

Effective research capacity strengthening

A quick guide for funders

2023

ESSENCE Good Practice Document Series



To prevent capacity gaps from blocking the equitable uptake of research opportunities, many funders embed capacity strengthening initiatives into the research programmes they support. *Effective Research Capacity Strengthening: A Quick Guide for Funders* is an accessible guide to the latest evidence and best practice in this field.

Having elicited advice and expertise from funders around the world, the authors offer a concise definition of research capacity strengthening, and identify the central principles that underpin the concept. They then identify ways in which funders can improve existing systems to ensure that awardees' proposals for capacity-enhancing projects are well designed, carefully implemented, and evaluated in ways that encourage participants, as well as the wider research community, to learn from their experiences. Relevant case studies and a detailed checklist provide practical insights from existing and recent programmes.

The aim of this Good Practice Document is to encourage research funders and their partners to use and improve on evidence-informed approaches to accelerating research capacity improvements among individuals and institutions within and across national and international boundaries.

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ESSENCE members: Bill & Melinda Gates Foundation; Canadian Institutes of Health Research (CIHR); Carnegie Corporation of New York; DBT/Wellcome Trust Indian Alliance; Department of Health and Social Care (DHSC) funding through the National Institute of Health Research (NIHR); Ensuring Value in Research (EViR); European and Developing Countries Clinical Trials Partnership (EDCTP); European Commission Directorate-General for Research and Innovation; Federal Ministry for Economic Cooperation and Development (BMZ) / Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); Fogarty International Center – National Institutes of Health (FIC/NIH); Fondation Mérieux; Foreign, Commonwealth and Development Office (FCDO); Global Research Collaboration for Infectious Disease Preparedness (GloPID-R); Institut Pasteur; Instituto de Salud Carlos III (ISCIII); International Alliance of Mental Health Research Funders; International Development Research Centre (IDRC); New Partnership for Africa's Development (NEPAD); Norwegian Agency for Development Cooperation; Oswaldo Cruz Foundation (Fiocruz); Southern African Development Community (SADC); South African Department of Science and Technology; South African Medical Research Council (SAMRC); Swedish International Development Cooperation Agency (Sida); Swiss Agency for Development and Cooperation Federal Department of Foreign Affairs (SDC/DEZA); Tanzania Commission for Science and Technology (COSTECH); Association of Commonwealth Universities (ACU); DLR Project Management Agency; Global Alliance for Chronic Diseases (GACD); Netherlands Organisation for Scientific Research / Science for Global Development (NWO/WOTRO); Research Council of Norway; Royal Society-DFID Africa Capacity Building Initiative; UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR); World Health Organization's Department of Sexual and Reproductive Health and Research (SRH) including the Special Programme HRP; UBS Optimus Foundation; UK Collaborative on Development Research (UKCDR); UK Research and Innovation; United States Agency for International Development (USAID); Wellcome; World Health Organization.

For further information about ESSENCE please visit <https://tdr.who.int/groups/essence-on-health-research>

For further information about CCR, please visit www.lstmed.ac.uk/ccr

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Frequently used acronyms and abbreviations

CCR	Centre for Capacity Research
FAQs	frequently asked questions
HORN	One Health Regional Network for the Horn of Africa
LMICs	low- and middle-income countries
LSTM	Liverpool School of Tropical Medicine
NGO	non-governmental organisation
Q&A	question and answer
RCS	research capacity strengthening
TDR	UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases
ToC	theory of change
WHO	World Health Organization
UK	United Kingdom
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
USA	United States of America

About ESSENCE, CCR and this document

ESSENCE on Health Research is an initiative of international funding agencies to improve the coordination and harmonisation of research capacity investments in health. ESSENCE members embrace the principles of donor harmonisation and country alignment expressed in the 2005 Paris Declaration on Aid Effectiveness and the 2008 Accra Agenda for Action. In following these principles, donors align and harmonise their activities and procedures with the priorities of the countries in which they work.

Since its inception in 2008, ESSENCE (Enhancing Support for Strengthening the Effectiveness of National Capacity Efforts) has achieved notable progress in facilitating dialogue among all partners and promoting better strategic cooperation between them – particularly among bilateral development agencies, funding organisations, international health programmes, research councils and universities.

ESSENCE's Steering Committee has representatives from IDRC, EDCTP, TDR, HRP, UNICEF, WHO, the World Bank and the Joint UN Programme on HIV/AIDS, SAMRC, Sida, DHSC, the Fogarty International Center and Wellcome.

The CCR (Centre for Capacity Research) is based at the Liverpool School of Tropical Medicine (LSTM), which is a registered charity and the first institution in the world to be dedicated to research and teaching in tropical medicine. LSTM's mission is to reduce the burden of illness and death, particularly in the world's lower-income countries, through research and practice-based collaborations and partnerships that focus on countries' local needs and priorities.

Here, CCR specialises in the science of research capacity strengthening, and is a global leader in advancing evidence-informed actions to help research funders and research teams improve the design, implementation and evaluation of their capacity strengthening programmes.

CCR's research strategy has three components. The first is to advance theoretical and conceptual understandings of capacity strengthening. The second is to support the implementation of capacity strengthening through 'embedded learning' research (this involves enhancing programme success and highlighting 'good practice' for current and future initiatives). The third is to develop and apply frameworks and tools appropriate for tracking and measuring the progress, outcomes and impact of capacity strengthening interventions.

Through its research, CCR aims to contribute to enhancing individuals' skills, organisational research environments and cultures, as well as national research systems. Improvements at these levels lead not only to more effective and impactful research but also improve the motivation and retention of researchers and research managers.

This *Quick Guide* was developed in collaboration with funders working in low-, middle- and high-income countries. CCR at LSTM in the UK prepared an initial draft, bringing together the latest published evidence on research capacity strengthening (RCS). Following discussions and several rounds of feedback from a working group of RCS funders from around the world, the draft was adjusted and refined, and the working group provided case studies from their own experience to highlight key issues.

The aim of the guide is to encourage funders (and, by implication, their programme partners) to use an evidence-informed and common approach to RCS programmes. Our view is that this has the potential to enhance the design, implementation and evaluation of these programmes, enabling all involved to compare programmes and learn from those that make the best use of resources while accelerating learning and programme improvements.

Acknowledgements

This document was developed with the support of a working group made up of representatives from international funding organisations that have a particular interest in funding RCS programmes.

The authors are Neele Wiltgen Georgi, Susie Crossman and Imelda Bates from CCR, and Garry Aslanyan from ESSENCE.

The working group comprised: Tade Aina from the Mastercard Foundation, USA; Karen Gosch from Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany; Theresa Köbe and Detlef Boecking from DLR Projektträger, Germany; Sepo Hachigonta from the National Research Foundation, South Africa; Branwen Hennig from Wellcome, UK; Sue Kinn from the Foreign, Commonwealth and Development Office, UK; Linda Kupfer from the National Institutes of Health, USA; Lydia Manoti from the African Academy of Sciences; Frederic Nduhirabandi from the Medical Research Council, South Africa; Kemi Oladapo from ESSENCE; Charlotte Seeley-Musgrave from the Department of Health and Social Care, UK; and the late Ana Lúcia Weinberg, from the European and Developing Countries Clinical Trials Partnership. Inputs were also provided by Alice Chadwick El-Ali from the UK Collaborative on Development Research. Everyone's contributions are immensely valued.

ESSENCE and CCR acknowledge everyone who contributed to discussion groups, provided case studies, recommended resources and contributed to expert reviews. In addition, we thank Lorelei Silvester and Zena Parker of CCR-LSTM for excellent administrative support and Welton Media Ltd for the diagram on page 15.

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Introduction

Approaches to research capacity strengthening (RCS) that support the sustainable local ownership, and the wider sharing of learning and knowledge, are essential to the future of research as well as for nations and communities to find solutions to the many challenges facing the world.

This *Quick Guide* is for funders of RCS programmes who are looking for a short and accessible guide to the latest evidence on RCS best practice. However, RCS is complex; consistent and shared definitions of the term are still evolving and, in many contexts, the knowledge that is emerging remains tacit. In a review of 172 publications on RCS, we found 25 different definitions of the term, none of which were cited by more than three papers.

For the purposes of this guide, we adapted a definition used by ESSENCE¹ and define RCS as: *enhancing the capacity of individuals and organisations to conduct, manage, share and apply research, while enabling national and sub-national research systems to effectively support research and the linkages between research and practice.*

Through our reviews and consultations, we identified three central principles underpinning RCS, and used these to inform the development of this guide. That is, RCS:

- takes place at, and between, the individual, institutional and 'societal' levels;
- has different dimensions related to national, institutional and programme strategies, resources, leadership systems, infrastructure, skills and culture;
- is an emergent, systemic and long-term process in which everyone involved has a responsibility (and a right) to contribute and benefit.

In addition, there seems to be broad consensus that *quality* RCS interventions tend to:

- strengthen existing systems rather than create new ones;
- allocate adequate support and resources to core research activities; and
- ensure that institutional leaders are given credit for RCS gains, and motivated to invest in replicating them.

¹ Adapted from ESSENCE on Health Research (2016: 5).

The development and focus of this guide

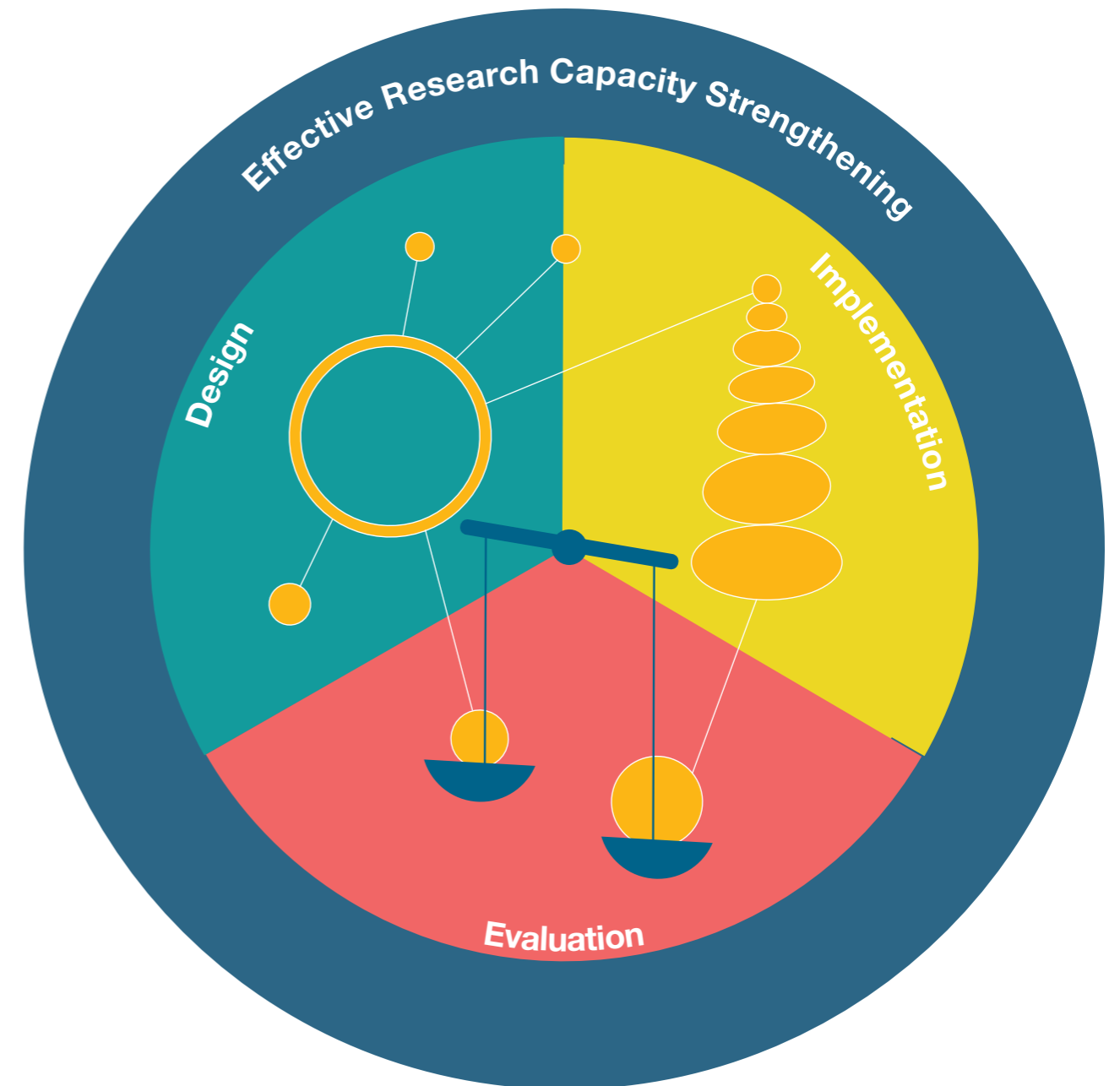
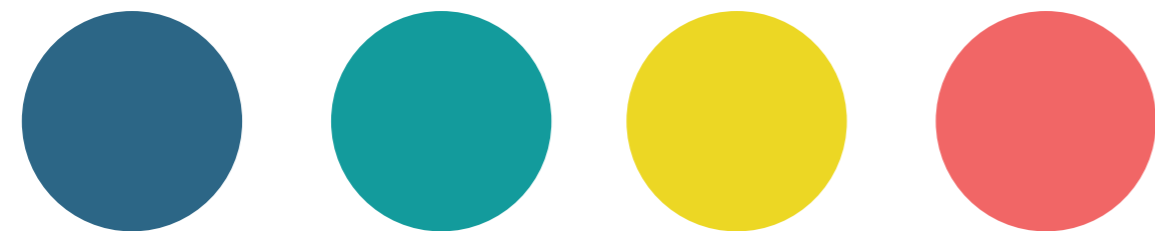
This document was developed in collaboration with a team of funders working in low-, middle- and high-income countries. It is also based on a review of existing publications, and builds on the *Seven Principles for Strengthening Research Capacity in Low- And Middle-Income Countries*.²

The content is perhaps particularly applicable to programmes that involve health- and science-related research in low- and middle-income countries (LMICs) since the evidence reviewed is derived primarily from these contexts. However, we suspect that many of the lessons learned are quite widely applicable and have attempted to make the contents relevant to a range of disciplines and contexts.

Short case studies drawn from funders' experiences of past and present RCS programmes are also included, several of which are Africa focused. This reflects a bias evident in funders' support for RCS programmes at the time of writing.

From the consultations and reading that contributed to the development of the text, it became evident that rather than focusing on RCS alone, the vast majority of funded programmes have RCS initiatives embedded in them. Our aim is to encourage funders (and, by implication, their programme partners) to use consistent and evidence-informed approaches to designing, implementing and learning from past and present RCS programmes.

The document has four sections. Section 1 introduces RCS. It explains why funders have a critical role to play in driving improvements to RCS programmes and why an overarching programme framework (such as a theory of change or ToC) is useful in guiding decisions about RCS programmes. Sections 2, 3 and 4 suggest how funders can participate in the design, implementation and assessment of quality RCS programmes. Case studies drawn from current or recent RCS projects provide windows into some of the complexities of the topics covered. Readings and resources that provided insight into RCS, and informed the writing of this *Quick Guide*, are listed at the end of the document.



² ESSENCE (2014).



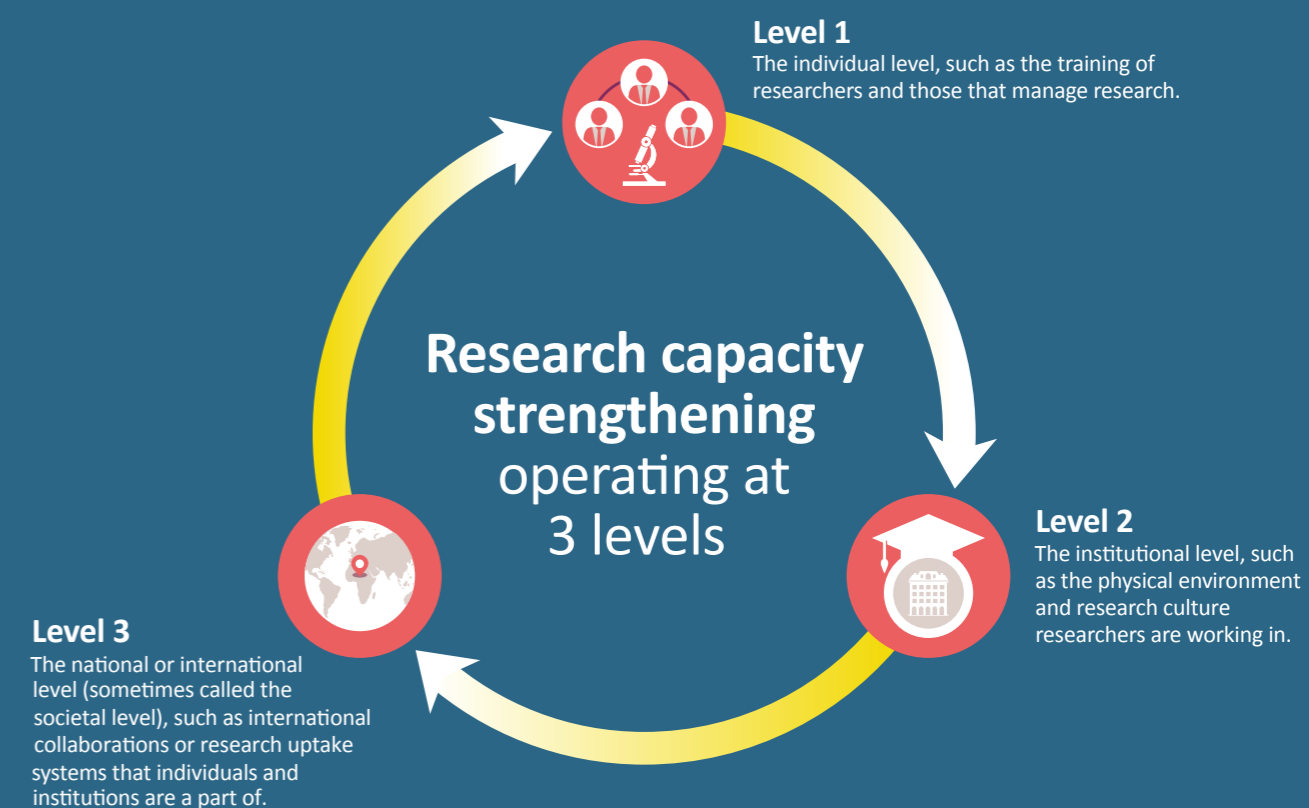
**SECTION 1: UNDERSTANDING
THE CONCEPT**



RCS is generally understood to be needed at (and between) the three levels of contemporary research systems, namely:

- the individual level – primarily through PhD studentships, post-doctoral fellowships and research management training;
- the institutional level – relevant to physical facilities and resources, staff levels and skills, research systems and cultures of learning and teaching; and
- the (inter)national or societal level – how knowledge is produced, translated and disseminated within and beyond the academy through research uptake, collaborations and networks.

Typically, funders support three types of RCS programmes: *primary* – where RCS is the primary objective of the funding; *embedded* (the most prevalent) – where RCS is secondary to awardees' research objectives; and *50/50* – where RCS and the research objectives are equally important.





The funders' role

Since the design, implementation and assessment of RCS activities often have a major influence on the long-term impact and value of funded research, funders (both national and international) have a pivotal role in ensuring that RCS programmes address global, regional, local and institutional priorities in effective and equitable ways.

In many funding initiatives, funders and grant applicants tend to share an (often unspoken) assumption that they each have coherent and similar ideas about how to achieve their research goals – that is, a theory of change (ToC). Increasingly, those involved are realising that making their ideas and theories explicit can help them shape and inform their research objectives and activities more effectively, ultimately improving project impact and outcomes.³

Similarly, to realise the full potential of funded programmes, funders must make their expectations regarding the need for high-quality, relevant, equitable, impactful and measurable RCS outcomes clear and explicit to awardees.⁴ In practice, this means making sure that awardees:

- are aware that they can *and should* allocate adequate resources to RCS, alongside delivering their research outcomes, so that their RCS efforts are impactful and sustained;
- align their RCS efforts to the overall goals of their institutions, and ensure that these, in turn, attempt to meet local and (inter)national needs;
- use quality evidence to inform RCS programme design and implementation, as well as measurable indicators to monitor progress and impact;
- share what they learn from RCS programmes with funders and fellow awardees, thereby helping to drive the development of increasingly effective capacity strengthening initiatives.




To help funders think through ways in which they can use the available evidence to improve the design of RCS components in their funding calls, as well as contribute to enhancing the implementation and assessment of RCS in funded projects and programmes, the table below summarises the points that are set out in more detail in Sections 2, 3 and 4 of this guide.

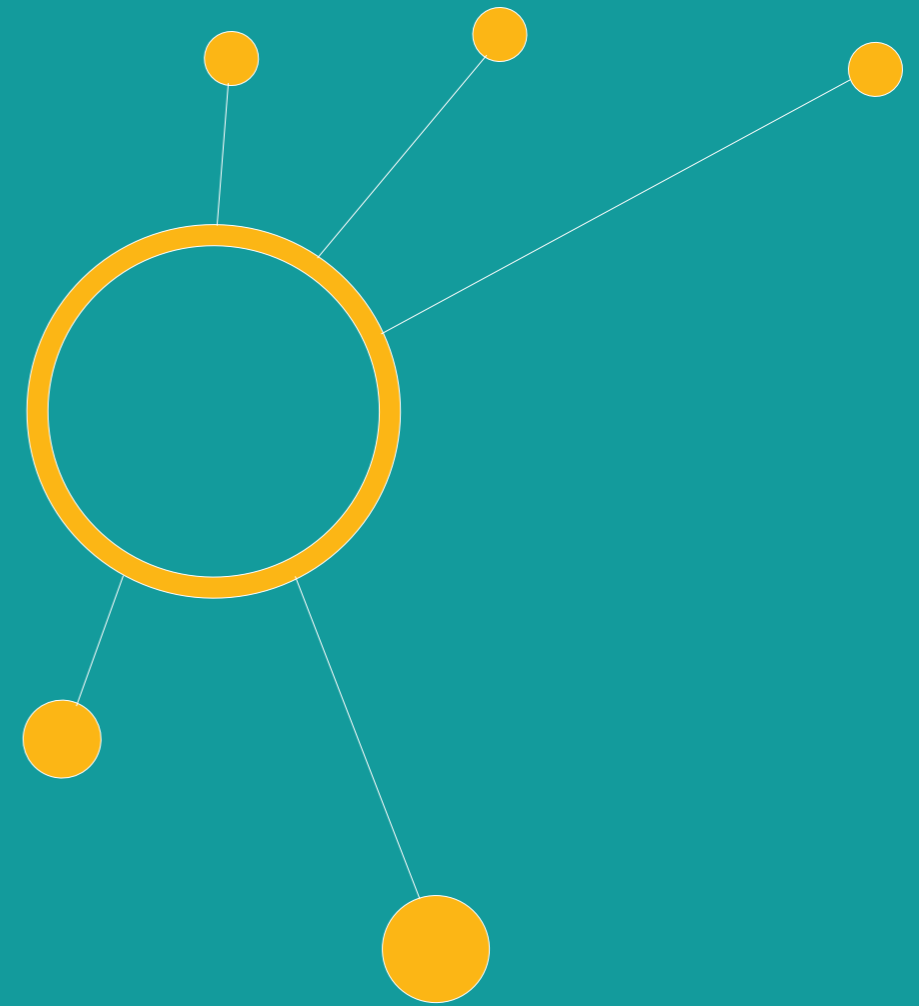


³ The development of a ToC generally starts by participants in a programme identifying their desired long-term goal/s. They then work backwards and forwards along the pathways towards the goal/s, elaborating on possible risks and embedded assumptions, and adjusting the activities in ways that make the intended outcomes more likely. The process of creating a ToC should be collaborative and iterative, thus helping everyone involved to understand the links between the activities and achievements, and clarifying how progress can be assessed at different stages of the process. ToCs are often represented diagrammatically. For more on ToCs, see [Case 3](#) below and <https://www.theoryofchange.org/what-is-theory-of-change/>.

⁴ For example, funders could reference the evidence-based components of their calls and/or provide a resources list that applicants can use to explore the evidence on which a specific call is based.

When funding for research capacity strengthening works

Key attributes	How you know if it's working	What you can measure to assess progress
 <p>Programme design is evidence-based</p>	Programme RCS goals and pathways to impact are clearly communicated to applicants	Projects' RCS efforts are aligned with funders' expectations
	The interconnectedness of RCS at the individual, institutional and (inter)national levels is accepted	Systematic and system-wide RCS is achieved
	The RCS needs of all involved are considered equitably and match those of their institutions	Institutional research systems are holistically strengthened
	Feedback from everyone involved in research is encouraged	Skilled individuals are motivated, valued and retained
	Research partnerships – including across disciplines – are fair, equitable and respectful	Research cultures and environments improve and foster collegiality and wellbeing
	 <p>Project selection and implementation is optimised</p>	Selection criteria are transparent and equitable
Selection panels are representative and have RCS expertise		RCS programmes are efficient, cost effective and successful
RCS is appropriately weighted and resourced		High-quality RCS is funded
Baseline research capacities and gaps are formally identified		RCS efforts target justifiable priority needs
RCS improvements are locally owned and valued		RCS improvements prove sustainable
 <p>Evaluations are productive</p>		Clear evaluation criteria improve RCS design
	Learning about RCS is embedded in programmes	RCS projects improve in quality
	Research leadership and management improves	Institutional autonomy to conduct and manage high quality research grows
	The evidence base for RCS expands	Improvements in RCS are continual
	Experiences of RCS are shared in and beyond programmes	Research skills grow and knowledge gaps decrease



SECTION 2: SETTING PARAMETERS THAT INFORM PROGRAMME DESIGN



1. Promoting equity in research partnerships

Research partnerships work best when they are founded on mutual trust, respect and reciprocity. When opportunities to shape research agendas as well as costs and impacts are fairly allocated, partners are more likely to value each other's contributions and collaborate more easily.⁵

In many contexts, however, capacity gaps present real obstacles to the equitable allocation of research opportunities. Not all institutions or researchers have access to the same kinds of infrastructure and facilities, funding, administrative support, communication skills, opportunities for public engagement or career and professional development.

When working with research institutions to address these and other research capacity gaps, funders can:

- Ensure that equitable opportunities feature in the priorities and design proposals for research teams, research users and affected communities.
- Encourage all research partners to take responsibility for aspects of project management.
- Confirm that access to benefits (such as new technologies, intellectual property and training) will be shared fairly among partners and that this is reflected in written commitments and contractual arrangements.
- Define how awardees calculate and allocate direct and indirect costs in their project proposals. (Indirect costs tend to be lower in LMICs, and guidance on how these costs can be more fairly calculated and allocated can help address systemic and institutional inequities.)⁶
- Encourage research institutions to focus on developing one another's grant management skills and systems, so that all awardees can participate fairly and confidently in competitive research environments.
- Ask awardees to source staff locally unless there is a strong justification not to do so.

“Research partnerships work best when they are founded on mutual trust, respect and reciprocity.”

⁵ The UK Collaborative on Development Research's Equitable Partnerships Resource Hub contains excellent resources on this.
⁶ For practical guidance on issues related to indirect costs, see Essence on Health Research (2020).

Case 1 Addressing RCS by promoting equity

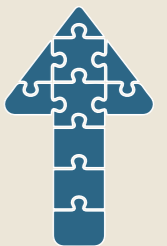
Research Networks for Health Innovations in Sub-Saharan Africa supports five research consortia, uniting 26 African research institutions in 14 sub-Saharan countries with 10 German partner institutions. Led by African coordinators, the networks conduct research on high-burden diseases in Africa (such as tuberculosis and various parasitic diseases). A considerable portion of the funding is dedicated to expanding clinical, laboratory and institutional capacities in the African partner countries, including new career opportunities for researchers and management and administrative personnel. By simultaneously addressing RCS and promoting research equity, the initiative aims to strengthen Africa's health research systems.

The funding initiative promotes research equity by ensuring that:

- Calls for proposals are needs driven, thematically broad and do not rely on narrow disciplinary, methodological or technical prerequisites that could make responding to the call difficult for African research institutions.
- Project coordinators are African and affiliated with African institutions.
- Participating African institutions receive funds directly and individually from the German funding body (not via their German partners). This helps to ensure that the results and data are African-owned.

Lessons learned

- Implementation always comes with challenges – in this case, it required sufficient institutional (administrative and financial) capacity in African institutions to comply with complex German funding regulations. As a consequence, the initiative now allocates funds for the recruitment and training of support staff (see [Case 7](#)).
- At first, applications were submitted by African–German research partnerships at a time when the German institutions were already leading similar partnerships. This history, and the fact that the funding comes from Germany, put the German partners in a stronger position. By being alert to past trends, the funder was able to help the institutions to overcome this structural inequality; by the end of the first funding period, this imbalance was mostly overcome.
- The effectiveness of investing in administrative and financial capacities is often jeopardised by rapid staff turnover. This leads to a loss of network knowledge and requires frequent training of new staff. For many African institutions, this presents an additional administrative burden. Providing funding for training and support throughout the funding period has helped to mitigate the effects of this problem.
- To achieve gender equity within the partnerships (in leadership and junior positions, senior management and administrative staff), the principle of gender equity was agreed upon at the outset. Deviations from this had to be strongly justified in applications and implementation was closely monitored.
- Trust strengthens equity and, to this end, communication is key; frequent and regular meetings of network partners, as well as close communication between partner institutions and implementing agencies, have proven crucial to the success of the initiative.



This initiative is funded by the German Federal Ministry of Education and Research (BMBF) and jointly implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit and the project management agency of the German Aerospace Center (DLR-Projekträger), Department Health, Division International Cooperation in Health Research. The first funding phase started in 2016; a second will be launched in 2023. For more information, see [Case 7](#) below and [Research Networks for Health Innovations in Sub-Saharan Africa](#).



2. Supporting genuine partnerships

Unspoken assumptions and misperceptions can quickly undermine any relationship. Misunderstandings and tensions are common between research institutions and within research partnerships in relation to issues such as gender, access to resources, language, disability and the hierarchies that persist between disciplines, professions and pay grades.

Traditionally, funders left these issues to researchers to address. Increasingly, however, funders are identifying ways in which funding systems can be adjusted to help support equity in research partnerships.⁷ These include allowing extra time and funding for partnership development and for research impact and uptake, and highlight how integral RCS is to equitable partnerships.

When funders ensure that research partners collaborate on shaping research foci and processes, the effects of differential access to various inputs and constraints can often be more easily foregrounded. With appropriate support, partners can address these issues in ways that prevent or provide channels for resolving tension. This enhances partnership bonds and strengthens both the researchers and their institutions. For funders this means checking that awardees:

- are aware that they can cite activities that foster collegiality and ‘citizenship’, or their ability to demonstrate impact and longevity, as evidence of the ‘excellence’ of their research processes, rather than focusing exclusively on traditional metrics such as grants awarded and papers published;
- encourage all project members to undertake training on issues such as discrimination, unconscious bias and safeguarding;
- have access to adequate communication systems (including internet connectivity, email systems, cloud data storage, and uninterrupted power supply units) so that research team members with childcare needs and/or mobility restrictions can work off site and from home;
- allocate adequate time and resources to strengthen language and/or translation skills and to obtain editorial support for publishing in English and local languages so that they can contribute fully to research *and* dissemination processes (see also [Section 10](#));
- have appropriate policies in place to ensure fairness and equity when sensitive issues (such as harassment, intimidation, safeguarding, discrimination, etc.) arise, along with clear channels to follow for those raising concerns or seeking psycho-social and personal wellbeing support.

⁷ See *Four Approaches to Supporting Equitable Research Partnerships* (ESSENCE on Health Research and UKCDR, 2022).

“Funding systems can be adjusted to help support equity in research partnerships.”

Case 2 Addressing gender equity

From 2016 to 2021, \$100 million was allocated to a programme to develop excellence in leadership, training and science. Known as DELTAS, the programme included research-based learning about how to train and develop world-class researchers, how to foster careers and collaborations, and how to promote research uptake. As part of this programme, a team of researchers explored specific barriers and enablers to gender-equitable career paths in DELTAS-funded African research institutions.⁸

Lessons learned

- Funders should insist that RCS initiatives have gender-balanced leadership teams.
- Funders should encourage awardees to identify female academics who can act as role models, coaches and mentors across research programmes.
- Funders should allow awardees to employ staff who can only work part-time.
- Funders should allow awardees to include budgets for childcare when researchers have to travel and/or attend conferences.
- Neither funders nor awardees should expect excessive work hours from research teams and should allow for work-related travel, meetings, etc. to occur during working hours.
- Funders should not impose age restrictions to entry and progression along career pathways so as to avoid discriminating against people who take maternity leave or time out for health reasons.



The programme was funded by Wellcome and the UK government's Foreign, Commonwealth and Development Office.

⁸ See Liani et al. (2021).

3. Communicating with applicants

Two-way communication can help inform applicants about how a particular funder understands RCS and how to respond to specific calls; it can also help to alert funders to the RCS priorities of institutions and help them identify networks they wish to support.

Consistency about RCS requirements across application forms, notes and guidance documents is highly valued, and aspects of the process about which applicants appreciate explicit guidance include:

- the relative weighting of RCS versus research activities when RCS is embedded within a research project or programme;
- how the funding call defines RCS principles and goals or objectives;
- assessment criteria used for RCS-related applications;
- information about resources, such as webinars, question-and-answer (Q&A) sessions or lists of frequently asked questions (FAQs) with responses, that they should work through before completing their applications;
- whether or not grants support the convening of networks or new consortia prior to a programme call, as well as induction sessions for awardees on RCS good practice at programme start-up;
- the flexibility that is considered acceptable in RCS-related activities to allow for RCS needs to mature and evolve;
- the ethics approval processes for RCS projects – this is especially important where the involvement of several institutions and countries means that additional time and funding has to be factored in for approvals;
- the availability of funds and other resources for investment in institutional leadership training that attempts to refine institutional systems in ways that value, nourish and support research cultures;
- the overarching framework or theory of change (ToC) on which the funding organisation has based its strategy and programme;
- The outcome/impact indicators that reflect the goals of the ToC and are used across awards within a funding programme.⁹

“*Applicants appreciate explicit guidance.*”

⁹ To accelerate learning, funders could develop and share outcome/impact indicators that would enable RCS impacts to be compared across different programmes and contexts.

Case 3 Using a theory of change to set goals and plan how to reach them

The UK's National Institute of Health and Care Research (NIHR) funds a number of research programmes within its Global Health Research Portfolio. To represent the logic by which the NIHR anticipate that programmes in this portfolio will achieve their intended outcomes and impacts, they created a theory of change (ToC).

In broad terms, the ToC maps out the steps that need to be taken for goals to be reached, including assumptions, inputs and activities, as well as short-, mid- and long-term outputs. Nested within the Portfolio's ToC, each individual programme is expected to develop its own ToC, setting out how the programme will contribute to the Portfolio's overall outcomes and impacts. When issuing grant applications, the Portfolio provides applicants with the relevant ToC to help them assess how well their project goals align with those of the Portfolio and the NIHR.

The Portfolio's ToC was developed iteratively and collaboratively through a series of workshops with key stakeholders, including NIHR Coordinating Centres, other strategic delivery partners and award holders. The NIHR recognise that, although a ToC is always a simplified representation of a complex programme, the process of establishing a ToC and assessing progress along the way, helps them understand more about how and why particular projects do or don't work.

Lessons learned

The process of developing a ToC can help funders to:

- Work collectively to clarify the intended outcomes of an intervention, strategy or policy.
- Align different stakeholders behind the purpose and direction of a programme.
- Identify underlying assumptions and mitigate potential risks.
- Ensure that programme evaluations focus on those aspects of a programme that are key to achieving impact.
- Understand how expectations play out in practice and why aspects of different projects work or fail.



For more information, see [Global Health Research Portfolio: Theory of Change](#), available online.



4. Developing individuals and meeting institutions' needs

RCS programmes must look holistically at career planning and work-related support systems for researchers. This includes investing in nurturing early career researchers and research leaders as well as in building and providing technical, administrative and managerial skills and back-up. Individuals who have opportunities to deepen their skills and knowledge tend to be more motivated and productive, and enjoy greater job satisfaction.¹⁰

To ensure that access to such opportunities benefits not only individuals involved in research but also their institutions, funders should check that applicants include evidence in funding proposals to show that they:

- have consulted institutional and faculty leadership (ideally as part of a formal assessment of institutional research systems) to identify areas that will benefit from improved capacity;
- are aware of, and are strengthening, existing institutional systems rather than setting up parallel processes;
- will select research and administrative staff, as well as students and other assistants, from among existing staff to help promote staff development and retention in ways that benefit the institution in the long term;
- can justify their decisions regarding individuals who will benefit from professional development in terms of the needs of the *person*, the *project* and the *institution*;
- warrant that opportunities for development offered to project members (including auxiliary, administrative and technical staff) will be equitably shared, and that training will aim to enhance technical and project management skills as well as expertise in eliciting equal participation and reciprocal collaboration;
- have made provision for the use, and ongoing mentoring, of local trainers so that future needs for training and development can be met within local systems.

10 See UKCDR (2022).

Case 4 The exponential effect of regional training initiatives

The Special Programme for Research and Training in Tropical Diseases (TDR) has taken a regional approach to capacity strengthening by establishing regional training centres to address research gaps related to infectious diseases of poverty in each WHO region. At the time of writing, seven centres are located in Colombia, Ghana, Indonesia, Kazakhstan, Malaysia, Senegal and Tunisia. The host institution for each centre was transparently selected, based on expertise.

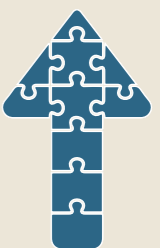
To improve access to, and delivery of, public health strategies and interventions, TDR worked with the regional training centres to develop a massive open online course (MOOC), several short courses on implementation research and *The Implementation Research Toolkit*.¹¹

This range of courses and training materials means that people working in different spheres of health research and provision – from researchers to practitioners, clinic managers, policymakers and local community members – can enrol in short, modular courses that are relevant to their needs and areas of work.

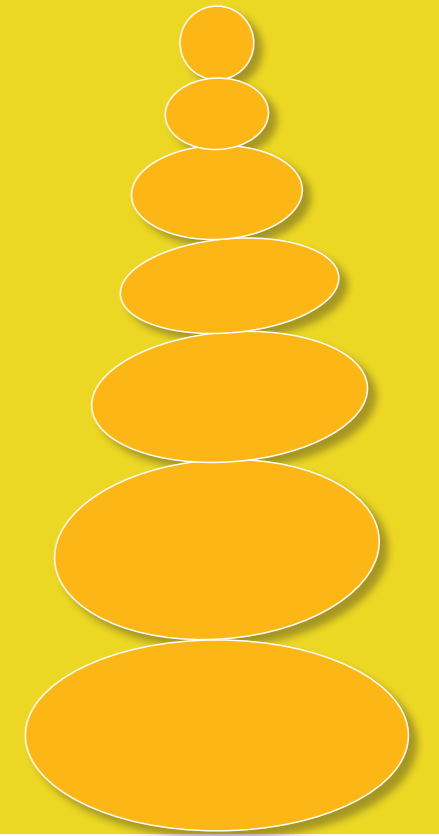
The regionalisation of expertise via train-the-trainer workshops has not only acknowledged and augmented existing expertise in disease-endemic countries, it is also helping to ensure that course content is relevant to regional needs. In addition, the training centres are serving as regional training hubs, and training courses are being offered in another 28 countries.

Lessons learned

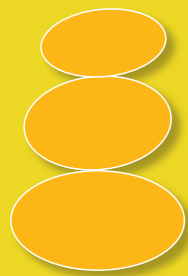
- Selection criteria for training centres should include evidence that applicants have staff who are capable of developing and delivering short courses in each WHO region.
- In planning their sub-regional work, the regional centres developed work plans based on regional health priorities and research strategies; these are accompanied by two-year budgets. When the plans and budgets have been approved (including pro rata payments for training centre staff), the centres put mechanisms in place for regular follow-up and biannual reporting, using a monitoring and evaluation framework that they developed themselves.
- Employee expectations about workload, performance and remuneration need to be managed carefully at the training centres, and roles and responsibilities must be clearly communicated.
- TDR support is dependent on budget allocations that are reviewed every two years, but centre managers need to secure longer-term funding to be able to guarantee ongoing course delivery and training-of-trainers. TDR is therefore working with each of the centres to develop a sustainability plan that includes strategies for extending regional collaborations.



TDR is a global programme of scientific collaboration co-sponsored by UNICEF, UNDP, the World Bank and WHO.



SECTION 3: IMPLEMENTATION TOOLS TO HELP ASSESS RCS APPLICATIONS



5. Choosing panel members and proposals

To ensure that funding applications are fairly and appropriately reviewed, funder selection panels must be diverse and gender balanced. Panel members must have relevant experience and skills in implementing RCS in research institutions (including in LMICs). Panel members also require clear information about the funder’s expectations and assessment criteria regarding RCS activities. In this regard, an evaluation template that helps panel members review key elements of each application is invaluable. If shared with applicants, this template can also establish transparency, assuring everyone that selection panels apply the same assessment criteria to each proposal.¹¹

When they first meet, selection panels benefit from being given time to acquire and/or share their knowledge and experience of RCS, and consider how this aligns with the requirements of a particular funding call. Where two-stage application processes apply, convening the same panel to assess both rounds helps to streamline matters considerably.

To support a fair and effective selection process, selection panels benefit from a checklist that indicates whether applicants have:

- referenced some published evidence and the principles of good practice used to guide the design of the RCS-related aspects of their proposal;
- shown how their RCS project aligns to the overarching goals or ToC of a research programme or institutional strategy;
- explained how the proposed RCS activities will remedy gaps in the capacities of individuals and institutions.

When assessing RCS applications, panels should consider:

- the breadth and ambition of applicants’ plans to include and support under-represented groups (such as women and early career researchers) in the cohort of researchers and support staff;
- how the proposal fits the host institutions’ long-term objectives, and how institutional capacity strengthening will be achieved and sustained;
- how the planned interventions align with the funder’s overall goal and framework (or ToC), and how impactful they are likely to be;
- whether risks related to implementation and impact have been considered and mitigated.

¹¹ For additional information, see Gregorius et al. (2018).

“Funder selection panels must be diverse and gender balanced.”

Case 5 Choosing and briefing panel members about how to assess RCS applications

Between 2012 and 2016, the UK Department for International Development (now the Foreign, Commonwealth and Development Office) funded ten UK–Africa consortia to carry out a five-year programme of research in the natural sciences (specifically renewable energy, soil science, water and sanitation). Titled the African Capacity Building Initiative, RCS was considered a central component of the programme.

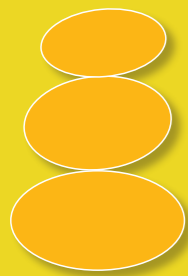
A total of 78 eligible applications were received; 34 consortia were shortlisted and reviewed by at least five external reviewers. From these, a review panel then selected ten consortia to receive funding. Observations of panel meetings and interviews with panel members explored how RCS related assessment criteria were applied during the application reviews.

Lessons learned

- In assessing applications that have an RCS component, funders must ensure that a good proportion of panel members they appoint have practical experience and knowledge of the evidence underpinning good RCS practice. These ‘RCS experts’ should be retained on the panel across different application rounds.
- Funders need to inform selection panel members of the RCS outcomes expected from programmes, and clarify the weighting they should apply to RCS activities outlined in project applications relative to the primary research component.
- Selection panels need specific and measurable criteria from funders that explain and quantify the plans that applicants must provide in terms of RCS processes, outcomes and impact.



The African Capacity Building Initiative was funded by DFID/FCDO and managed by the Royal Society, UK. For more information, see Gregorius et al. (2018).



6. Evaluating proposals against measurable and long-term goals

Published, valid and robust indicators for measuring many aspects of RCS are scarce, and data tend to be more descriptive than quantitative. This makes the evaluation and selection of RCS proposals difficult and complex. Increasingly, RCS funders are seeking to collaborate with researchers to develop appropriate, evidence-based processes and indicators for monitoring the impact of funded RCS.¹²

In general, assessment panels check that applicants have identified important research capacity gaps and needs, confirm that this process was consultative and inclusive, and discern whether the RCS response strategies devised seem appropriate (with reference to measurable baselines or benchmarks). In other words, panel members assess proposals to ensure that awardees:

- demonstrate their awareness of funders' requirements for RCS impacts;
- explicitly align their activities with an overarching framework or ToC related to RCS in their institution and/or region;
- show that they have included diverse partner needs and interests (individual and institutional) when prioritising RCS initiatives;
- explain how, after consulting with the staff cohort at all levels, they conducted a baseline assessment and developed their RCS action plan with partner institutions;
- use evaluation tools and indicators to measure impact at the end of a funding cycle that cover the individual, institutional, regional and/or societal levels, as well as a broad range of research capacity changes. These changes should include quantifiable and unquantifiable, tangible and intangible, technical and managerial, strategic and operational, programme- and institution-oriented, short- and long-term shifts.

Towards the end of a funding cycle, when it's time to assess and evaluate its impact, funders should consider asking all awardees to report against a small set of common indicators derived from the funding programme's ToC.

“Changes monitored should include quantifiable and unquantifiable, tangible and intangible, technical and managerial, strategic and operational, programme- and institution-oriented, short- and long-term shifts.”

¹² Pulford et al. (2020).

Case 6 Capacity assessments inform programme decision-making

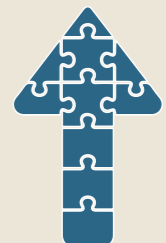
One Health is a global movement that acknowledges that human health is inseparable from the health of all life on Earth. The movement is bringing multiple sectors together to collaborate on the design and implementation of programmes, policies, legislation and research, with the aim of achieving better health outcomes for our planet and all who live here.

The One Health Regional Network for the Horn of Africa (HORN) is a multi-disciplinary, international partnership of universities and research institutions based in Kenya, Ethiopia, Somalia, Somaliland, Eritrea and the UK, as well as some national and international funding organisations and NGOs.

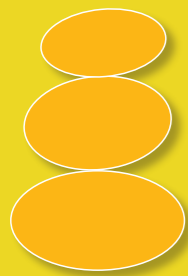
Shortly after it was established, HORN undertook a series of capacity assessments to identify gaps in its partner institutions' facilities. These were prioritised and reflected in action plans. As a result, the University of Addis Ababa decided to use some of the allocated funding to obtain 26 new biological microscopes and a teleconferencing system. A similar assessment at the University of Nairobi led to the refurbishment of an old cold-storage facility, enabling staff to remove temporary cold-storage equipment from laboratories and corridors, and freeing up space for researchers.

Lessons learned

- Research institutions in many LMICs cannot rely on state funding, so research budgets have to include allocations for the purchase, maintenance and eventual replacement of basic infrastructure and resources.
- It takes time to build and adequately equip multi-regional and multi-disciplinary partnerships, and funders must therefore plan for long-term involvement.



HORN is partly funded by UK's Global Challenges Research Fund. For more information, see <http://onehealthhorn.net>.



7. Opting for inclusivity and knowledge sharing

When approached with openness and mutual respect, consortium management processes can double up as reciprocal capacity strengthening mechanisms. All research projects require strategic and managerial decision-making. If staff at all levels, and from all disciplines, are willing to share their knowledge and skills, a wealth of opportunities to engage and learn often opens up.¹³

Larger funders in particular are engaging with national governments that do not routinely allocate state funds to research or higher education, and encouraging them to consider at least matching donor funds allocated to academic institutions, scholarly research and RCS.

When evaluating RCS proposals, funders are increasingly:

- acknowledging the reality of power imbalances and tensions in research partnerships and institutional consortia, along with the implications of related compromises and trade-offs for RCS;
- acknowledging that cross-regional and cross-institutional partnership building as well as research consortia management requires deliberate planning. This includes ensuring that adequate resources, time and training are allocated to the monitoring and optimising of *mutual* capacity strengthening opportunities;
- recognising that additional financial resourcing and time allocation is needed for projects with dual research and RCS goals, and acknowledge that efficiency and effectiveness are *both* essential to achieving research excellence and sustained RCS;
- encouraging applicants to prioritise RCS activities that help research or consortium leaders make sound long-term management decisions. For example, allocating budgets directly to all partners and strengthening all partner institutions' accounting systems (rather than allowing a lead institution to manage all the finances) is proving to be a very effective strategy;
- checking that responsibilities are equitably allocated within a research team, and that 'good' leadership practices are actively cascaded beyond senior project leaders;
- promoting institutional leadership and ownership of RCS programmes alongside the alignment of activities with institutional goals so as to ensure locally appropriate and sustainable outcomes.

¹³ For example, see Ding et al. (2022).

Case 7 Research consortia strengthen research skills and spark better career opportunities

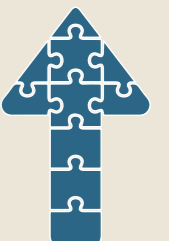
Research Networks for Health Innovations in Sub-Saharan Africa supports five research consortias, uniting 26 African research institutions in 14 sub-Saharan countries with 10 partner institutions in Germany.

The network coordinator's role is to foster collaboration within the consortium, both scientifically and regarding research uptake, while also reaching out to policymakers and civil society. An important aspect of RCS in this initiative is the strengthening of administrative and financial staff to improve grant management structures in sustainable ways.

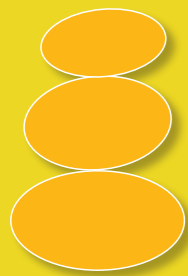
Accordingly, the Network's funding allocations acknowledge that African network coordinators do not all have the institutional resources needed to play a coordinating role with regard to the organisation, supervision, management and reporting of consortium-wide activities. Where this is the case, funding encompasses the employment of support staff for network management. In addition, North–South and South–South collaborations are strongly promoted in order to strengthen the consortias' cohesion and sustainability beyond the limits of funding cycles.

Lessons learned

- Long funding periods (five years) are a prerequisite to enable consortia partners with varying scientific and institutional capacity to establish well-functioning cooperation.
- For coordinators to fulfil their roles well (that is, handling overall supervision, management, reporting, proposal writing, etc.), sufficient funds for support staff must be allocated and some flexibility allowed regarding deadlines for the submission of reports.
- The initiative has succeeded in creating strong networks with high chances of sustained scientific cooperation. However, achieving sustainability with regard to extending institutional capacity beyond the limited funding periods remains challenging.
- Solid monitoring and follow-up processes must be jointly developed by the funder, the implementing agencies and the research networks to report against project targets, facilitate progress assessment, reduce long feedback loops and increase accountability.



This initiative is funded by the German Federal Ministry of Education and Research (BMBF) and jointly implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit and the project management agency of the German Aerospace Center (DLR-PT), Department Health, Division International Cooperation in Health Research. The first funding phase started in 2016; a second will be launched in 2023. For more information, see [Research Networks for Health Innovations in Sub-Saharan Africa](#).



Consulting and integrating the technicians

A professional boundary between laboratory and academic staff is deeply entrenched. Consequently, while laboratory staff are often critical to conducting effective research practice, their knowledge and skills are seldom fully utilised or appreciated. Similarly, the equipping of research laboratories is a major catalyst for quality research but laboratory equipment can quickly become redundant when project funds are used up.¹⁴ When it comes to equipping research laboratories in ways that draw on and extend the skills of laboratory staff, funders can do much more to encourage awardees to plan for sustainability.

For example, where core institutional funding is limited or absent, funders can consult with awardees (*including* technical and laboratory staff) about their strategic goals and future research plans to determine which laboratory equipment and skill sets will be used and maintained *after* a funded project is completed.

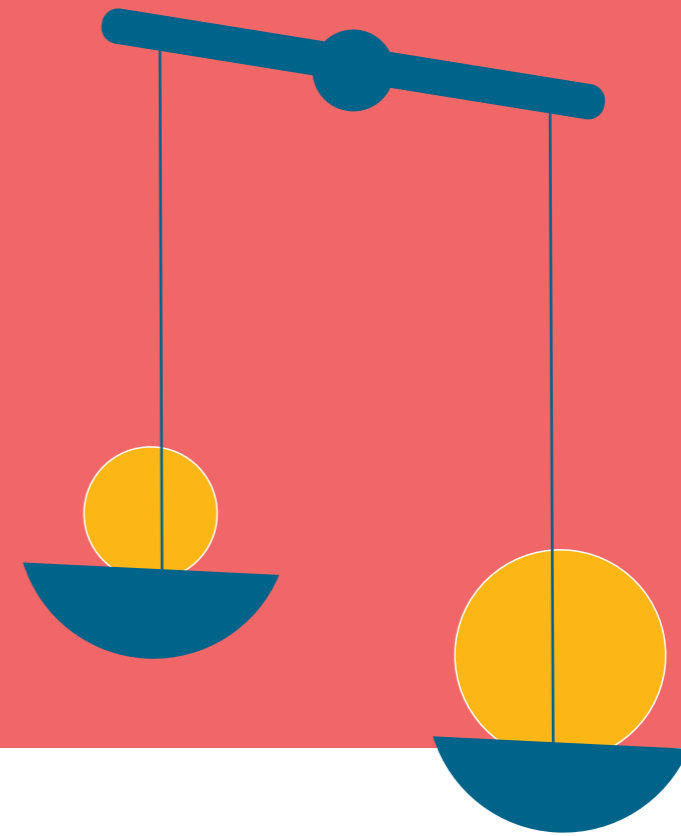
Similarly, funders can encourage awardees to use project grants to achieve and retain accreditation for institutional laboratories so that these facilities can be used to generate income for ongoing maintenance and refurbishment while helping to fund ongoing research.

“*Funders can do much more to encourage awardees to plan for sustainability.*”

In addition, funders can ask awardees to include the following information in their applications:

- a budget for laboratory technicians' time, *including* overtime, as well as equipment maintenance, repair and servicing, and an indication of how much time they will allow for procurement (this often delays projects unexpectedly);
- a description of how institutions will ensure there is adequate space to house new equipment, how they will maintain it, and how they will cover the ongoing costs of employing and training technicians;
- an indication that technicians are valued as members of the research team and an undertaking to include technicians in decision-making about equipment requirements, procurement and maintenance;
- any professional or career development opportunities (such as scholarships, authorships, conference presentations) that they will provide for laboratory technicians.

14 See, for example, El Hajj et al. (2020).



SECTION 4: EVALUATIONS THAT INFORM FUTURE PRACTICE



8. Reflecting on experience and building interdisciplinarity

Multi-disciplinarity is increasingly necessary and expected in contemporary research. Funders have a key role to play in supporting research programmes to cross traditional disciplinary and professional boundaries in ways that make research and its uptake more effective.

Many funding organisations now reflect this role in their own ToCs, programme strategies and employee job descriptions. For example, this can include:

- ensuring that awardees allocate sufficient time and resources to budgets, schedules, recruitment, meeting planning and mentoring to encourage project members to perceive, understand and cross disciplinary barriers and navigate professional hierarchies in mutually respectful ways;
- monitoring and producing relevant metrics regarding multi-disciplinary relationships so that this can be included as a criterion in proposal selection and evaluation;
- supporting scholarly networks and mentorships that are intentionally cross-disciplinary and cross-regional.

“Funders have a key role to play in supporting research programmes to cross traditional disciplinary and professional boundaries in ways that make research and its uptake more effective.”

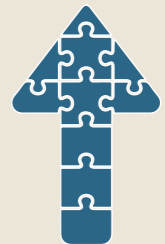
Case 8 Embedded reflection enhances interdisciplinary skills and collaboration

The International Multidisciplinary Programme to Address Lung Health and TB in Africa (IMPALA) set out to understand key regional policies, stakeholders and decision-making platforms that impact on lung health in sub-Saharan Africa. Accordingly, the research team included clinicians, social scientists, health economists and health systems scientists. To foster the mutual trust that was necessary for the multi-disciplinary team to work together effectively, a learning programme for team members was embedded in the programme design.

Accordingly, all team members were expected to allocate time and energy to reflect on and identify commonalities and differences, as well as any enablers and barriers to collaboration that arose as they worked. From these reflections, the team produced transferable and cross-cutting recommendations based on their own experiences.

Lessons learned

- The real-time sharing of what team members were learning helped everyone in the programme deepen their awareness of disciplinary and professional boundaries.
- Team members developed new skills and insights that enabled them to collaborate more productively with colleagues from other disciplines.



IMPALA was funded by the UK's National Institute for Health and Care Research from 2017 to 2021. For more information, see Ding (2019).



9. Assessing project impacts

Evaluating the impact of RCS programmes is challenging. Robust assessment requires expertise in qualitative data collection, which can mean that additional specialist researchers have to be included in the project from the outset. In addition, some benefits will only be realised years after a funding programme ends and will seldom be captured.

Nevertheless, shorter-term indicators of success should be agreed upon in advance of RCS projects being funded. These indicators should align with and feed into funders' ToCs (which should also have clear RCS objectives), thereby demonstrating that RCS is part of research impact.¹⁵

Beyond this, funders who invest in learning about RCS can share what they learn with other funders. To maximise this learning process, funders can:

- ensure awardees are aware of the characteristics of quality RCS interventions (as mentioned in the introduction) – that is, they strengthen existing systems rather than create new ones, they allocate adequate support and resources to core research activities, and they ensure that institutional leaders are given credit for RCS gains and motivated to invest in replicating them;
- encourage awardees to incorporate continuous assessment and improvement into project design;
- ensure awardees collect data on impact and that they use monitoring data to improve the programme throughout its lifetime;
- understand that investment in RCS can have wider ripple effects; methods for capturing these effects can provide evidence of the added value of a programme and can also contribute to more effective future RCS efforts. For example, to strengthen institutions' research capacities more generally, extend project-related training to institutional staff outside of funded projects whenever feasible;
- recognise that it can take five to ten years for new research capacities to embed themselves institutionally and be passed on to new cohorts of researchers: consider gradual reductions of funds for several years after the end of a project so that improvements are robustly embedded and continuous.

¹⁵ See Chadwick et al. (2022).

Case 9 The ripple effects of effective RCS programmes

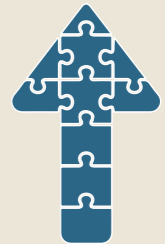
One Africa-based funding programme supported seven research facilities involved in testing products to control mosquitos and prevent the spread of malaria. The primary aim was to help the facilities obtain certification in Good Laboratory Practice.

As part of the programme evaluation, various different impacts of the project were examined. These included the effect on facilities' research capacities and institutional skills, as well as the professional development of individual team members. A number of additional benefits that extended beyond the research project were also identified.

Interview data revealed that learning more about planning and budgeting not only helped project staff (including drivers and cleaners) to enhance their personal financial and household management, but also opened up new employment opportunities for them (such as collecting samples of mosquitos from the community).

Lessons learned

- RCS efforts often have unanticipated benefits beyond the direct project outcomes.
- To understand and document these benefits it is important to capture a wide range of views and experiences, especially from people in partner institutions who may not have been directly responsible for the primary research (e.g. technicians, institutional leaders, non-scientific administrators/managers).
- To support the engagement of all stakeholders, the capturing of possible ripple effects must be planned for from the outset, and may need to include impacts that occur beyond the research system (such as the strengthening of local businesses that provide consumables and construction materials).



For more information, see Begg et al. (2021b). This work was supported by the Bill & Melinda Gates Foundation; see www.gatesfoundation.org.



10. Supporting knowledge translation

Circulating research findings about RCS within and beyond the academic sphere is crucial for many reasons.

Funders can support research teams to become skilled in various forms of scholarly and public engagement by, for example, encouraging awardees to:

- conduct skills audits and skills training on knowledge translation so that they learn how best to engage with key dissemination platforms, clarify how much time and resources this will take, and discern which communication strategies will be effective and appropriate to their projects;
- budget for knowledge translation services and online platforms, employing professionals who can provide knowledge translation training and expertise, not only for researchers and research managers but also for institutional library and IT departments where these are under-funded and under-resourced.

At the same time, funders must recognise that some knowledge translation activities can take place only after the main funding period, and should therefore enable projects to apply for follow-on funding for these purposes.

“A ‘learn by doing’ approach, although sometimes challenging and time consuming, is a feasible, rewarding and effective means of strengthening specific research-related capacities.”

Case 10 Learning by doing

From 2016 to 2021, a five year \$100m programme known as DELTAS (Developing Excellence in Leadership, Training and Science) connected 54 African institutions through 11 research consortia. Between 2019 and 2021, DELTAS ran a pilot project on community and public engagement.

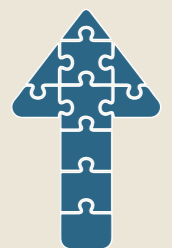
For the pilot, 25 early career researchers and research support staff were selected from 122 applicants. Each awardee received grants of between US\$25,000 and US\$35,000 to strengthen their skills via a ‘learn by doing’ approach.

All 25 awardees attended a three-day induction event that included talks and advice on how to design, monitor and evaluate public engagement strategies and activities. Over the next year or so, each awardee put what they had learned into practice within their own projects. Ongoing virtual mentoring was made available to them throughout this period.

The funders had the pilot project formally reviewed and found that awardees had improved their knowledge and competence, and were motivated to continue with community and public engagement efforts. Some awardees were even considering changing careers to focus more on science communication and knowledge translation.

Lessons learned

- A ‘learn by doing’ approach, although sometimes challenging and time consuming, is a feasible, rewarding and effective means of strengthening specific research-related capacities of staff working in funded projects.
- Awardees reported learning most from the challenges they encountered when implementing their projects.
- Small grants can enable awardees to obtain grant income and gain practical experience – often for the first time – as a principal investigator in the arena of community and public engagement.



DELTA was funded by Wellcome and the UK’s Foreign, Commonwealth and Development Office. For more information, see Mwangi *et al.* (2022).

Effective RCS: a checklist for funders

Designing RCS programmes

- ✓ Are the RCS goals of your programme clearly articulated and have you indicated the pathways by which you expect the goals to be achieved, using a theory of change (ToC) or equivalent framework?
- ✓ Have you clarified whether the RCS programme aims to benefit individuals, institutions or (inter)national research systems (or which combinations of these)?
- ✓ Is RCS the primary programme objective or is RCS embedded in a larger research programme? If it is embedded, what proportion of effort and resources should be devoted to RCS?
- ✓ Where RCS is embedded in a larger research programme, have you allowed for the additional time and resources awardees need for RCS activities (including to establish understanding and trust across multiple disciplines and to obtain ethics approvals – possibly in multiple countries)?
- ✓ Have you considered including a specialist RCS ‘learning team’ to support awardees with RCS-related activities and evaluations (especially at institutional level), and to generate data that will help funders improve current and future programmes?

Providing guidance for applicants on funders’ expectations

- ✓ Have you informed applicants of your expectations regarding RCS achievements and given them your programmes’ ToC or equivalent framework? Have you made applicants aware that their own ToC or framework should align with yours?
- ✓ Have you told applicants that you expect them to use published evidence (and not rely purely on personal or anecdotal experience) to design and evaluate their RCS approaches?
- ✓ Where RCS components are embedded within a larger research project, have you made it clear to applicants what weighting to allocate to RCS compared to the primary research, and (broadly) how you expect them to assess and report on RCS processes and achievements?
- ✓ Have you given applicants access to resources (such as webinars, Q&A sessions, FAQs with responses, publications) to help them align their RCS efforts with your programme’s vision and optimise the quality of their RCS approaches?
- ✓ Have you made it explicit that you require all RCS activities to be designed with a view to ensuring local ownership and long-term sustainability and not just paying lip-service to these goals?
- ✓ Are awardees aware that they need to consider development needs of everyone involved in the research process (not just the researchers) and make sure that where training is provided for individuals, this also meets their institutions’ expressed needs and priorities?
- ✓ Have you encouraged awardees to support potentially disadvantaged members of the research team (for example, people with caring responsibilities, different first languages, mobility restrictions) in ways that enable them to contribute fully?
- ✓ Have you considered providing RCS sessions for successful awardees at your first pan-programme meeting to brief them about your RCS requirements, and provide individualised support to help them improve their plans for conducting and evaluating their RCS activities?

Selecting and informing panels that assess RCS applications

- ✓ Have you put together a diverse and gender-balanced selection panel (including representation from LMICs if appropriate), with relevant experience, skills and knowledge of the evidence related to implementing RCS for individuals, institutions and (inter)national systems?
- ✓ Do panel members have clear information about your expectations and assessment criteria regarding RCS activities including what weighting should be given to RCS compared to other components in the application?
- ✓ Have you provided an evaluation template that the panel can use that shows how your programme-level ToC aligns with the guidance and resources provided for applicants?
- ✓ Are the panel aware that (where appropriate) you would like them to assess the quality and effectiveness of multi-disciplinary collaborations in the applications, beyond simply listing disciplines and numbers of collaborations?
- ✓ Are the panel aware that applications should outline how opportunities for equitable development will be provided (for management, administrative and technical staff, etc.) and that they should also consider the needs of the institutions and/or (inter)national research systems?
- ✓ Have the panel been instructed to select applications that promote institutional leadership, ownership and sustainability of RCS impacts, and which provide evidence that these align with institutional needs?
- ✓ Is the panel aware that applicants should build on existing institutional systems rather than set up parallel processes?

Evaluating RCS outcomes and impacts to improve future practice

- ✓ Among the many possible options, are you clear about how you want awardees to measure and report on their RCS efforts? Have you considered whether any of these measures should be the same across all projects within a programme in order to accelerate learning about how to improve RCS initiatives?
- ✓ Have you considered how you will demonstrate that your programmes’ RCS goals have been achieved and do these go beyond simply numbers of people trained and workshops held? For example, how will you know whether RCS improvements are locally owned and embedded, whether and how they have impacted institutions’ systems or research environment and culture, and whether the changes are sustainable?
- ✓ Many RCS impacts will occur several years after a programme has finished and cannot be measured, but are awardees aware that you need them to demonstrate the ways in which they are on a trajectory towards achieving these impacts?
- ✓ Have you considered offering tapering funds to support and document post-programme RCS sustainability? Would you consider providing limited funds so that awardees can collect data to understand why and how RCS success was or was not achieved?
- ✓ Have you considered joining or setting up an RCS learning network among funders you work with to collect and share data on RCS, and to inform future agendas for research on RCS?

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LSTM/CCR research capacity strengthening seminars

(all available on YouTube)

[What is research capacity strengthening?](#)

[Designing research capacity strengthening components within funding proposals](#), 4 May 2021.

[How to manage research consortia](#), 1 June 2021.

[How to optimise cross-disciplinary research collaborations](#), 29 June 2021.

[How to measure research outcomes and impact](#), 13 July 2021.

[Incorporating PhD studentships into projects](#) (n.d.).

Other RCS guides and toolkits

Canadian Association for Global Health's [Equity Partnership Tool for Valuing Global Health Partnerships](#).

CCR's specialist support to funders on [Monitoring and Measuring Impact of Capacity Strengthening](#).

Council on Health Research for Development's [Research Fairness Initiative](#).

Swiss Commission for Research Partnerships with Developing Countries (2018) [A Guide for Transboundary Research Partnerships: 11 Principles and 7 Questions](#).

UK Collaborative on Development Research's [Equitable Partnerships Resource Hub](#).



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