evaluators used a consistent rubric to make judgements about the strength of evidence, as follows:
High confidence – High level of confidence in the evidence, based on a good degree of coverage, coherence and points of triangulation in the evidence, with triangulation (a) across documentary sources, (b) across stakeholders and types of stakeholders, and/or (c) across all five lines of evidence;
Sufficient confidence – More confident than not in the evidence, but confidence reduced by shortcomings with regards to coverage, coherence and triangulation within and/or across the evidence, and/or some contradictions in the evidence;
Limited confidence – Low level of confidence in the evidence, so findings should be treated as tentative, with reliability reduced through limited or partial coverage, coherence and triangulation, and/or major absences of evidence and/or contradictory insights;
Insufficient evidence – Insufficient evidence to support a contribution judgement.

identify optimal locations for establishing and operating fish farms, ensuring the best possible conditions for fish growth and production and enhancing sustainability. Unregulated fish farming poses potential negative impacts on water quality, affecting local communities. Integrating community perspectives and knowledge significantly enhanced efficiency of the tool. The comprehensive cage suitability map has been adopted by regulators as a licensing tool for aquaculture in Lake Victoria, streamlining the investment process.

In the Indian Ocean case study, GCRF-funded marine modelling findings were taken up into national and international ocean governance documents, including a marine management plan associated with the UN High Seas Treaty. Further related outcomes included local investment supporting the establishment of a marine science centre and international investment in Western Indian Ocean fisheries. These examples underscore the transformative impact of GCRF-funded research in enabling evidence-based decision making, promoting sustainable resource management, and fostering a blue economy in the region.

Where GCRF awards contributed to resource management policy outcomes, collaboration with low-income communities has emerged as a key RIU process, helping to ensure that their perspectives are reflected in policies. This is notable given that these communities are often excluded from decision-making processes. Inclusion of vulnerable groups in research processes is one of the foundations of development impact that the evaluation has previously highlighted. Evidence from the case study clusters showcases how this enhances the potential for LTOs. For example, evidence on the customary rights of low-income communities has informed the design of marine area management plans in Indian Ocean (South Africa) and Kenya. In South Africa the customary rights of small-scale fisher communities to access marine and coastal areas were in danger of being excluded from the new national marine spatial planning process, with detrimental effects on their livelihoods, food security and cultural heritage. Participatory interdisciplinary research funded by GCRF's One Ocean Hub has made a significant contribution to building the profile and agency of small-scale fishers as stakeholders in decisions on marine planning. As a result, customary fishing rights have been included in marine spatial planning maps and formed the basis of successful legal challenges against extractive industries to protect customary fishing areas.

Practice: Innovations in technologies, practices and services are applied, Invested in and implemented

Fifteen awards across three case study clusters in India, Vietnam, Kenya and Lebanon supported innovation uptake. An award in the Vietnam cluster has developed a mapping methodology used to forecast extreme weather conditions. Their methodology was then used in southern Africa for tropical cyclone impact forecasting. Humanitarian organisations such as the Red Cross have since used this data to produce emergency reports. The methodology for water hyacinth detection, developed under an award in the India cluster, was applied in Lake Victoria in Kenya because of the involvement of a Kenyan PhD student in the award. This in turn stimulated the government of Orissa's interest and spurred additional funding and efforts focused on composting and recycling water hyacinth.

There are other examples of GCRF innovations supporting better-informed disaster response and resource management. This has been driven by GCRF teams increasing access to key datasets with LMICs. A flood forecasting tool developed by a GCRF team produced survey results which have enhanced understanding of Vietnamese Central Highlands farming communities' sensitivity to climate change and floods. Knowledge gained from the surveys has likely contributed to global flood risk mapping efforts, impacting disaster risk reduction planning , for example, the methodology was subsequently applied to tropical cyclone impact forecasting in Southern Africa. In Kenya, a GCRF team designed suitability maps to regulate the rapidly expanding fish farming industry in Lake Victoria, which had been operating under limited regulation because of the absence of national policy and regulatory frameworks. This tool has been widely adopted by the state department in charge of blue economy as an official licensing tool for aquaculture in Lake Victoria, contributing towards sustainable natural resource management through mitigating negative impacts on water quality. The tools and resources developed under these awards have the potential to significantly influence climate change mitigation and adaptation strategies and investments at scale.

Even in the very challenging context of Lebanon, there was some evidence of GCRF evidence influencing practice through the team's ability to respond to new needs arising from the crisis there. The challenges of the crisis in Lebanon meant that awards were not able to achieve their desired outcomes (see limitations discussed in Section 3). However, there is still important learning on how research can be moved into use under these circumstances.

Lebanon: R&I in crisis

The Lebanon case study is distinct from the others because of the worsening economic and financial crises taking place there from 2019. The severity of the crisis has pushed over 80% of the population into poverty and has driven unemployment up to around 30%. Nearly half of those affected are children and adolescents, including refugee populations from Syria and Palestine. Public services are overstretched with demand as a result.

This had profound implications for the GCRF awards in the cluster and for the results they were able to achieve. Awards were particularly affected by the reduced capacity of the Lebanese state to implement policy and services and to act on policy-oriented R&I insights. For example, awards found that they were able to engage in dialogue with key stakeholders, including those from government, about the needs of marginalised young people in education but that there was no space to turn these into concrete outcomes.

Despite this, the evidence showed that ODA R&I funding had an important role to play in this crisis context. The money enabled researchers to keep working, even in difficult situations, and to protect vital space for R&I to continue generating knowledge and insights.

For example, to meet the challenge of improving disability-inclusive action, in the context of education and employment for people from displaced communities in Lebanon, disability-inclusive guidelines have been made available and accessed in relation to reconstruction in the wake of the Beirut port explosion. In addition, journalists trained under the same award demonstrate increased use of inclusive language. Although there is no available evidence of how far the outcomes and impacts from the award's achievements extend, there is strong evidence of potential contribution towards transformational change through the use of inclusive language.

Markets: Markets and value chains are strengthened

Using small grants, including networks, to stimulate value chains has strengthened market opportunities for agricultural communities living in poverty in Vietnam and India. Three awards in the Vietnam and India case study clusters show evidence of this outcome being achieved. Effective use of small grants catalysed networks to facilitate the flow of funding, technical expertise and cross-communication with stakeholders along the value chain. This was supported through exploring new business models while fostering public–private partnerships. In the case of India, this has enabled the development of applications or digital platforms that farmers could use to access market information, manage logistics, or extend the shelf life of perishable goods. These contributed significantly to strengthening the supply chain for smallholder farmers, who are more likely to experience poverty than others within the agricultural sector.

These awards worked by developing commercially relevant, innovative technologies to address an environmental or public health issue within a value chain, thereby making it stronger. In India, one research team identified new techniques for isolating chemical compounds from the flower waste resulting from religious ceremonies, creating a new market for the collection, processing and use of these materials. In Vietnam, GCRF researchers developed a new business model within the existing rice production value chain through gaining a patent for innovative use of rice proteins and through developing technological tools to monitor risks to crops. More evidence would be needed, however, to understand how these value chains are explicitly pro-poor, per the objective of GCRF, beyond contributing economic gains within contexts where there are high levels of poverty. Although it is still relatively early to see changes at this systemic level, these emergent outcomes are promising.

R&I: Innovation and research capabilities are improved and maintained in LMICs and the UK

Evidence from the RIU case studies for improved innovation and research capabilities centres around greater opportunities for career progression and employment for researchers, particularly early career researchers (ECRs). This was observed across almost all awards in all clusters. This provides more insights into how this important foundation for development impact – mutual capacity building – has strengthened progress towards outcomes. The awards provided training in new skills that directly benefited researchers and contributed towards the successful research within the awards themselves. For example, opportunities for knowledge exchange between researchers were provided in one Indian Ocean award through establishing a training centre to support increased research and technical marine science skills; more senior researchers provided support, guidance and leadership to more junior colleagues, which has supported career progression both within and outside the institution. In the case of the One Ocean Hub (Indian Ocean), the Hub collectively decided to shift funding towards ECRs during Covid to improve their career stability, acknowledging that many senior researchers have stable contracts or permanent positions. Even in Lebanon, where progress towards LTOs was curtailed by worsening economic and political crises, there were good examples of reciprocal exchange between researchers and

stakeholders (teachers) in Lebanon, Europe and the UK. Through these efforts, GCRF awards played a critical role in creating a supportive environment for young researchers, helping them to build valuable skills, gain practical experience, and advance their careers in research and development. Researchers also benefited from the use and presentation of the rich body of data generated under awards, enhancing their personal academic standing. Given the scale of GCRF funding, and the evidence that these outcomes were observed in a large majority of awards, it is possible to infer that this has had an important impact on R&I capabilities in countries where GCRF has been active. However, further evidence would be needed to confirm this.

There is also some evidence of R&I capability building at institutional level, particularly in India and Vietnam. The networks created or sustained through GCRF awards have supported institutional learning and collaboration and acted as a conduit to bring in resources and further funding. This evidence highlights how fairness in partnerships promotes mutual capacity development and supports the establishment of new capabilities for R&I in LMICs. In India, teams leveraged their institutions' existing networks and platforms to support official collaborations, which enabled pooling of resources and expertise, fostering a collaborative research environment. This provided opportunities for ECRs and facilitated collaboration between UK-based researchers and Indian and Ethiopian partners, enabling knowledge transfer, capacity building, and the establishment of a robust international research partnership. In one example of this outcome, a GCRF networking grant funded a two-day workshop in which numerous new collaborations and fledgling projects were initiated. The follow-on grant from the Royal Academy of Engineering, obtained via the original networking grant, helped establish a collaborative network between the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the University of Stirling, the University of Strathclyde, and other partners. This network was instrumental in the development of early researchers and their career progression. Similarly, in the Vietnam cluster awards, GCRF facilitated partnerships and collaborations with UK-based research institutes, fostering knowledge exchange and providing access to advanced expertise. These collaborations not only enriched the learning experiences of the Vietnamese researchers but also opened pathways for further research opportunities and career progression.

The evidence also showed R&I capabilities being strengthened not only among researchers and institutions in the higher education sector but also in partners operating in the systems that GCRF seeks to influence. Similarly, this evidence highlights how important non-academic partnerships are for outcomes and for promoting new interdisciplinary capabilities for R&I. Emerging evidence from India, Vietnam and Lebanon found that developing R&I skills among civil society and private sector partners supported the uptake of evidence and the demand for R&I-led practice. For example, interdisciplinary partnerships have sparked entrepreneurial ventures among students and local industry in Vietnam. At Hanoi University, one student launched a small business using rice protein to produce snacks, benefiting from resources, mentorship, and industry collaboration. These initiatives helped students transform research ideas into market-ready products by building research capacity, linking with industry needs, and offering real-world exposure. This approach has equipped students with essential skills and connected them with market opportunities. In one Lebanon award, ongoing collaboration between a university partner and a non-governmental organisation (NGO), facilitated by the award's PI, has had an impact on the NGO partner's internal processes. These include their research practices, use of evidence, learning, advocacy, and their approach to delivering education. In the case of another award, co-learning and design activities which were part of the process of preparing proposals for further GCRF funding led to two non-academic POs sharpening their focus on research-oriented activities. Rooting GCRF's contribution in systems in this way increases the likelihood of higher-level, far-reaching and sustainable impact further down the line.

Excellence in equity, diversity and inclusion (EDI) supports research impact

The analysis showed the benefit of building EDI considerations into R&I. EDI is often presented as the right ethical choice, but our evidence demonstrates that it also pushes projects towards better results. Placing EDI at the centre of an ODA R&I project helps focus attention on how and why development challenges affect different groups of people, and identifies some of the less tangible barriers to positive RIU outcomes. There are many examples across the case studies of EDI considerations built into projects.

One award in Kenya demonstrated excellent practice in applying an EDI lens to their work to develop solar technology that addresses energy gaps while allowing land to be used for agriculture. Although focused on developing the technology, the team approached the project in terms of the equity issues within energy and land use that contribute to poverty. They considered fair distribution of the benefits of the technology, representative decision making, and potential impacts on different groups within the affected communities. This helped ensure their innovations were pro-poor, helped build understanding and demand for their technology, and prompted private sector engagement.

How did GCRF's short term outcomes lay the groundwork for the faster progress observed?

As noted earlier, the evaluation expected to find evidence that STOs were being met. As faster progress has been made, the evidence provides insights into how these STOs have combined with ongoing RIU processes in different contexts to create pathways for further progress to happen. There is evidence of outcomes across four of the five outcome

categories anticipated in GCRF's ToC (see Annex 1) . However, there is no direct evidence for the fifth outcome category – enhanced global reputation of UK R&I organisations as highly capable, equitable partners of choice. Some progress in this area can be inferred from examples where collaborators in GCRF awards continued to work together post-award to pursue further funding opportunities.

Table 1: STOs and evidence confidence[26]

Country	Short term outcomes				
	Conceptual, attitude and demand-change	Technological and practical solutions tested to proof of concept	Direct application of pro-poor practices, technologies and products – project scale	Changes in capabilities for challenge-focused, interdisciplinary, cross-sectoral R&I	Enhanced global reputation of UK as capable & equitable partners
India 	High confidence	High confidence	Sufficient confidence	High confidence	Insufficient evidence
Kenya 	High confidence	Sufficient confidence	Sufficient confidence	High confidence	Insufficient evidence
Indian Ocean 	High confidence	Sufficient confidence	Sufficient confidence	Sufficient confidence	Insufficient evidence
Vietnam 	High confidence	High confidence	Sufficient confidence	High confidence	Insufficient evidence
Lebanon 	Sufficient confidence	Limited confidence	Insufficient evidence	Limited confidence	Insufficient evidence

There was evidence across all case study clusters of conceptual, attitude and demand change among stakeholders. This was a foundational change across contexts, where changes in perspective on problems and solutions were catalysed through being involved in the research process (13 awards). For example, in the Indian Ocean, Lebanon and Kenya clusters, there was evidence that stakeholders at all levels had gained a greater awareness of issues through being involved in the research process and becoming sensitised. Evidence from 10 awards across these case study clusters highlighted how this experience catalysed a sense of agency and new capacities to tackle issues among stakeholders directly affected by the R&I topic. Greater effects were observed where there was a genuine process of co-production between stakeholders and researchers. One award in Kenya exemplified this

[26] As before, the evaluators used a consistent rubric to make judgements about the strength of evidence, as follows:
High confidence – High level of confidence in the evidence, based on a good degree of coverage, coherence and points of triangulation in the evidence, with triangulation (a) across documentary sources, (b) across stakeholders and types of stakeholders, and/or (c) across all five lines of evidence;
Sufficient confidence – More confident than not in the evidence, but confidence reduced by shortcomings with regards to coverage, coherence and triangulation within and/or across the evidence, and/or some contradictions in the evidence;
Limited confidence – Low level of confidence in the evidence, so findings should be treated as tentative, with reliability reduced through limited or partial coverage, coherence and triangulation, and/or major absences of evidence and/or contradictory insights;
Insufficient evidence – Insufficient evidence to support a contribution judgement.

collaborative approach in their work on using solar technology to improve energy access. They actively involved community members and other local stakeholders in a co-produced research process to solve problems and co-develop evidence-based policy applications. This inclusive approach empowered local communities and sensitised the wider community to the threats facing their landscapes and encouraged their active participation in preserving their heritage. However, context can present effective barriers between researchers, intended users and actors at other institutional levels that hinder potential collaboration, co-production and therefore receptiveness to and uptake of R&I. This could be seen in the Indian Ocean cluster, where two awards highlighted how legacies of colonialism and mistrust of western interference, notably in South Africa, contributed to challenges in establishing relationships and building trust among researchers and local stakeholders, particularly in the early stages of these relationships. In one award this was compounded by a lack of trust among South African small-scale fishers towards government agencies, coupled with a less supportive regulatory environment, which meant that the success seen in Madagascar was not echoed in South Africa.

This outcome also involved stimulating demand for new solutions, which further supported uptake of context-driven, relevant research by stakeholders outside the R&I community such as practitioners and policymakers – an important precondition for policy and practice-related change. Perspective change is often needed among stakeholders who are more distant from the issues, particularly decision makers (e.g. policymakers and resource managers). In the Indian Ocean cluster the One Ocean Hub, a large-scale (£18 million) programme of R&I related to ocean governance, used arts-based approaches to catalyse new perspectives on issues. A theatre piece, Lalela uLwandle, combined intergenerational stories and marine science evidence to highlight small-scale fishers' customary rights to the sea for their cultural, food security and livelihood needs. It included post-performance sessions which acted as forums for community representatives to interact directly with marine scientists and policymakers who were otherwise unreachable. These forums provided further opportunities to build links and dialogue among stakeholders on a potentially divisive issue in ocean governance. In Lebanon there was an example of how solutions to problems related to young people's education and employment were specifically defined by users/adopters of research at the outset. As noted earlier, aligning to local needs is a foundation for development impact. In this example, it was key to creating demand for the research and thereby achieving results. Educators and communities engaged with the research because they felt the research would make a difference to them and their future. This STO contributed particularly to the Policy LTO and the Practice LTO.

Our analysis suggests that this STO was linked closely to another: testing solutions to proof of concept (21 awards across four case study clusters, contributing to Practice and R&I LTOs). Working with stakeholders and communities to test innovative tools and ideas helped speed up the process of stimulating demand, generated understanding about the local conditions needed for adoption, and strengthened the network of potential users and positioned ideas to be scaled up. In Madagascar, for example, a One Ocean Hub project

demonstrated the potential of emergency transponders for small boats, thereby catalysing greater demand for using the technology at scale.

Co-creation was the crucial RIU process in these examples. The best examples of co-creation actively involved stakeholders at stages of their R&I project, including consultation, agenda setting, implementation, testing of outputs and capacity strengthening in communities. This approach facilitated a comprehensive understanding of the contextual challenges, integrated diverse perspectives, and ensured that the project outcomes were relevant, impactful and sustainable within the community.

Testing technological and practical solutions to proof of concept worked in turn to support application of practices, technologies and products that generate practical benefits to reduce poverty, , creating conditions for practice-related outcomes to emerge (10 awards in two case study clusters, supporting Practice LTO). In the Vietnam and Kenya clusters there was evidence from 10 awards to demonstrate development and testing of locally relevant research and solutions, laying the foundations for application at scale. In Vietnam, for example, prototyping platforms for rice protein utilisation led to a patent being successfully obtained – a key proof of concept. The team mapped and created a value chain model engaging local stakeholders, including Vietnamese plant protein companies, which contributed to strengthening the supply chain for rice protein. Testing their models to proof of concept showed benefits to rice farmers through identifying areas for waste reduction in the supply chain – a pro-poor innovation resulting from the team's technological solution.

Where contextual understanding and community engagement of this type were lacking, technological solutions did not achieve proof of concept or encourage pro-poor practices. In the Indian Ocean cluster, one award implementing marine transponders to support small vessel safety was unsuccessful because the team had not sufficiently involved small-scale fishers and were therefore not aware of their concerns about the technology being used for surveillance by authorities.

Where teams established effective, reciprocal capacity-building relationships, the evidence showed institutional-level improvements across partners for working in interdisciplinary and innovative ways. This underpinned all the other STOs and contributed to all the LTOs. This effect was chiefly observed in the Kenya, Lebanon and Indian Ocean case studies. One Kenya-based award implemented a comprehensive range of activities in institutions, including capacity building for research management and recruitment of postdoctoral researchers, which had never happened before in that specific context or those academic disciplines. In the Indian Ocean cluster, a new marine science research institution was created. The Lebanon case study highlights academics building research capacities of partners (e.g. NGOs) while also benefiting from the on-the-ground experience of partners, including non-academics. This enabled the development of evidence-based policy for including disabled young people in education.

There was emerging evidence of a new outcome area, not anticipated in the GCRF ToC, where communities gained legal resources and capacities to engage with judicial

processes to advocate for their customary rights. This was a key contributor to policy-related outcomes and was observed in the Indian Ocean and Kenyan clusters. In Indian Ocean (South Africa), the customary rights of small-scale fisher communities to access marine and coastal areas were in danger of being excluded from the new national marine spatial planning process, with detrimental effects for food security, livelihoods and cultural heritage. The One Ocean Hub's participatory interdisciplinary research made a significant contribution to building the profile and agency of small-scale fishers as stakeholders in decisions on marine planning. One Ocean Hub evidence and arts-based submissions formed the basis of successful legal challenges brought by community leaders against extractive industries denying community access to customary fishing areas.

In Kenya we found evidence of communities advocating for the conservation of their cultural heritage. One award sought to bring archaeologists and community organisations together in a new initiative to conserve the wells and their landscapes for cultural heritage preservation and tourism across northern Kenya and southern Ethiopia. This ultimately empowered the communities to become advocates for the preservation of their cultural heritage, fostering a sustainable and impactful outcome.

Optimising impact potential: what has worked?

Achieving large-scale impact is complex and uncertain, influenced by dynamics beyond the control of researchers and innovators. Their role is to contribute to or catalyze processes that may lead to change. Progress relies on the actions of others and on sociopolitical or economic factors that can either aid or hinder change. The GCRF Theory of Change (ToC) integrates these ideas into "influencing conditions," some of which can be shaped by researchers, while others occur by chance. These dynamics create varying conditions for scaling outcomes from research and innovation, such as political opportunities, active networks, and available financing. Implementers can navigate these dynamics through stakeholder engagement, seizing opportunities to amplify change, building networks for evidence take-up, and mobilizing new capabilities. The next section examines how GCRF researchers have navigated these conditions in the case studies.

Iterative engagement and responding to opportunities to amplify change

In all case studies, iterative engagement at local and national levels was key to building contextual understanding and enhancing the receptiveness of stakeholders as a key enabler for outcomes. Underlining the importance of the foundations for impact, the case study clusters showed various examples where R&I (e.g. tools, guidelines and data) that had been co-produced with stakeholders were more aligned with the concerns of decision makers and communities and responded better to local conditions. Where R&I products have been informed by stakeholders' perspectives, they were more likely to feel it would make a difference and the research was likely to be seen as more credible. For example, in Lebanon demand-based approaches to award focus and activities meant that GCRF researchers sought solutions to problems specifically defined by users or adopters of research. Educators and

communities engaged with the research because they felt the research would make a difference to them and their future. Researchers in Lebanon were also able to pivot to find opportunities to enhance the relevance of the research, even where the political environment was unconducive. Researchers produced a report on Covid-19 that was not originally planned, due to the flexibility of GCRF that created the space to respond to a rapidly evolving context and, reportedly, influenced policy change.

In a contrasting example from the Indian Ocean case, a study on squid fisheries off the South African coast did not find alignment between science-led interest in how squid fisheries behave under warming sea currents and local decision makers' interests in early indicators of fish stock collapse. The marine science did not fully integrate this focus, although it did identify potential connections between the two issues. The decision makers, however, could not see how to make the highly scientific data useful to their timelines and processes, and an opportunity was missed.

Iterative engagement between researchers and stakeholders was further enabled where there was an existing, active civil society working in the same field as researchers. This was evident in the Lebanon case study, for example, where there is an active network of civil society organisations working on disability. In the Lebanon case study, the receptiveness of journalists to training by civil society actors on inclusive language led to improvements in inclusive language used in media. Receptiveness was enhanced by award holders' high level of relevant expertise with regard to media literacy and supporting other professionals in improving their approaches to inclusivity and ableism. In the Indian Ocean case study, an active community of civil society organisations in South Africa working to support small-scale fishing communities was instrumental in amplifying the research on their rights and livelihoods in coastal areas.

These insights highlight the need for researchers seeking real-world impact to develop an in-depth understanding of how problems are recognised and framed by stakeholders in the context as an integral part of their research. Engaging iteratively with stakeholders can help to build credibility for the research, leading to local stakeholders being more receptive to applying it.

Networks, credible evidence/innovation and new capabilities mobilised

The case studies highlight many examples of how agile networks and champions are critical for navigating complex policy, practice and market environments in LMICs. Even in unpromising governance environments, however, windows of opportunity can emerge, and well-networked researchers, partners and stakeholders can respond to these. In Kenya, researchers were able to mitigate the dominance of the election campaign through sustained engagement with decision makers and through collaborative problem solving that helped identify key challenges and knowledge gaps in areas such as cage fish farming, land use, climate change and water governance.

This agility includes creating new networks and mobilising existing networks and networking opportunities. For example, in the Indian Ocean case study, GCRF-supported researchers and their network of partners in South Africa were able to respond to the window of opportunity presented by the nationwide marine spatial planning process. This process was at risk of excluding small-scale fishing communities, with customary rights and access to make a living from the sea, from the consultation and subsequent policy design. The network that was mobilised was in part formal and in part a looser configuration of researchers and activists who had been working on the issue of the rights of small-scale fishing communities for many years. The marine spatial planning process and associated consultation process created salience for the issues and also created a 'policy moment'. The network was able to mobilise a combined package of marine science, participatory social science, arts-based approaches and evidence-based legal challenges that were influential in enshrining small-scale fishing communities' customary rights in the marine planning process.

These examples emphasise how establishing local leadership and convening networks in LMICs have been key to navigating unconducive or politicised environments for the uptake of R&I. Even where the context is not stable and/or receptive, the locally led network can maintain the salience of an agenda or issue area and continue to develop work around it, poised to respond and mobilise evidence across multiple spaces when a window of opportunity opens. This is illustrated by the Lebanese networking and engagement award working with civil society organisations on inclusivity and raising disability awareness.

The international collaboration within GCRF awards provided access to networks which brought together expertise from a range of LMIC and UK actors, often while addressing mutual skills gaps. In India, collaboration between UK research institutes and local researchers brought together different expertise to develop algorithms for thermal data processing and training students in advanced techniques. Vietnamese partners were able to leverage the reputation of UK institutions to give them access to new networks and key stakeholders, which was important for uptake of their innovation. Access to community and private sector networks in Vietnam and India was equally important. Including local researchers, institutions and organisations with these contacts helped to tailor technological innovations to the relevant market and value chain and to create demand for and interest

Follow-on investments mobilised by GCRF

GCRFs support for initial research activities and showcasing of project outcomes unlocked subsequent funding streams, advancing research and innovation. This ensured locally-relevant solutions and greater research impacts.
In India, a GCRF networking grant led to the development of a mobile app for estimating invasive weed spread, used by local communities and researchers. The project's success attracted government attention, leading to further investments, such as Orissa' state government providing funding for composting and recycling water hyacinth. The methods were then adapted for detecting water hyacinth in Kenya's Lake Victoria, highlighting international learning and replication.

GCRF funding also opened access to government and international networks, driving long-term outcomes. In Kenya, the national government partnered with a foundation to scale up the Lake Victoria spatial plan. In South Africa, government investment in marine science infrastructure was mobilized, and in India, increased investment in livelihood improvements and sustainable agriculture was achieved through GCRF awards.

in the tools and services. Awards have also catalysed champions, notably in Indian Ocean and Kenya, where the ability of community advocates and civil society partners to participate in various decision-making processes in defence of their customary rights has been strengthened by evidence-based legal resources. An important function of these champions in Indian Ocean (South Africa) was that they often had better fluency with local practices and processes and better understanding of the local science–policy interface, enabling research outputs to be accessible to key decision makers.

At times, however, networks have not always reached their full potential, especially where funding was curtailed as a result of the ODA budget reductions in 2021/22. GCRF has made a significant contribution to network building through encouraging and funding proposals aimed at fostering collaborations between scientists in UK and in the global South. However, in many instances across the case studies, intended networks were not properly consolidated, largely because of ODA budget reductions and the lack of alternative funding. This meant that for some awards, even short-term intended outcomes (e.g. network producing research outputs, as in the Lebanon case study) were not achieved. Moreover, the networks and partnerships that were maintained were kept alive largely through the individual efforts of researchers, who had often known and worked with each other before GCRF.

Given the importance of networks as a significant driver of impact at scale, the lack of a fund-wide effort to build

Contextual factors hindering RIU outcomes and processes

The RIU case studies highlighted how numerous barriers in the context have hindered RIU outcomes and processes. These are likely both to challenge the extent to which outcomes could become established and also to limit the potential to scale.

Political and governance dynamics affect stakeholder behaviours around research and its use in policy and practice, and most awards have had to contend with this. For example in Kenya, the ongoing presidential campaign meant that policymakers focused mainly on political matters over policy and evidence initiatives. In Lebanon, the politicisation of research agendas, especially on refugees and education, was a serious barrier to policy uptake. In India and Vietnam, multi-level governance systems mean that agriculture, food security and livelihoods policies are also affected by disconnects and overlapping processes. Successful awards were able to navigate these dynamics through ongoing stakeholder engagement at different points in different governance settings, engaging across multiple channels and policy processes.

The Covid-19 pandemic was a major global disruptor, impacting the implementation of GCRF awards around the world, with ongoing effects evident in 2024. Award holders and other stakeholders highlighted delays to research and hindered travel caused by Covid-19 restrictions, the negative impact on networking and the inability to meet in person as research teams, and limitations on learning opportunities when activities were forced to go online. However, there is evidence that where awards are still active following the end of lockdowns, there have been opportunities to revive activities previously curtailed by restrictions. For some researchers, the ability to respond to context and pivot their research to respond to Covid-19 provided an opportunity to contribute to the current context.

Funding limitations have posed another significant barrier to LTOs, mainly arising from the UK's ODA budget reductions as a result of the pandemic response. During 2021–23, most GCRF investments were significantly delayed or reprofiled by Covid-19 and the resulting ODA budget reductions. Across the case studies, this appears to have particularly impacted ECRs – through limiting either the funding available for capacity building and training activities or the number of ECRs able to participate in the research – thereby constraining opportunities for capacity strengthening, career development and progression. Network consolidation has also been affected. Many networks were not consolidated and failed to achieve their intended outcomes because of funding limitations. In many cases alternative funding beyond GCRF was sought to fill the gaps, but this has been challenging to win. As discussed previously, networks are key drivers of momentum towards real-world impact, so this has had a constraining effect.

connections and coordination between GCRF awards working in the same countries on the same issues has been a major missed opportunity. The complicated delivery architecture of GCRF (noted in earlier evaluation reports), whereby multiple funders manage calls and grants, has worked against the building of cohorts and coordinating awards for greater impact. This gap was highlighted by award holders themselves when convened by the evaluation team to develop pathways to impact in the early stages of the RIU case studies. For many award holders, this was the first time that they had had the opportunity to meet with other teams working in the same countries. There was general feedback that this would have been important to do at the start of the grants, to promote coordination for impact and lesson sharing. In future programmes it would be important to address this.

Successfully activating a range of RIU processes

Our analysis of outcomes clarified which of the RIU processes set out in the GCRF ToC were fundamental to achieving results. They can be understood as a crucial 'transmission belt' between research outputs and wider development outcomes. Often working in concert, they form the foundations for the scaling of results and the achievement of longer-term policy, practice, markets and capacity outcomes. The cluster case study evidence confirms and complements evidence for RIU processes from previous evaluation activities and enriches insights from the wider literature, making them generally relevant.

Where awards relate to technological innovations and new tools or platforms, demonstration and testing has, unsurprisingly, been fundamental in uptake. This is exemplified by the Kenyan example of agrivoltaic (AV) system installation,[27] which served as a significant enabler in community members adopting practices and innovations that supported improved water and food security. Although the demonstration and testing process is an established part of developing new technologies, GCRF teams have gone further, using this process to activate and mobilise stakeholder networks. Some awards have complemented their testing and network-building work by investing in user-side capacities. This has helped to boost demand and create opportunities to use and apply the innovations. In combination, these processes have led to direct application of practices, technologies and products that generate practical benefits to reduce poverty. For example, this combination is in evidence in the awards that have reached the longer-term markets and value chains outcome.

Collaboration and collaborative problem solving, including co-production of evidence-based policy applications, help to support uptake of tools and resources among stakeholders outside the R&I community. This process works because it strengthens researcher understanding of complex contextual problems as well as increasing non-academic stakeholders' research capacity. By fostering collaboration and shared problem-solving approaches, researchers in the Kenya cluster reported having been able to address complex research questions effectively, which would have been difficult without the collaborative approach. Collaboration also facilitated the dissemination of research outputs to a range of stakeholders – also seen in the Vietnam cluster, where it provided a platform for knowledge

[27] Agrivoltaic systems develop the dual use of land for solar energy production and agriculture.

exchange and showcasing the project results. Mechanisms such as embedding researchers in local contexts and/or non-researchers in research teams, as well as engaging researchers already embedded in local contexts (the Indian Ocean and Kenya), appear to support effective collaboration, ensuring deep contextual understanding and trust from local communities. There is reliable evidence that involving stakeholders from the outset is a fruitful strategy that supports co-production (the Indian Ocean, India and Vietnam).

Co-production of knowledge

Co-production has emerged from our analysis as key to positive outcomes. This approach goes beyond consulting communities and stakeholders on ideas, insights conceived and developed by an R&I team; a co-production approach treats communities and relevant stakeholders as integral to the R&I project from start to finish. The evidence shows that this can activate multiple mechanisms which build potential for longer-term outcomes and impact. Co-production can build capacity and demand, ensure solutions are pro-poor and tailored to needs, demonstrate proof of concept, and engage policymakers and stakeholders.

One clear example of this came from the Indian Ocean cluster. In South Africa, small-scale fisher communities were excluded from a marine spatial planning process, posing a serious risk to livelihoods, food security and welfare. The One Ocean Hub's participatory approach supported small-scale fishers to establish themselves as decision makers in the planning process, demonstrating the importance of their customary fishing grounds for livelihoods, food security and cultural value. As a result, customary fishing rights have been included in marine spatial planning maps and supported successful legal challenges against extractive industries denying community access.

Working together with non-academic stakeholders contributes towards developing actionable policy recommendations grounded in context-relevant experience. This is supported by assistance, leadership and mentoring by experts in award teams, which have been key in enabling stakeholders to effectively utilise tools and resources, shaping their strategies, investments, and research and development activities within GCRF-funded initiatives.

Open access data and tools were key to supporting innovation uptake by non-academic stakeholders to improve practice. Projects across four clusters (India, Vietnam, Kenya and the Indian Ocean) have used media engagement to showcase project success, engage stakeholders and support effective dissemination and uptake. Extensive dissemination through academic institutions, specialist conferences and international journals helped to boost visibility of tools and resources.

How did the distinct features of GCRF contribute to the outcomes observed?

The following section explores how the distinct features of GCRF as a fund contributed to the longer and shorter term outcomes observed in the case studies. Our cross-case analysis shows a good alignment with the following areas of contribution:

1. Interdisciplinarity

2. Capacity building

3. Equitable partnerships

4. Promoting foundations for development impact.

1. Interdisciplinarity

GCRF's support on interdisciplinarity and intersectoral working provided unique opportunities for partners from different disciplines and sectors to work together. This led to innovative approaches and outcomes which are less commonly observed in more traditional development R&I. Interdisciplinarity has been one of the core principles of GCRF since its inception; all awards had to have an interdisciplinary team, and partnerships with civil society, private sector and other non-academic stakeholders were encouraged. Researchers across the clusters indicated that this was relatively uncommon among large funds at the time awards were commissioned. In Lebanon, for example, GCRF grants were used to build research networks for the purposes of concretising emergent areas of interdisciplinary study (two awards). This resulted in bringing together education specialists with researchers working on conflict – research areas that tend to be built on different disciplinary bases, with sets of academics and practitioners who do not usually work together. Although tangible outcomes are yet to be seen, other evidence shows that network development lays strong foundations for success when the time is right. Interdisciplinary approaches coupled with community involvement in one Indian award resulted in the development of novel approaches to dealing with flower waste from religious ceremonies; this has led to potential job opportunities and the empowerment of women in religious organisations.

GCRF award holders were therefore able to gain funding for R&I utilising transdisciplinary, participatory and arts-based approaches, which encouraged local relevance, cross-sectoral engagement, and local acceptance and uptake of research products and outputs – all key factors promoting positive outcomes and real-world impact. The evidence indicates that this led to more comprehensive and holistic research outcomes, addressing complex challenges from various angles. When shared with policymakers, these multidisciplinary research findings tended to offer a more nuanced and well-rounded understanding of the issues at hand, thus making it more likely for them to be considered and integrated into decision-making processes.

2. Capacity-building and strengthening

GCRF's emphasis on capacity strengthening meant that award holders could build novel key skills and understanding, not only among ECRs but also among partners and key potential users of R&I. This was likewise a key foundation for outcomes. GCRF awards contributed to both strengthening existing capacities and building new ones through the opportunities they created for students and ECRs for career progression and employment. GCRF funding supported a wide array of capacity-related activities, including workshops, training sessions and skill development initiatives. This was a significant factor in enhancing the capabilities of LMIC researchers, empowering them to contribute effectively to the projects and contributing to the sustainability of outcomes. Awards also provided capacity building for non-academic stakeholders – civil society, private sector and community groups – to be able to use innovations. Unusually, GCRF funding allowed relationships to be built between academic and non-academic partners, particularly by enabling funding to be used for in-person co-

learning, collaborative design and training activities. These encompassed capacity-building activities, training workshops and mentorship programmes conducted by experts to equip stakeholders with the necessary knowledge and skills to utilise innovations effectively. An example of this is the training in disability awareness carried out in the Lebanon cluster with media professionals. In the Indian Ocean cluster, communities' legal knowledge and skills were built allowing them to advocate successfully for their land claims and succeed in legal challenges This was possible only because GCRF funding specifically included budget that could be spent on these activities – which, award holders noted, was not common for research funding.

3. Equitable partnerships

The third area of contribution also relates to GCRF founding principles, from the fund's commitment to funding R&I delivered through equitable partnership. Despite structural inequities in the financial rules that made UK institutions budget holders, GCRF awards nevertheless invested in both partnerships and networks which developed new configurations of stakeholders. This facilitated the exchange of resources needed for effective R&I and built connections with potential or intended users in the R&I process. Partnerships prompted mutual exchange of technical expertise and reciprocal learning between academic and non-academic institutions – civil society, NGOs, private sector and community groups. GCRF's direct contribution of financial assistance has been pivotal in initiating and sustaining research activities, crucially in fostering international collaborations, workshops and conferences. This, in turn, boosted further or continuing collaborations and helped award holders with the skills and connections to find follow-on funding. This has supported knowledge, expertise and resource exchange across a wide range of stakeholders beyond the academic community, bringing people together in person who would otherwise have struggled to find funding that allowed them to meet each other. For example, the India case study cluster includes two examples of start-up companies that have developed locally relevant solutions, including using an invasive weed to improve livelihoods. Here, collaboration with private sector entities included SENSEACRE, an ICRISAT-incubated drone company, and a student startup in Kerala utilising aquatic weed biomass for paper production and fish feed. As well as developing ways to use the weed, work involved training women farmers to develop rural livelihoods. These start-ups grew from informal collaboration and follow-on funding stemming from GCRF's networking grant. GCRF's explicit encouragement of including partners from outside the academic community directly facilitated the uptake of research findings. By involving communities, policymakers, civil society and private sector actors in the research process, GCRF enabled a closer alignment between research outcomes and the practical needs of the intended users of R&I.

However, although investigators valued GCRF's focus on capacity building, there was evidence to suggest that the structure and implementation of dedicated 'capacity building' awards were also seen as a hindrance. For example, in the Indian Ocean cluster, national investigators involved in one award which was an explicit 'capacity building' award noted that most of the funding remained in the control of the UK partner, which, it was felt, was

misaligned with the spirit of capacity building and did not directly support LMIC researchers and stakeholders, somewhat blunting capacity-building efforts.

Across the Kenya case study cluster, co-creation of research acted as a critical enabler in the development and testing of locally relevant research, leading to innovations and effective practices aimed at enhancing livelihoods, food and water security, and overall well-being. Engaging with communities in collaborative and inclusive ways meant that research directly resonated with the community, optimising the potential for meaningful and sustainable impact. For example, one award used on-the-ground pilot field studies to identify the specific challenges and needs of the community before developing small research proposals to address the challenges identified.

4. Foundations for development impact

The final area of contribution relates to the flexibility offered by GCRF funding, a way of working that strongly supports the foundations for development impact. Longer time frames and a responsive approach to contextual changes supported award holders to achieve outcomes relevant to the context and setting. Longer time frames allowed flexibility to respond to changing situations and new issues arising in R&I contexts. This flexibility allowed researchers to shift their award focus and activities to better align research aims and activities with evolving local contexts and emerging demand for solutions, rather than being tied to the aims, activities and outputs indicated in the application for funding. This was particularly important in the case of Lebanon, because it allowed for appropriately supportive responses by research teams in the turbulent context. Flexibility was also a key enabler of transdisciplinary and participatory approaches, which, because of their deep stakeholder engagement processes, are characterised by continual adaptation and steering from participant involvement, necessitating a flexible approach. In practice this meant the ability to shift the research focus to respond to community engagement, local ‘steer’ and windows of opportunity. The Hub model in the Indian Ocean case study exemplifies this approach because its activities and outputs were less defined as compared to a conventional award.

6. Conclusions, lessons and recommendations

Conclusions

The RIU case studies are a key part of the third and final stage of the main GCRF evaluation, drawing on primary evidence from 36 awards clustered under five overarching themes. The case study synthesis helps to answer MEQ 3a: **What results has GCRF produced or contributed to, and what has worked in terms of transforming outputs to outcomes, and outcomes to impacts?**

There is good theory-based, qualitative evidence that the case study awards have achieved more progress towards real-world impact than was anticipated in the GCRF ToC for this point in time. Overall, the RIU case studies provide wide-ranging evidence for STOs being achieved in the study settings. Wider systemic processes are also working to amplify, diffuse and replicate the knowledge, technologies, practices and tools developed by GCRF R&I. This means LTOs are already emerging, making an important contribution towards real-world impacts on complex global challenges, as the examples discussed previously indicate.

Policy improved through the use of GCRF-supported evidence

GCRF R&I contributed to improved policy design and implementation in all five case studies – a key step in GCRF moving towards real-world impact at scale. There is evidence for this at national and local levels. Evidence from some case study settings on the inclusion of poor and marginalised communities in decision-making processes highlights the potential for policies to ultimately benefit them. It also points to vulnerable groups having strengthened their abilities to participate in decision-making processes in the future.

Uptake at this institutional level usually takes some time to come to fruition and relies on congruence between the timing of research and policy ‘moments’. It is therefore realistic to expect to see more impact at this level further into the future. However, the case study clusters show how researchers face numerous challenges in accessing and influencing policymakers unless key contextual enablers are in place. These include working with active civil society partners and other embedded stakeholders, responding to a stated demand for the research by relevant government actors, and working together with policy actors to catalyse demand and build user-side capacities.

Practice improved through applications of innovations

There is early evidence from Vietnam, Kenya and Lebanon that GCRF awards are supporting innovation uptake and influencing practice, with some starting to be applied at scale. For example, Indian farmers improving water management practices and Vietnamese uptake of an app for real-time monitoring of rice crop quality show potential for lasting impact for the current

users, but there is not yet evidence that this impact is more widespread. In Lebanon there was some evidence of GCRF evidence influencing practice through the team's ability to respond to new needs arising from the crisis there.

Many examples of uptake of novel methodologies and techniques, both within and outside the original contexts of the awards, show promise for lasting impact through extending their reach and demonstrating international replicability. This includes: (i) applying various mapping methodologies in Vietnam and southern Africa and (ii) the water hyacinth detection techniques developed under an Indian award but applied in Kenya. Strong demand for technology outside the original testing context was also evident in the Indian Ocean case of novel tracking devices for small boats. Authorities from several other nations in sub-Saharan Africa, including Mauritius, Senegal, Zanzibar, Namibia, Mozambique, the Seychelles and the Gambia, have expressed an interest in trialling the innovation in their respective counties. The scale of this expansion provides an indication of wide demand for the solutions developed through the GCRF award and their relevance and applicability to multiple contexts.

Markets and value chains strengthened

There is only limited evidence so far for strengthening markets and value chains in LMICs as a key mechanism for scaling pro-poor innovations. This is partly because fewer awards in the sample and in GCRF as a whole are market-facing. Through the use of small research and networking grants to stimulate value chains in Vietnam and India, opportunities have been strengthened for agricultural communities living in poverty. These awards worked by developing commercially relevant, innovative technologies to address an environmental or public health issue within a value chain, thereby making it stronger.

R&I capabilities strengthened in LMICs

Evidence for improved R&I capabilities centres around the establishment of collaboration networks across countries and greater opportunities for career progression and employment for researchers, particularly ECRs, with some evidence for institutional capacity strengthening for R&I. This was observed across almost all awards in all case studies. R&I capabilities have also been developed outside the higher education sector, extending to partners operating in the systems that GCRF seeks to influence. Developing R&I skills among civil society and private sector partners supported the uptake of evidence and the demand for R&I-led practice (emerging evidence comes from India, Vietnam and Lebanon).

Capacity strengthening of award holders (in both the UK and LMICs), wider research teams and non-academic partners has great potential to support lasting change. Many GCRF awards across all the case studies have led to further research and projects post-award, largely through continuing collaborations with academic colleagues through networks and ongoing relationships. Many of these have been facilitated or strengthened by the awards. However, evidence for long-lasting change is still limited, and in many cases it is too soon to tell. Where awards are failing to achieve STOs and LTOs, evidence suggests that this is largely because of challenges in the context and political constraints. We can see potential for lasting change

eroded where awards have experienced funding cuts and a lack of follow-on funding to allow progress from outputs to RIU outcomes.

Lessons on the mechanisms and conditions needed to transform research and innovation outputs to outcomes and impacts (EQ 5)

The case study cluster evidence highlights how a strategic and impact-focused approach is needed to establish the foundations for development impact from the start. Six key lessons have been identified for future funds and programmes.

1. Clustering awards working on the same issue in the same country is crucial for coordination, sharing learning on complex issues such as EDI, and achieving critical mass for greater impact within country systems.

As noted, GCRF was not designed around strategic clustering of awards working on similar challenges within the same geographies or contexts. A portfolio approach was considered through the establishment of the Challenge Leaders, but ultimately this was not successful.[28] The RIU case study evaluation retrofitted coherent portfolios within thematic and country contexts to gain holistic insights into how pathways to impact worked (or not) in different contexts.

The evaluation brought together award holders working in the same cluster to discuss their collective insights into the pathways to impact. Award holders noted that earlier coordination by funders could have helped with combining efforts, promoted shared learning and amplified impact. This represents a missed opportunity to cluster and connect awards (with the exception of some GCRF programmes such as Hubs and FLAIR). Evidence shows awards mobilized significant stakeholder networks, with abundant opportunities to share learning on key impact drivers. In challenging areas such as EDI, teams could have pooled learning on, for example, integrating and involving vulnerable communities in the research process.

The RIU case study clusters have effectively shown post hoc that the clustering approach would enable awards to work together synergistically and achieve critical mass. The evidence from the case study clusters shows that, while the fund has achieved faster than expected progress for this stage of implementation, perhaps greater progress could have been achieved by taking a clustering approach and capitalising on the learning network potential.

2. GCRF's evaluation evidence shows that proactively managing for development impact, alongside research excellence, is closely associated with progress towards impact. This involves building in the processes that drive impact right from the design

[28] See Vogel, I. *et al.* (2024) Evaluation of the Global Challenges Research Fund: Stage 1b Synthesis report Synthesis of the evidence on programme processes and progress towards impact in GCRF's six flagship investments. Available at: https://assets.publishing.service.gov.uk/media/65b39af0a0ae1b000d5260a8/evaluation_of_the_gcrf_stage_1b_synthesis_report.pdf

phase and optimising these throughout implementation - so fund-level prioritisation and resourcing of the foundations for impact is vital.

GCRF was designed to go beyond considering research excellence alone to promote challenge-led, excellent ODA research with impact. This has not always translated into the implementation of R&I, where research excellence was at times prioritised over impact, as has been evidenced in our previous reports.[29] Nevertheless, the RIU case study clusters provide further evidence that when ways of working that support the four foundations for development impact[30] (coined as 'ODA excellence' by the evaluation) are prioritised and invested in, these actually catalyse pathways to impact and create momentum for sustainable change.

This prioritisation, along with funding, is needed from the fund level in order to ensure consistent integration of these ways of working and achievement of ODA excellence across the whole portfolio of R&I investments.

3. GCRF's flexible funding and diverse award types enabled outcomes by creating local partnerships and stakeholder networks, able to adapt to changing conditions and emerging needs. The RIU case study clusters illustrate how, in a country context, a combination of different, and flexible, funding mechanisms effectively created local stakeholder networks and systems for moving research into use in country contexts. GCRF's flexible funding, investment in local partnerships, and strategic award sequencing was a key enabler of outcomes. From a cluster perspective, diverse award types supported various R&I stages - small exploratory awards led to larger ones, while early career awards, networking awards, and capacity-building awards played crucial roles in catalyzing networks and stakeholder engagement. Large-scale awards such as the One Ocean Hub case study demonstrated how strategically combining diverse grants in a mixed portfolio built interlinked research efforts, effectively moving research into use. GCRF's funding flexibility allowed teams to adapt to changing conditions and emerging needs.

4. Iterative engagement, co-production and proof of concept testing with local stakeholders are key to R&I being positioned for use, enabling research teams to respond to emerging opportunities to promote influence and uptake of their findings.

Case studies show that iterative engagement at local and national levels is vital for building contextual understanding and enhancing stakeholder receptiveness, both crucial for LTOs. Co-production with stakeholders ensures R&I products are better aligned with local conditions and decision-makers, boosting R&I credibility and fostering positive mechanisms like research engagement and relevance.

[29] See BEIS (2022) 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

[30] (i) On-the-ground insight to ensure relevant, locally aligned R&I; (ii) fairness and mutual capacity building in partnerships between UK and LMIC organisations, including non-academic partners; (iii) a focus on gender, social inclusion and poverty reduction; (iv) mobilising stakeholder networks for uptake.

This alignment is particularly important in politically challenging environments, such as Lebanon, and is amplified by active civil society involvement. Stakeholder readiness and receptiveness are key for R&I uptake, as they build capacities and opportunities to apply, adapt, and champion research findings. Direct collaboration and co-creation with stakeholders are essential. Timing research and leveraging policy moments are also critical, but academics often lacked direct access to policymakers, underscoring the value of partnerships with influential civil society and other partners.

5. Reciprocal capacity-building relationships are crucial for many STOs - strengthening research system capacities through diverse funding mechanisms could further enhance impact potential.

Case study evidence shows how these relationships, where both UK and LMIC partners develop skills and infrastructures, built a strong foundation for interdisciplinary and innovative work. Strengthened institutional capacities can sustain interdisciplinary collaborations into the future, responding to emerging needs beyond the life of the project. However, the cross-case analysis suggests that enhancing research capacities only leads to outcomes if other enablers, like accessible funding mechanisms, are present. Funds like GCRF could invest more in institutional research capacities, which has potential for sustaining long-term outcomes.

6. Networks are critically important for scaling outcomes but were not consistently prioritised and resourced.

The case study clusters highlight many examples of how agile networks and champions are critical for navigating complex policy, practice and market environments in LMICs. The international collaboration within GCRF awards provided access to networks which brought together expertise from a range of LMIC and UK actors, often while addressing mutual skills gaps.

Given the importance of networks as a significant driver of impact at scale, the lack of a fund-wide effort to build connections and coordination between GCRF awards working in the same countries on the same issues has been a significant missed opportunity. Networks have also not always reached their full potential, especially where funding was curtailed as a result of the ODA budget. Many of the networks and partnerships that were maintained were kept alive largely through individual efforts of researchers, based on pre-existing relationships. Sustaining the stakeholder networks over time needs continued support to build shared understanding, trust and momentum towards impact.

Recommendations for future funds

Recommendations	Owners

1.1. Future funds should adopt clustering awards and building cohorts for learning and impact as a strategic management approach (avoiding the limitations of the earlier Challenge Leaders approach).[31] The UK R&I funding architecture makes this complicated because it requires coordination across different POs as well as information sharing and resources for this at programme management level. Nevertheless, the added value for impact justifies the extra effort needed.	Fund owner DSIT and POs
2.1. **On-the-ground insight to ensure relevant, locally aligned R&I:** RIU is unlikely to happen without strong in-country insights and engagement at all levels, from locally led problem identification and co-creation of solutions to local leadership and locally led networks. Future funds need to prioritise and support fair and equitable local-level engagement – a crucial driver of equitable partnerships, as well as operating as key RIU mechanisms. 2.2. **A focus on gender, social inclusion and poverty reduction:** A focus on gender, inclusion and wider EDI issues can be challenging for R&I projects to integrate, requiring specialist skill-sets to understand how to involve vulnerable communities. Our evidence demonstrates that addressing EDI issues by analysing how a project impacts on existing inequities, and implementing appropriate mechanisms can catalyse pathways to impact. It is not only an ethical choice and is worth investing in for development impact. Future funds should prioritise EDI at the fund level, with expertise and tools to support teams in: (i) integrating an analysis of gender and intersecting vulnerabilities to understand how development challenges affect different groups of people; (ii) involving vulnerable communities in the research process; and (iii) identifying some of the less tangible barriers to positive RIU outcomes. *The other foundations for development impact are covered under the specific recommendation they relate to.*	Fund owner DSIT and POs
3.1. Future funds should continue to provide and sequence a diversity of award types to allow partnership development, growth of the networks, stakeholder engagement and collaborative ways of working that have been key to catalysing outcomes. Diverse granting should be done intentionally and applied within a clustering or portfolio approach at the country level. 3.2. Future funds can strengthen the position of the UK as a research partner of choice by offering longer-term funding opportunities with more certainty of continuation, particularly in areas where there is a global gap in funding opportunities. Crucially, this should include research activities that prioritise interdisciplinary and cross-sectoral working, capacity building, networks and stakeholder engagement.	Fund owner DSIT and POs
4.1 Iterative engagement requires flexible funding that can respond to changing dynamics. Future funds should continue to prioritise stakeholder engagement from the outset and provide the type of flexible funding for communications, events, arts-based approaches, evidence advocacy and policy influencing that has proved effective in GCRF. 4.2. Proof-of-concept testing that involves and engages the end users – communities, policymakers, practitioners and businesses – supports RIU through speeding up demand for innovations, as seen in the Kenyan community solar generation example. Future funds should fund pilots and	Fund owner DSIT and POs

[31] See learning brief for a more detailed look at how to achieve this [link to be included once published].

demonstrate success through quick wins to provide the foundations for successful scaling.	
5.1. Future funds should improve the fairness of R&I funding, including establishing funding that can be awarded directly to LMIC research institutions, with a focus on mutual capacity strengthening between UK and LMICs. There should be recognition of the specific capabilities LMIC research institutions bring in terms of building and sustaining national networks which are crucial for lasting change.	Fund owner DSIT and POs
6.1 Networks and stakeholder engagement activities were key enablers; their absence appeared to stifle potential for impact. Future funds should consider including dedicated networking funding mechanisms that support these activities, including dedicated resources for stakeholder engagement activities.	Fund owner DSIT

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