CHANGE PATHWAYS

climate | energy | evaluation

Design scoping study for the capacity strengthening component of the CLARE Programme

Final Report

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EXECUTIVE SUMMARY

The United Kingdom's Department for International Development (DFID) and Canada's International Development Research Centre (IDRC) have committed considerable resources in support of large applied climate research programmes. These programmes have approached capacity strengthening in various ways, incorporating a range of actors with different roles and responsibilities. Significant progress has been made by these programmes, but given the scale and urgency of the problem, still more work is needed.

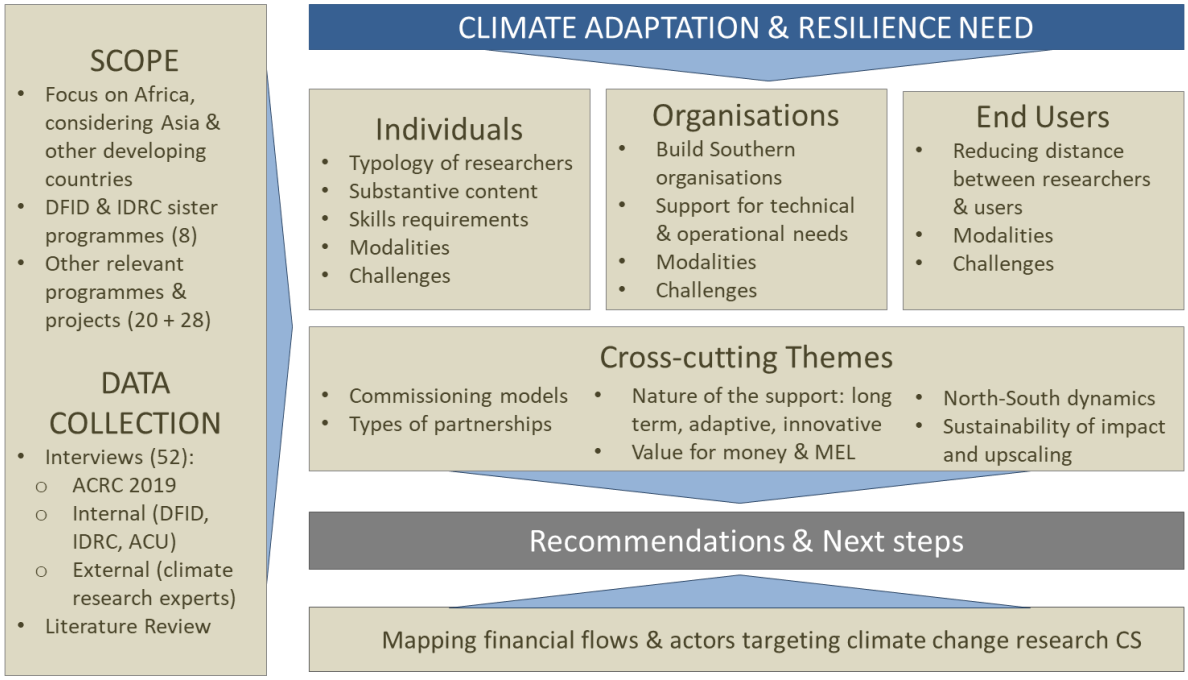
DFID and IDRC's upcoming Climate and Resilience (CLARE) framework intends to build on the capacity strengthening processes and outcomes of their previous programmes, optimise their impact with a set of transition activities, and unlock new approaches and potential through a coordinated portfolio approach.

This study aims to contribute to the capacity strengthening elements of the design of CLARE, both as a standalone pillar and a cross-cutting theme. The study aims to contribute to equipping CLARE to address some of the persistent challenges confronting initiatives aimed at strengthening capacity for climate change research. Additionally, emphasis has been placed on innovative approaches that can result in long-lasting impactful processes and outcomes in the shifting terrain of the 2020s - referred to here as the 'age of implementation' on climate action. This follows increased recognition of the importance of capacity strengthening in achieving desired climate change adaptation and resilience outcomes in Africa, and the perception that more needs to be done in this regard.

This study does not provide a complete assessment of capacity strengthening within the field of climate change research but has rather sought to focus on recommendations related to capacity strengthening with respect to researchers, organisations, end users, cross-cutting themes and examples. Attention was also paid to informing a capacity building 'call down facility' as well as a review of the donors and funds supporting capacity strengthening for climate change research, but these areas received less focus and attention.

The figure below summarises the scope, the data collection activities and the methodological framework used to organise the findings and recommendations based on the analysis.

Methodological Framework



The analysis identified a range of needs against which any capacity strengthening initiatives should be referenced. Specifically, the need for:

- an urgent and accelerated responses to the climate crisis;
- transformative change at scale and speed;
- enhanced implementation and ambition (in the "age of implementation"); and
- transdisciplinary research efforts integrating multiple stakeholders across multiple sectors and contexts.

Key Findings

Researchers

Climate researchers need strengthened "soft-skills" to deliver greater research impact, which can foster transdisciplinary engagement and learning by doing. Included, for example, may be skills related to partnership building, policy engagement, or design thinking.

A broader typology of researchers, representing other sectors and disciplines, need to be included in future capacity strengthening initiatives. Such a typology should be accompanied by a range of capacity strengthening modalities such as fellowships, embedded researchers and secondments as well as more informal mentorship and learning opportunities through building communities of practice.

Building the capacity of researchers faces significant challenges related to academic incentives, and organisational barriers that do not support research for impact. Furthermore, researcher capacity strengthening often happens in isolation of their contexts and there is a lack of creativity in approaches (e.g. over-reliance on workshops).

Organisations

Many interviewees referred to organisational barriers individuals faced at their home organisations, as they try to adopt new ways of working or skills acquired through Fellowships or visiting researcher programmes. These may, for example, include limited technical support, different ways of approaching research and the process of knowledge production, institutional barriers that prevent working effectively or limited support to reduce teaching loads, which preclude a large focus on research.

Focusing on organisations is therefore a key aspect of capacity strengthening interventions. In this regard, there is a pressing need to build organisational capacity in the South. Organisations also need to be able to support researchers to deliver positive climate change adaptation and resilience outcomes. This includes training on technical capabilities to tackle complex research problems as well as operational capabilities to create a sustainable and enabling environment to support the technical work.

Strengthening organisational capacity faces significant challenges too. It is difficult to ensure the sustainability of investments in core funding for organisational strengthening and there is a trade-off between autonomy and deciding, top down, what organisations need. Investing in organisations can be risky and knowing where to start is difficult given the wide-ranging challenges faced by African universities.

End users

There is a need to bridge the gap between researchers and end users, as this can increase the opportunities for systemic change and strengthen the capacities of those involved in the process.

Often what is needed is not new knowledge or solutions, but rather the facilitation of a process that brings end-users together (with or without experts) and fosters connections to enable peer learning. This highlights the need for skills related to knowledge brokering, a relatively recent concept in the climate sphere, but a role that has existed for a longer time in the health and education sectors, from which we can learn.

However, a number of challenges are at play, ranging from the inadequate skills on both sides of the spectrum, the incentive structures in place and the need to reconfigure a system that is based on these structural divisions.

Cross-cutting themes

Commissioning models, the weighting of selection criteria and reviewers are all crucial for enabling the selection of CLARE-supported researchers, organisations and end users that can deliver transformative outcomes in the age of implementation. Investing in different types of partnerships is an effective way of bringing together a diverse set of actors and skills to drive learning and creativity through new ways of working. Long term, adaptive support can create the conditions for creativity.

Establishing monitoring, evaluation and learning frameworks from the start of a project that can capture the qualitative and quantitative information that communicates the richness and evolution of capacity strengthening can make a valuable contribution to demonstrating the value for money of an intervention.

Power imbalances between the global North and South continue to be a feature of capacity strengthening programmes and need to be addressed, by dismantling an implicit “catch up” narrative, and investing in approaches that unlock the contribution from the South and enable multi-directional, multi-dimensional learning between all participants.

Lastly, sustainability and upscaling of impact can be enhanced through offering follow up funding that provides career development opportunities for programme cohorts, and experiments with lighter touch models, that can leverage and upscale the resource-intensive investments made by previous programmes.

Recommendations

A number of **guiding principles** are presented to inform all activities planned and undertaken as part of the CLARE programme. Discussing and modifying these principles with all stakeholders involved in the design and implementation of CLARE would be important in creating a shared vision for capacity strengthening.

1. **Greater investment of resources into capacity strengthening is required**. A stand-alone pillar is needed to formally deliver capacity strengthening as a primary objective. Given the complex, multi-faceted and integrated nature of capacity strengthening, a cross-cutting theme is also required to ensure that capacity strengthening is mainstreamed (considered, prioritised and tracked) in all CLARE components (i.e. where capacity strengthening can be delivered but where it does not represent the primary objective).

2. Capacity strengthening approaches need to be **fit-for-purpose, participant-driven and demand-led**, if they are to be owned by participants and deliver transformative impact.

3. CLARE should **consider the interconnectedness of the individual, organisational and systemic/societal levels** to ensure that capacity strengthening interventions are targeted, integrated, coordinated and ultimately address the challenges for which they are designed. A portfolio approach can contribute to this.

4. **Innovation, transdisciplinarity and new, unfamiliar partnerships** can contribute to developing diverse skills while **co-creating the required (and possibly unexpected) solutions** needed to address climate challenges.

5. Capacity strengthening interventions need to be designed to address the features of t**he age of implementation**, i.e. an era of **enhanced ambition and action, at scale and speed, under complexity, uncertainty and poor data conditions**. Think creatively, think big!

6. **Flexibility, reflection and adaptive learning** are crucial ingredients for establishing iterative, innovative approaches that are equipped to navigate the rapidly shifting terrain of the 2020s: **provide the space for these ingredients.**

7. Capacity strengthening aimed at the South needs to be **Southern-led and owned, by engaging critical, diverse voices.**

8. To ensure **sustainability and scaling up of impacts**, institutionalisation of successful tools, approaches and methods should guide all interventions.

9. **Nexus or holistic thinking** should represent a reference principle against which the substantive content of any capacity strengthening intervention of CLARE is evaluated.

Priority recommendations for CLARE are presented according to "focus areas" and based on the identified needs.

The five focus areas include several specific recommendations. An "explanation" is provided to expand on, and substantiate, each recommendation. This explanation is based on the findings of what capacity strengthening is needed and what has worked well in the past. In addition to a review of literature, the study relied heavily on interviews with key stakeholders and experts which elicited their recommendations on the most important needs, as well as opinions regarding the best way for CLARE to address these needs. Interviewees were pressed to substantiate their comments and did so where possible but were not always able to provide examples. The explanations provided here therefore include interviewee recommendations and opinions, findings from the literature review as well as specific examples, where possible.

Initial suggestions have been made regarding where and when the recommendation should be applied within CLARE ("Inclusion in CLARE"). "Area" refers to components of CLARE (standalone pillar or cross-cutting theme), the targeted stakeholders (researchers, organizations or end users) and the scale (project, programme or portfolio) to which the recommendations apply. "Timing" refers to the distinct phases of CLARE adapted from the design scoping study, namely scoping, start-up, implementation and consolidation.

Focus Area 1: Long-term, iterative, multi-pronged approach

Recommendation	Explanation	Inclusion in CLARE
1A- Leverage the CLARE lifespan to iteratively strengthen capacities rather than focusing on delivering short-term results.	• **Long-term, sustained support** is a fundamental ingredient for **fostering such learning and the development of trust and relationships** that are essential for lasting impact but take time to develop. • **Putting capacity strengthening first may mean** accommodating lower quality research outputs in the	Area • All areas Timing • Scoping • Start up • Implementation

Build on and scale up existing programmes, e.g. through the provision of more advanced career options. **Upscaling in diverse ways** including, virtual workshops, institutionalising project processes in **government structures and budgets**, and developing **networks that diffuse new ways of working**.	short to medium term, but could enable more "appropriate" research, in the longer term. • **Provision of on-call mentorship and advisory support** throughout the funding lifespan has been proven to contribute to long-term uptake of programme learning, for example, the provision of IDRC Programme Officers within the Think Tank Initiative (TTI) • TTI showed that **flexible, non-directive calls that allow for proposals to address a range of ambitions**, in line with organisations' needs, priorities, and contexts are best. • Setting up **multi-stage grant-making processes** allows for experimentation, iteration and improvement. • Involving a **diverse range of stakeholders** enables a **ripple effect** through diverse spaces. • A phased, iterative approach enables **tailoring, flexibility and learning-by-doing** that is fit for purpose.	
1B- Invest in a diverse spectrum of interventions across the risk spectrum, adopting **a multi-pronged approach.** Aim to balance types of interventions: • safe/low capacity return & risky/high capacity return • large & small • formal & informal	• A portfolio approach allows for investing in a **diversity of approaches**, which are designed to contribute to a **common set of objectives from different angles**, potentially contributing to change in different often unexpected ways. • There is a need to find a balance between **leveraging what works** e.g. fellowships (e.g. AfriCLP, CIRCLE, IIHS) embedded researchers (e.g. FRACTAL) and core grant support, to drive economies of scale and lower transaction costs, **versus piloting/experimenting to explore** unchartered territory to drive innovation. • **There needs to be an openness to failure**. "If funders want to build capacity, they have to be prepared to take risks". • An example of a diversity of interventions can be seen in **PlanAdapt's** mix of face-to-face training with e-learning targeting users who need to understand climate risks.	Area • All areas Timing • Start up • Implementation
1C- Strengthen capacity to undertake flexible, iterative **decision making under**	• It is critical to think about **what type of research (and capacity strengthening) is required for the "age of implementation**", including a combination of transformative research, and demand-led, incremental research.	Area • All areas Timing • Set up

significant uncertainty in data-poor environments.	• There is a need for adaptation and resilience **research to move beyond problem identification** and increasing accuracy of prediction or levels of certainty (e.g. of models), **to the identification of solutions, their implementation**, and monitoring their effectiveness. • **CLARE should look to leverage the skills of think tanks, consultants and practitioners** who can produce evidence quickly and effectively in the context of uncertainty and data-poor conditions and look to develop these skills in researchers based in academia. • An emphasis needs to be on developing the **abilities of researchers and end users to work together.**	• Implementation

Focus Area 2: Consider the full value chain

Recommendation	Explanation	Inclusion in CLARE
2A- Individual capacity strengthening needs to be a long-term commitment accompanied by addressing broader organisational challenges. • **Rotate fellows within a project to break down silos and enable cross-pollination.** • **Post-intervention support** should be offered to assist supported researchers with re-entry into home institution. • **Need to strengthen technical and**	• **CLARE must recognise the different starting points of researchers** and reflect this in the design of CLARE. • **Planning for diverse career pathways (within and beyond academia)** can retain skills and facilitate their continued development to enhance impact. • Organisations require support to develop **both technical and operational capacities**, this could include undertaking organisational needs assessments at different stages, providing mentoring, and establishing organizational policies and structures to improve the research environment as took place in **CIRCLE**. • TTI showed that **core funding** allows flexibility and enables **short-term tactical decisions and long-term strategic** planning, accompanied by **demand-led advisory and organisational development support** works well. • Developing a clear **theory of change** for how core support funding will lead to the desired climate change adaptation and resilience results in Africa enhances clarity of the logic and value of an approach.	Area • Standalone pillar & Cross-cutting theme • Researchers & end users • Project, Programme Timing • All phases

operational capacities of organisations.	• **There is a need to identify southern organisations that have developed strong operational capacities** (e.g. SouthSouthNorth and Climate Systems Analysis Group, UCT) to help develop processes for collaboration and sharing. • **There should be a multi-scale focus**, from individual researcher, to organisational level, to broader environment through promoting south-south learning platforms, networks and exchanges **(e.g. SARUA curriculum development to grow the pool of young researchers, African Evidence Network and ARUA that enhance networked learning).**	
2B- Broaden the set of skills of researchers and end users. • Help actors in the climate change evidence value chain **better understand each other and each other's organisations, objectives, incentives and processes.**	• CLARE should invest in the same set of skills as previous initiatives (e.g. strengthening **"basic" research methods skills** and specific technical skills), but **needs to go beyond** (e.g. partnership building, conflict resolution, understanding complexity, ability to engage politically). • "**Soft skills" are needed to translate research into impact,** working under conditions of complexity, uncertainty and poor data quality and availability. • Fellowships, secondments, exchanges and embedded modalities **(e.g. FRACTAL)** build relationships and improve understanding of each other's contexts.	Area • Standalone pillar & Cross-cutting theme • Researchers & end users • Project, Programme Timing • Set up • Implementation
2C- Reduce the distance between researchers and end users by resourcing for transdisciplinarity. • **Include experts from different disciplines and fields** to co-design and co-produce research and provide support through a **"call down facility".**	• Climate change adaptation needs action, demand-driven research, and moving from theory to practice, it needs to be **less about models and technology, and more about learning with people.** • Priority should be placed on the **co-production of knowledge** to address the needs expressed by decision-makers, offer **tailored, advisory support.** • CLARE should promote participatory processes that **encourage double- and triple-loop learning (e.g. CISRO)** for questioning assumptions, values and beliefs. • **Democratising the process of knowledge production is critical** and can be delivered **by requiring the integration of diverse types of knowledge** (including non-scientific, contextual, tacit knowledge from stakeholders' experience).	Area • Researchers & end users • Project, Programme Timing • Scoping • Set up • Implementation

	• Transdisciplinary processes are **time- and resource-intensive** and may **not deliver rapid, countable impacts** but can **lay the basis for systemic, transformational change.** • Include **knowledge brokers to work as connectors** (e.g. Climate Knowledge Brokers).	

Focus Area 3: Foster innovation

Recommendation	Explanation	Inclusion in CLARE
3A- Invest in developing and implementing **innovative approaches** to capacity strengthening. • Focus on enabling social learning, learning by doing & action. • **Move beyond central focus on climate researchers.**	• CLARE needs to be explicit and specific about the capacity strengthening objectives of a call and issue some calls that exclusively focus on capacity building, including through novel partnerships. • Incentivising **creativity and innovation can be achieved through commissioning models that promote diverse** teams and **by outlining specific criteria in funding calls** (e.g. demand-based action research, fostering two-way learning, led by a knowledge broker). • CLARE should encourage the use and development of **collective sense-making tools** (e.g. participatory scenarios & social labs by Reos Partners) & **cutting-edge methodologies** such as **adaptation pathways** (e.g. CSIRO), **experiential learning games** (e.g. Red Cross Red Crescent Climate Centre), **theatre of the oppressed, storytelling and community listeners' clubs** (e.g. FAO).	Area • All areas Timing • Set up • Implementation
3B- Foster experimentation and risk taking. • Allow for **small-scale experiments** that leave the design and modality of capacity strengthening in the hands of the participants.	• Offering **small opportunity funds** (e.g. FRACTAL and START) for exploring different modalities, to target candidates, followed by larger grants for good-performing candidates, accompanied by mentorship can help to strengthen proposals, for organisational development. • The required scale of transformational change **needs extensive experimentation and learning**. CDKN achieved this through a light touch, experimental and	Area • Researchers & organisations • Project, Programme Timing • Set up • Implementation

	phased approach (funding shorter experimental projects over time) • To experiment effectively requires a strong **learning lens, with adaptive management.** • Gaps were identified with respect to organisations and work in the Fourth Industrial Revolution, experience of incubators and support platforms targeting enterprises, insights from impact venture capitalists, change management experts and others (consider for additional scoping).	
3C- Foster **unusual partnerships** that bring in new, diverse skills and expertise, and promote **mutual learning.** • Promote collaborations across **different disciplines and types of expertise through transdisciplinary approaches.** • **Crowd in the private sector.** • Explore partnerships with **activists and the media.** • Encourage collaborations with **universities and schools.**	• There is a needed to partner with diverse sources of expertise outside the climate field **e.g. behavioural psychology (for influencing decision-making), political economy (engaging with interests), Monitoring, Evaluation and Learning (MEL), complexity and systems thinking, social and institutional change.** • **Partnerships with business schools and leadership thinkers** should be explored (e.g. the School of International Futures, Wasafiri). • **Partnering researchers with adaptation/climate resilience projects** enables the monitoring of effectiveness of interventions and provides research findings and lessons that can be shared (e.g. CSIRO approach, ICCCAD's master's programme). • **Partnering researchers with practitioners and decision-makers** enables learning from tacit knowledge about implementation (E.g. IIHS fellowship, PlanAdapt, AGNES). • **Partnering researchers with development implementer**s can help climate proof interventions. (e.g. working with DFID's country offices, learning from CSIRO support to Australia's ODA programmes) • **CLARE should target the next generation** through curriculum development, mentorship programmes and competitions that foster climate awareness and research skills through student-led community projects (e.g. SARUA, HSTA, IIHS)	Area • All Timing • Set up • Implementation

	• There is a need to invest in the establishment of **new ways of working and communities of practice** (e.g. MAPS programme) • Research centres and funding sources in the private sector could be crowded in based on mutual objectives.	

Focus Area 4: Address imbalances of power

Recommendation	Explanation	Inclusion in CLARE
4A- Prioritise Southern researchers & organisations through **preferential selection criteria, designing governance structures that shift responsibility to** Southern organisations & applying targeted **& alternative funding approaches.**	• There is a need to identify and target Southern candidates that are less-resourced and less established but that have the potential, with capacity strengthening support, to take over Principal Investigator roles over time (e.g. AAS and CIRCLE). • There is a need to offer opportunities for northern researchers to develop their capacities and sensibilities for working in the global South. • CAAST NET+ and other ERA-Net programmes demonstrated potential alternative funding approaches through co-financing from national sources (from EU and countries in the South) for international research consortia, which can enhance ownership and address power imbalances.	Area • All Timing • Scoping • Set up • Implementation
4B- Strengthen **Southern organisations' technical** capacities to successfully accommodate the necessary researchers **and operational capacities** to manage projects and remain sustainable in the long term.	• **"Non-earmarked" core funding** can address systemic deficiencies within organisations (e.g. IDRC through TTI and DFID through the PPA approach). • Facilitating **Southern organisations as leads** and ensuring consortia are made up of **diverse Southern voices** (e.g. CIRCLE and LUCCC) can be achieved through modifying selection criteria in funding calls.	Area • Standalone pillar & cross-cutting • Organisations • Project, Portfolio Timing • Scoping • Set up • Implementation
4C- Exert influence over broader institutional barriers such as academia's favouring	• Structural barriers hinder evidence-informed decision making.	Area • Standalone pillar & cross-cutting

of publishing over applied research for improved decision making. Targeted advocacy engagements should be explored.	• **Researchers face a dilemma**: there is pressure to produce the professions' valued outputs but also to show the public benefits of their work (e.g. supporting decision makers to better address the complexities of climate change). • A number of countries have started considering the value of **engaged scholarship** alongside academic publishing (e.g. South Africa). • From an **ethical point of view**, there is an obligation to ensure that adaptation research results in social benefits.	• Organisations • Project, Portfolio Timing • Scoping (interrogate key barriers) • Set up • Implementation
4D- Invest in platforms that **bring together and amplify critical voices from the South** and enable South-South collaborations and networks.	• **Southern critical voices** are in short supply, over-subscribed and **platforms are needed to amplify** their voices and **bring them together.** • Investing in existing **South-South networks** is a way to foster South-South collaborations, knowledge exchange and learning (e.g. LUCCC, ARUA and AEN). • **CLARE should consider funding a gathering of established critical thinkers/voices from the South to work with DFID and IDRC to brainstorm key features and principles** for CLARE's approach to capacity strengthening. • There is a need to strengthen the links between the Intergovernmental Panel on Climate Change (IPCC) and Southern researchers.	Area • Individuals, Organisations Timing • Scoping • Set up • Implementation

Focus Area 5: Co-design, track, assess & learn

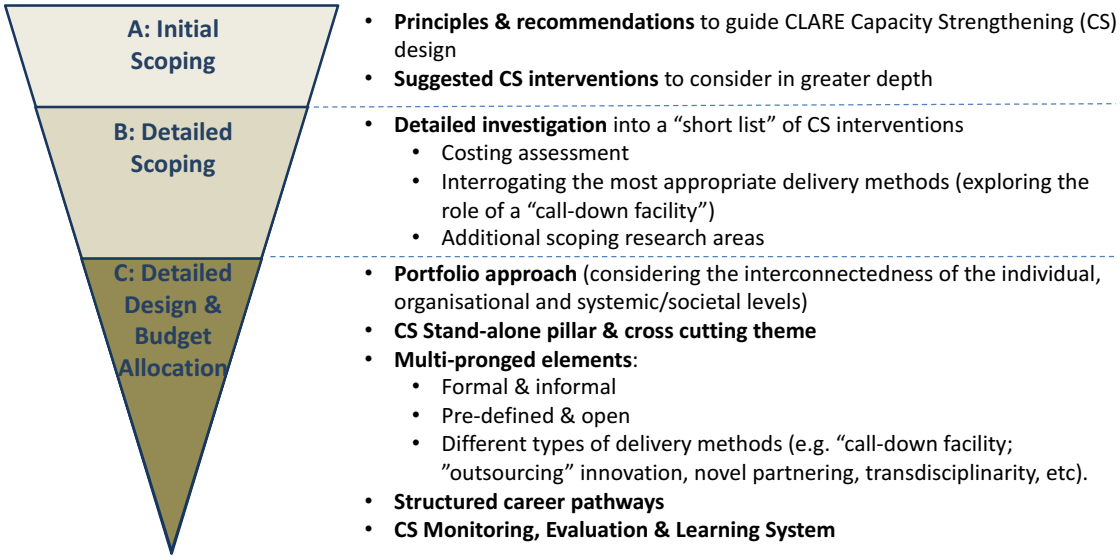
Recommendation	Explanation	Inclusion in CLARE
5A- Promote the **co-design and co-definition of participants' capacity strengthening needs,** to ensure **support is demand-led and tailored,** and	• A starting point should be to employ dedicated capacity strengthening / **education/ pedagogy & MEL experts** to help design & set up CLARE's capacity strengthening pillar (including MEL approaches) • There is a need to conduct **baseline assessments** of researchers' **skills,** their aspirational **learning needs**, their preferred capacity strengthening **modalities**, and	Area • Standalone pillar & cross-cutting • Individual, organisations

reflective of **different starting points.**	**organisational constraints**, track these over the project lifespan (AfriCLP) and FCFA). • Success of a capacity strengthening initiative depends on **setting up a collaborative design process, which considers the starting conditions** of the individual/organisation, their needs and aspirations (lessons from PPA). • A strong focus on **adaptive learning and reflection**, will shed light on the most appropriate mechanisms. • A good example of this is the benchmarking survey for BRECcIA Co-Is/PIs	• Project, Programme, Portfolio Timing • Scoping • Set up • Implementation • Consolidation
5B- Invest in MEL approaches that are equipped **to capture the evolution** of capacity strengthening during a project to make the case for **value for money** of an intervention. • Enable a **flexible & adaptive** approach. • For long term, sustained impact promote **institutionalisation** of practices.	• Investing in MEL approaches that adequately capture **quantitative indicators**, combined with **rich qualitative storylines** (ASSAR) can illustrate and differentiate the **evolution of impact** (AfriCLP). • There is **limited information** on investments in and **effectiveness of capacity strengthening** for climate change resilience. • **Tracking and publicly reporting on the impact** of funds invested in capacity strengthening is needed to ensure the broad community of actors investing in research for climate adaptation and resilience in Africa can align, avoid gaps and duplication of effort, and deliver a more efficient, effective and transformative collective effort. • **Institutionalisation** refers to the inclusion of the new knowledge, tools and practices in operation manuals or procedures of organisations to ensure capacity strengthening approaches become engrained and remain active after the completion of a project.	Area • Start up: Indicators, frameworks and methodologies can be co-produced • Project, Programme, Portfolio Timing • Set up • Implementation • Consolidation

Proposed next steps towards the design of CLARE's Capacity Strengthening interventions

This study represents the first step towards the design of the capacity strengthening components of the CLARE Programme. The figure below provides a summary of how the findings and recommendations of this report should be taken into subsequent scoping and ultimately into the final detailed design and budget allocation of CLARE.

Steps towards the design of CLARE's capacity strengthening interventions.



A: Initial scoping (this study)

This study focused on principles and recommendations to guide the design of specific capacity strengthening interventions. These should be used as a basis for agreeing on a "short list" of preferred interventions and subsequent scoping activities.

B: Detailed Scoping

The next phase of scoping work should focus on further refinement and prioritisation of the capacity strengthening interventions based on a detailed investigation into this "short list". Various tasks need to be undertaken as part of this process. This study proposes a costing assessment (to build on initial efforts to try and track financial flows associated with climate change research capacity strengthening) and a number of specific additional scoping research areas.

In addition, the next iteration should consider how best to deliver the short list of capacity strengthening interventions. A potential "call down facility" is explored as an example of a mechanism to deliver capacity strengthening interventions included in both the standalone pillar and the cross-cutting theme. This could include:

1. **Centralized strengthening of broadly relevant skills** (e.g. training related to co-production approaches or how to respond to a call);

2. **Centralized provision of services** (e.g. operational capacities related to HR or accounting could be provided as a service to organisations on a limited time basis, coupled with interventions to transfer the skills and build up the resources of those organisations to undertake those operational tasks in-house, on a sustainable basis);
3. **Centralized repository of tools and other resources** (e.g. templates, a roster of service providers, etc.); and
4. **A platform to drive innovative capacity strengthening** (e.g. a service provider network or platform that facilitates the coming together of the most appropriate teams for a given piece of work, driven by an explicit call / TOR that requires a particular combination of skills and experience).

C: Undertake detailed design and budget allocation

A portfolio approach can contribute to a greater consideration of the interconnectedness of the individual, organisational and systemic/societal levels to ensure that capacity strengthening interventions are targeted, integrated, coordinated and ultimately address the challenges for which they are designed.

There is no capacity strengthening "silver bullet". Within the portfolio approach and delivered through the standalone pillar and the cross-cutting theme, CLARE will need to include a multi-pronged approach. The design needs to include both formal and informal approaches, pre-defined and open arrangements, and various methods through which capacity strengthening is delivered. This is necessary to ensure research is fit-for-purpose, innovative, flexible and leads to positive climate adaptation and resilience outcomes in Africa.

This study has begun to identify and motivate for the capacity strengthening "spaces" that need to be created. These "spaces" encompass not only the types of capacity strengthening interventions but also the nature in which they should be designed and delivered. The next iteration of scoping and design work should look to determine the scale (relative emphasis and associated budget) of each of these spaces. This should be informed by the additional work outlined in this study and undertaken with reference to the principles and recommendations put forward in this report.

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1 INTRODUCTION

The threats of climate change demand action at unprecedented scale and speed to prevent dangerous levels of warming of the global climate system and to adapt to the impacts that are already unfolding. Given the complexity and high degree of uncertainty associated with the climate change problem, research has a key role to play in producing and communicating information to equip decision making to respond to the challenges presented by climate change.

To enhance the impact of research and the information it produces, capacity strengthening is required throughout the value chain. From the production of knowledge, to the distillation and communication of knowledge and its use in decision making, be it at policy level or in communities. This necessitates targeting actors and organisations throughout the value chain; it also calls for improving the manner in which the different stakeholders work together to create synergies, ensure efficiency and ultimately enhance impact.

DFID and IDRC's eight sister programmes have approached capacity strengthening in various ways, incorporating a range of actors with different roles and responsibilities. Significant progress has been made by these programmes, but given the scale and urgency of the problem, still more work is needed. The Climate and Resilience Framework programme (CLARE) intends to build on the capacity strengthening processes and outcomes of the eight sister programmes, optimise their impact with a set of transition activities, and unlock new approaches and potential through a coordinated portfolio approach proposed by CLARE. This study is also mindful that the CLARE is being designed in parallel with DFID's strategic programmes for Africa and Asia.

As well as identifying the progress and challenges of the sister programmes and other initiatives to build on, this scoping study aims to shine a light on the persistent gaps in capacity strengthening initiatives and to identify new areas of work. This includes the diverse skills required for researchers and other actors along the value chain, features of organisational environments that support or hinder research on climate change, and capacity strengthening of users of research in decision making. The persistent challenges and rapidly shifting landscape require research portfolio approaches that are equipped to adapt, innovate and deliver impact under uncertainty.

Despite the numerous efforts to enhance capacity of researchers, policymakers and practitioners to respond to the complex challenges presented by climate change, major capacity gaps persist. Innovative approaches that cultivate new ways of working are required to respond to this challenge. Such responses require an understanding of the existing landscape, to identify areas of progress and

existing gaps, to prioritise collaboration between diverse skills and experiences, and to leverage ongoing work to optimise impact in key focus areas.

1.1 Objectives

This study aims to contribute to the capacity strengthening elements of the design of the CLARE programme, both as a standalone pillar and a cross-cutting theme. The study represents the first part of a series of studies reviewing capacity strengthening with the purpose of informing the design of CLARE. Subsequent studies will build on this work and focus on priority recommendations and future areas of work that will be conducted under the CLARE design phase. This study therefore aims to highlight key areas and recommendations that warrant additional in-depth work.

More broadly, the study aims to contribute to equipping the CLARE programme to address some of the persistent challenges confronting initiatives aimed at strengthening capacity for climate change resilience. Additionally, emphasis has been placed on innovative approaches that can result in long-lasting impactful processes and outcomes in the shifting terrain of the 2020s - referred to here as the 'age of implementation' on climate action. This follows increased recognition of the importance of capacity strengthening in achieving the desired climate change adaptation and resilience outcomes in Africa and Asia, and the perception that more needs to be done in this regard.

The four main objectives of the study as stated in the Terms of Reference included:

1. Mapping of capacity strengthening initiatives for early career climate researchers.
2. Mapping of capacity strengthening initiatives for institutions working on climate change.
3. A summary of best practice examples and expertise to inform the development of a capacity building call down facility, and
4. A review of the donors and funds supporting capacity strengthening for climate change research.

Based on discussion with DFID and IDRC, the scope was expanded to include an assessment of all levels of researchers, as well as an assessment of capacity strengthening of end users.

Capacity strengthening within the area of climate change research is complex, multifaceted and often integrated into other project components and activities. This makes capacity strengthening difficult to map or assess and the scope of any assessment difficult to contain. The focus of the study, as captured in the objectives, shifted following initial work and interviews with internal (and some external) stakeholders during the inception phase. The shift in focus was validated through subsequent work which also informed the relative emphasis placed on different aspects of the

investigation. This study, therefore, does not provide a complete assessment of capacity strengthening within the field of climate change research but has rather sought to focus on recommendations related to capacity strengthening with respect to researchers, organisations, end users and cross-cutting themes and best practice examples. Attention was still paid to informing a capacity strengthening call down facility as well as a review of the donors and funds supporting capacity strengthening for climate change research, but these areas received less focus and attention.

The study presents findings and offers recommendations that are tailored to the specific capacity strengthening needs for climate change research as articulated by DFID and the IDRC. This includes recommendations for the CLARE Business Case, as well as identifying areas of capacity strengthening that require further research that were not feasible in the scope of this study, but that could be conducted in one of the deeper dives during the CLARE transition phase.

The study is one a series of current scoping studies intended to inform the design of CLARE, and will culminate in a workshop to consolidate learning and provide recommendations. The scoping studies form part of the activities that are currently being undertaken as part of the transition phase in preparation for the CLARE programme. Other activities include extension activities of DFID and IDRC's sister programmes namely: CARIAA, CIRCLE, FCFA, SHEAR, WISER, ESPA, CCMCC, AgMIP.

2 DEFINING THE CORE FEATURES OF CAPACITY STRENGTHENING FOR LOW-CARBON AND CLIMATE-RESILIENT DEVELOPMENT

Broadly applied, there is a rich body of knowledge on capacity strengthening. It is not the purpose nor is it in the scope of this report to engage in a comprehensive assessment of the literature on capacity strengthening. Rather the aim is to characterise capacity strengthening according to some of its core features and establish an operational understanding of capacity strengthening for climate change research in the age of implementation.

The UNDP defines capacity development as “the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time.” (UNDP, 2015, p.5).

While this is a fairly generic definition, it identifies some core features. Capacity strengthening is a process, typically a long-term one. It involves three interconnected levels of individuals, organisations and systems/societies, which interact to establish and then implement objectives. Capacity strengthening should lead to the capacity strengthening process itself improving over time for enhanced and lasting impact (Khan et al., 2019; UNDP, 2015).

The multi-level and multi-dimensional nature of capacity strengthening means that it needs to involve a diverse range of actors, from those that produce information all along the value chain to those that use information for decision making, be they policymakers or local communities (Newman et al, 2012). Therefore, capacity building needs to acknowledge the supply side and demand side of evidence, and aim to engage actors across the value chain to close the gap between producers and users, and deliver new ways of working to deliver integrated action that enhances impact.

Khan et al. (2019) identify education, training, public awareness, institutional capacity, research and technology development as the five core elements of capacity strengthening. Given that the elements are related but distinct, initiatives aiming to strengthen capacity could be tailored to each of the five elements, to ensure interventions meet a specific need.

2.1 Capacity strengthening to meet climate change adaptation and resilience needs

A major focus of the capacity strengthening literature and initiatives up until now has primarily endeavoured to close the 'capacity gap' between the global North and global South. While it is necessary to draw on this rich body of knowledge, defining the purpose of capacity strengthening is imperative for optimising the impact of interventions. The focus of capacity strengthening in this report is on the production and use of relevant information needed for non-OECD countries to pursue climate-resilient development pathways.

The term 'wicked problem' was coined in the 1970s to represent societal problems with high degrees of complexity, uncertainty and interconnectedness, for which traditional planning processes were inadequate (Rittel & Webber, 1973). Climate change can be characterised as a wicked problem (Tyler, 2018), which requires fundamentally different planning processes for adequate responses. Similarly approaches to capacity strengthening need to acknowledge these features in their design, if they are to contribute to long-term, transformational impact (Woodhill, 2010).

A further distinction required for shaping capacity strengthening is that action on climate change is happening under the global architecture of the Paris Agreement and the sustainable development goals (SDGs). The world has entered the so-called age of implementation, during which implementation at scale and speed is required to meet the long-term objectives of the Paris Agreement and SDGs to prevent dangerous levels of warming, which would affect the most vulnerable. Capacity strengthening interventions need to be tailored to these priorities, anything less will be inadequate for the challenge at hand.

Article 11 of the Paris Agreement sets out an ambitious vision for the role of capacity strengthening to enable countries to implement their nationally determined contributions (NDCs). It outlines that capacity strengthening initiatives should be country-driven and tailored to the needs of the country to enhance ownership; require the relevant institutional arrangements to support capacity strengthening; need to be cross-cutting and build on lessons learned; and lastly, should support countries to report on progress achieved through capacity strengthening interventions (UNFCCC, 2015).

The Paris Agreement articulates a potentially radical departure from mainstream capacity strengthening approaches adopted in the past (Khan et al., 2019). As with other parts of the Agreement, its transformative potential can only be assessed according to implementation achieved,

which given the defining features of climate change as a societal problem, will depend on the ability of capacity strengthening interventions to navigate the complexity inherent in this problem.

Woodhill (2010) identifies the need to invest in capacity strengthening that is equipped to contribute to the institutional innovation that is required to respond to the complex challenges of the 21st century, challenges such as climate change. The majority of investments in capacity strengthening have been approached as technical processes of transferring technology, knowledge and organisational models from the North to South. Consequently, there has been more success in supporting technological innovation, which gave little consideration to the political and institutional context, than there has been for institutional innovation (Woodhill, 2010). While this has led to progress according to certain metrics, such approaches are inadequate for responding to problems such as climate change.

In reality, accelerating the transition to low-carbon and climate-resilient economies means a rapid and widespread socio-technological transition. This can be broken down in terms of increased use of 'climate-smart' hardware: the tangible components (equipment, machinery, products); software, the know-how (skills, experience, manuals, practices) and; 'orgware', meaning the institutional framework, which refers to organisational and management issues (Boldt, 2012). The software and especially orgware dimensions speak to the need for widespread capacity strengthening, as it relates to organisational processes, societal norms and values, markets, political systems and governance. This begs the question of how to unpack these cross-cutting issues, in order to design capacity strengthening interventions that target specific aspects of socio-technological transitions. The so-called 'soft' capacities like building relationships and trust, facilitation and networking skills, leadership and communication, which typically take time to develop, are invisible, and their impacts difficult to measure (Woodhill, 2010). Nevertheless, they remain fundamental and require tailored efforts to be cultivated.

2.2 Fit-for-purpose capacity strengthening approaches

There is a need to transition to more fit-for-purpose capacity strengthening approaches. Some features of these approaches are discussed below.

Firstly, as identified by the Paris Agreement, capacity strengthening needs to be driven by developing countries, backed by high degrees of ownership and accurate problem definition (Khan et al., 2018; UNFCCC, 2015). Given the three levels of capacity building, there needs to be explicit attention paid to how each level affects the other, ensuring connections and integration where possible.

It is important to identify the existing capacity base, to acknowledge which actors bring which capacities to the table, and how these capacities can be supported and exchanged by a programme (Khan et al., 2018).

Local universities in developing countries have a key role to play as capacity strengthening hubs both through the training and education they offer, the research they conduct and that they are well established and therefore able to support sustained, long-term action and impact. Civil society networks and partnerships have a key role to play, to engage local communities, draw on their expertise and ensure broad-based participation in capacity strengthening. Long-term financing is a necessary enabler for cultivating relationships and skills development that cannot happen through short-term ad-hoc initiatives (Khan et al., 2019). Khan et al. (2019) call for a capacity building mechanism under the UNFCCC, to play a similar role to the existing technology mechanism, for the purposes of supporting capacity strengthening.

Ultimately capacity strengthening initiatives need to be dynamic, evolving processes that allow for direct and indirect impacts, expected and unexpected change that are required for stimulating transformative impact (Hewitson, 2015).

3 PROBLEM STATEMENT AND ANALYSIS OF THE NEED

This section discusses the problem statement of this study as well as the need it is responding to. The reason for including this section is to be explicit about how this study defines the problem of climate change, and how it defines the core features of the need for capacity strengthening for an adequate response to climate change. While some of this may be considered "taken for granted" information, the authors are of the view that it is important to be explicit to ensure common language and common understandings that can underpin the design of CLARE. Furthermore, the section frames the key needs that the findings and recommendations of this study seek to address, therefore demonstrating the relevance of the information that is presented.

Despite the numerous efforts to enhance capacity of researchers and policymakers to respond to the complex challenges presented by climate change, major capacity gaps persist. Innovative approaches that cultivate new ways of working are required to respond to this challenge, addressing the software and orgware dimensions of the technological transition. Such responses require an understanding of the existing landscape, to identify areas of progress and existing gaps, to prioritise collaboration between diverse skills and experiences, and to leverage ongoing work to optimise impact.

Given that climate change adaptation needs action, demand-driven research, and moving from theory to practice, it needs to be less about models and technology, and more about learning with people. This involves employing and deploying multiple sources of knowledge to improve what we are doing and how we are doing it.

For DFID and the IDRC, responding to this need entails building on previous programmes by identifying what has worked well and what has not worked well, unpacking challenges that have emerged, and addressing gaps and identifying new approaches to enhance the impacts of investments over the next 10 years, through the CLARE programme.

3.1 Core needs in a response to climate change

Given the characteristics of climate change as a problem, this study identifies the following core set of needs to be addressed by investments in responses to climate change:

- There is an urgent (and accelerated) need to deliver responses to the climate crisis.
- There is a need for transformative change at scale and speed.
- We are in the "age of implementation" requiring enhanced implementation and ambition.

- Climate change is a complex problem requiring transdisciplinary research efforts integrating multiple stakeholders across multiple sectors and contexts.

3.2 Capacity strengthening needs

Capacity needs related to climate change can be broadly grouped into: understanding the causes and impacts of the climate problem; ability to develop and implement actions to address the causes of climate change (mitigation) and actions to adapt to its impacts (adaptation); and lastly the ability to represent national interests by engaging in the UNFCCC negotiations and abiding by its obligations (Khan et al., 2018). The following represent principles that should be incorporated in how capacity strengthening is approached as a stand-alone pillar and cross-cutting theme in the design and implementation of CLARE.

- Capacity strengthening is needed across the value chain. The evidence value chain refers to the production, transfer and use of information and the actors involved.
- Capacity strengthening needs to be co-defined and co-designed (participants need to articulate their own needs and be involved in designing interventions to meet those needs).
- Interventions need to be specific, flexible and tailored.
- Capacity is needed to integrate climate change and adaptation challenges without over-relying on complex climate models.
- Capacity is needed to reduce the distance between researchers and end users.

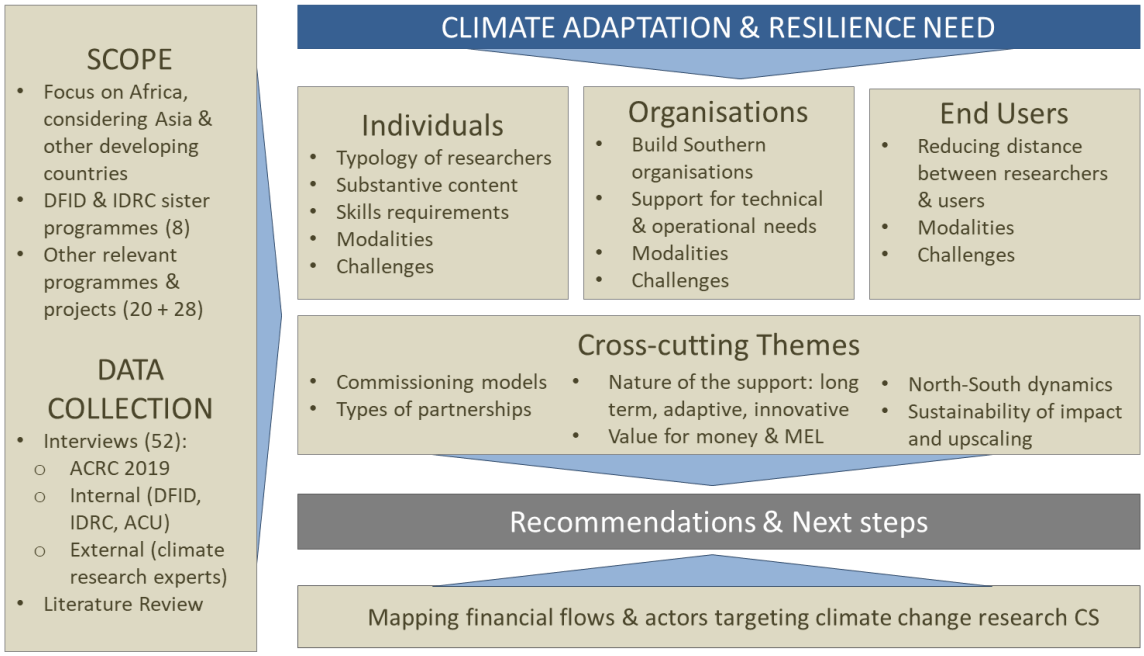
Given the horizontal and cross-cutting nature of human and organisational capacity to produce and consume climate change research for impact, it is practically impossible to establish a clear baseline dataset on existing capacities, in order to design priority interventions and track progress towards a specific target or ambition. Therefore, painting a picture of current capacity 'levels' is an inherently qualitative undertaking, where the target audience or intended beneficiaries must articulate their own assessment of personal and organisational capacities. And therein lies the rub: articulating capacity needs requires a certain amount of pre-existing capacity! Sometimes beneficiaries are able to know what they do not know, though often they do not know what they do not know (or need). If we accept this basic problem as a viable working hypothesis, then it becomes clear that processes of co-definition and co-design of capacity strengthening needs and solutions offer the most effective solution. Here, co-definition and co-design can take place between the 'already capacitated' and the 'capacitee'. Frameworks, such as structured questions and analysis, for working through this process can be developed and the starting point should be discussion and agreement on a stated goal or ambition.

In this context, we can start with the Paris Agreement and SDGs, and how these can enable national development plans and ambitions. From that high-level starting point, the team of co-designers can work backwards to discuss and agree on all the necessary steps and capacity needs required to achieve those ambitions. The question of what is a useful or appropriate level of detail is open for debate (and should itself be the subject of discussion in the co-design process). Logically, a highly specific set of capacity needs is more likely to lead to a set of specific interventions. Achieving a specificity of actions or interventions is key to success, as this increases the chances of programme design having clear causalities, enabling articulation of a robust 'impact pathway'. Co-design is also key to ensuring full understanding and buy-in on both sides of the equation, which is another key prerequisite for programme success.

4 METHODOLOGY

Figure 1 summarises the scope of the study, the data collection activities and the methodological framework used to organise the findings and recommendations based on the analysis. The approach was refined following a comprehensive inception phase and has evolved based on the review by CLARE design team (DFID/IDRC/ACU) on the first draft of the report, and the feedback from the CLARE Capacity Strengthening Scoping webinar. The final results will be presented in a workshop with the other scoping studies.

Figure 1: Methodological Framework



4.1 Literature review

The literature review included relevant documentation related to CLARE and capacity strengthening (including from DFID and IDRC), a review of other scoping studies completed or near completion[1], and a review of relevant literature on capacity strengthening for climate change research.

The review of relevant DFID and IDRC documentation was undertaken to ensure the process and outcomes of this study align with the expectations and objectives of DFID's Research and Evidence

[1] This included the Programme Design study ("Programme Design for Climate Resilient Development: A Review of Key Functions") and the User Needs study ("Understanding African decision-makers' needs for research and evidence.")

Division and the IDRC. The research also included reviewing the results of evaluation studies, other scoping studies, and transition activities of the sister programmes, to ensure their lessons inform this study.

To provide a robust and critical analytical basis for this scoping study, a concise literature review was conducted to engage with academic and grey literature relating to the main theoretical and practical debates surrounding research capacity strengthening for climate change. An additional aim of the literature review was to bridge the gap between academic and practitioner work on capacity strengthening. Academics have the space to critically reflect, assess and develop theory; practitioners make their primary contribution through implementing. While both communities have valuable contributions to make, they are seldom brought together. Bridging the gap between these communities through identifying opportunities for these communities to work collaboratively on common problems, can be a strategy for optimising impact.

4.2 Mapping of portfolios, programmes and projects

The mapping placed an emphasis on the 1st and 2nd priority level projects referred to in Annex 1. To optimise efficiency and minimise repetition, the mapping exercise aimed to build on other similar mapping and evaluation exercises. Additionally, the interviews with key individuals were leveraged to fast track and narrow down relevant projects and programmes to assess across Africa and Asia and to harvest critical, in-depth perspectives that were able to provide new and innovative insights.

The eight sister programmes ("DFID Sister Programmes" in Annex 1) were predominantly drawn upon to provide illustrative examples of successes and challenges that informed this study and feed into the recommendations.

Mapping was conducted according to a common information template which facilitated a structured and consistent approach by which information could be assessed and organised according to the methodological framework (see **Figure 1**). The number of projects assessed was influenced by the availability of necessary information and the time demands of each assessment.

4.3 Interviews

Key informant interviews were conducted to supplement the mapping research and collect critical reflections and recommendations. A snowball sampling approach was employed to ensure the team reached out to as many relevant informants as possible. This process was initiated with a number of

conversations at the African Climate Risks Conference (ACRC)[2], from which a collection of future conversations were identified and carried out as part of this research.

Principles to abide by included consistency in data collection and interviewing to allow for comparability of project data and findings. To capture in-depth qualitative insights, the team used semi-structured interview templates but adopted a flexible approach to ensure no unexpected insights or findings were lost in the process. A detailed list of interviews is available in Annex 2.

4.4 Mapping financial flows and actors targeting climate change research capacity strengthening

An initial investigation was undertaken to map the volume of funds being spent on climate research capacity strengthening and the agents involved (multilateral and bilateral agencies, research institutions, think tanks, foundations, and NGOs). Significant data gaps limited the assessment to a high-level snapshot. While not providing a comprehensive view of financial flows and actors involved in this space, the assessment generated insights into areas warranting a potential deep dive (as part of the next phase of the design work) as well as generating recommendations regarding monitoring and evaluation (M&E) of capacity strengthening to be considered in the design of the CLARE Programme.

4.5 Interrogating other areas of relevance

Other areas emerged as relevant to the objective of informing CLARE's approach to capacity strengthening. These were explored, to varying extents, in consultation with ACU/DFID/IDRC, and within the constraints of time and budget available. Examples include:

- How research capacity strengthening can be targeted at new focus or application areas, where climate change research has rarely been conducted, either in terms of mitigation or adaptation. A case in point is the humanitarian sector, which is now opening up to collaborate with development actors and national policy and planning, in line with the Global Compact on Refugees signed in 2018.
- Capacity strengthening in more mature development fields (such as healthcare and education).

[2] The ACRC took place in Addis Ababa from 7-9 October 2019 and brought together researchers, policymakers, practitioners and development partners, working on climate resilience in Africa and allowed the Change Pathways team to engage with these actors and to engage with the CLARE design team to inform the inception phase of the project.

- The role of behavioural psychology / the human factor in capacity strengthening for climate change research.

4.6 Limitations

As outlined above, there has not been a deep focus on analysing the intellectual theories on capacity strengthening. In a similar vein, while we looked into the DFID/IDRC eight sister programmes, this report focuses less on those, and rather aimed to capture prominent themes and best practice examples that emerged during the research and interviews that could complement what has already been done and is known by DFID and IDRC. In the modality sections of this report this study has not been exhaustive in outlining all ways in which capacity strengthening can occur (at either individual, organisational or end user level), with their respective pros and cons. Instead, the focus has been on providing what are considered a number of mechanisms and modalities that show potential for success and that we encourage CLARE to explore, with adaptive management, learning and flexibility as core principles underlying any activity that is undertaken. Central to this approach were the interviews that were conducted with a diverse range of participants and provided a rich set of reflections that informed the trajectory and findings of this study.

5 MAPPING AND ANALYSIS OF INITIATIVES AND PROGRAMMES

5.1 Researchers

In adaptation research, like in other fields, the last decade has seen an increasing emphasis being placed on research impact and the need for transdisciplinary approaches that bring together producers and users of research, prioritising uptake and impact (Jones et al., 2018). Involvement in these types of processes requires researchers with broader and more diverse skills sets and an ability to collaborate with a diversity of actors, for which their disciplinary academic training seldom equipped them.

Jones et al. (2018) propose five key areas to be changed to meet the needs of future adaptation research:

- Increasing transparency and consultation in research design;
- Encouraging innovation in the design and delivery of adaptation research programmes;
- Demonstrating impact on the ground;
- Addressing incentive structures; and
- Promoting more effective brokering, knowledge management and learning.

This study considered “who” are the researchers that CLARE should target, what subject matter to focus on, the skills that are required, modalities for strengthening researcher capacities and the challenges faced in this regard.

5.1.1 Typology of researchers

Creating a typology of researchers can assist with identifying the different types of researchers that need to be included, and how these fit together to ensure the inclusion of a diverse spectrum. Such a typology should cover different levels of researchers from Early Career Researchers (ECRs) to professors; researchers from different sectors and working across sectors; researchers from different disciplines working between and across disciplines; and particularly researchers with experience of using transdisciplinary approaches (Brandt et al., 2013; Jones et al., 2018).

Although, researchers are found in different sectors, emphasis to date has been placed on researchers in academia. Considering different types of researchers within academia is important as

different capacity strengthening is needed for ECRs (master's, PhD), post-docs and mid- to senior-level researchers. However increased emphasis is needed, and is shifting to, researchers in other sectors. Government officials conduct their own climate change research and sometimes have dedicated in-house research teams. There are many Research & Development (R&D) teams within the private sector, which have a key role to play in implementing climate adaptation and resilience measures. Other actors include think tanks, consultants and practitioners who, although often conducting less robust research than academics, have skills needed to produce evidence quickly and effectively in the context of uncertainty and data-poor conditions, and to communicate this evidence to a diverse audience.

Traditionally, DFID has focused on climate change researchers (from physical and social sciences) but developing the capacities for the next generation of adaptation research for development, in the age of implementation, requires a broadening of the range of disciplines involved. It also implies cultivating reflexivity and the ability to interrogate assumptions, ontologies and knowledge-making practices that different disciplines employ to respond to the problem of climate change (Leyshon, 2014).

CLARE's interventions should seek to be composed of broader teams that bring in specific expertise that are often missing in the above. This broader range of disciplines would enable teams to be more equipped to provide holistic responses, while also being able to include/mainstream climate change concerns into their respective fields. These may include, among others, behavioural psychology (where barriers are behavioural rather than technical or institutional); political economy and governance (to understand the influence of interests, institutional interrelationships and their roles with respect to change); complexity theory; socio-technical transitions; leadership; systems and design thinking; social change and change management; Monitoring, Evaluation and Learning (MEL).

The complexity of climate change not only requires capacity strengthening across a broader range of disciplines but also requires an approach that reinforces the way that different disciplines work together. This could be achieved through encouraging the formation of multi-disciplinary teams that include the diverse skills required to address problems in a more holistic manner, as was done, for example, in the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) programme.

5.1.2 Substantive content

Both the literature and our interviewees agreed on the need for adaptation and resilience research to move beyond problem identification and increasing accuracy of prediction or levels of certainty of models, to the identification of solutions and their implementation, supported by monitoring their

effectiveness (Lacey et al., 2015). While universities are still focusing on specialised knowledge, we need to learn from sustainability science – defined by "the problems it addresses rather than by the disciplines it employs" (Clark, 2007) – to advance "both useful knowledge and informed action, by creating a dynamic bridge between the two".

Interviewees claimed that many PhD students are still answering yesterday's questions and not engaging with problem solving of mega-trends that are defining the future trajectories of countries in the global South (e.g. the fourth industrial revolution, urbanisation, digitisation, green economy, and big data). Neither are they taking into account critically recognised knowledge gaps. For example, each IPCC chapter identifies gaps to be addressed, but these needs do not trickle down to universities where research topics for prospective students are being identified. An example that was heard time and again revolves around how to evaluate the effectiveness of different adaptation options. Interviews suggested that the field has not gone beyond saying that the effectiveness of adaptation initiatives depends on the context, but we still do not have the MEL tools and metrics to measure it adequately.

Strengthening the links between the IPCC and Southern researchers would bolster capacities to produce more relevant research and help to increase Southern authorship in the IPCC work (a current gap). The one-day training organised by the University of Cape Town's African Climate and Development Initiative, for example, created a platform for IPCC scientists to explain the possible ways in which researchers can engage with the IPCC process (as a contributing author, reviewer, addressing knowledge gaps, etc.). Contributing to the IPCC would also have important impact implications, as this constitutes the most powerful vehicle for influencing the science-policy interface for climate change at a global level, with important trickle-down effects given that national government negotiators then need to take the findings into national policy.

We also heard that there is a need for both demand-driven and transformative research that is critical of business as usual (this is explained in greater detail in Section 5.3). Finally, given that climate change adaptation needs action, demand-driven research, and moving from theory to practice, it needs to be less about models and technology, and more about learning with people. This involves employing and deploying multiple sources of knowledge (scientific, normative, traditional, tacit, pragmatic (Never, 2012) and experiential) to improve what we are doing and how we are doing it (e.g. see the multi-faceted approach to strengthening capacities and increasing resilience to disasters in Bangladesh[3]).

[3] To find out more, contact Saleemul Huq.

5.1.3 Skills requirements

Capacity strengthening efforts so far have tended to focus on a narrow set of researcher skills. According to our interviews, it remains relevant to invest in the same set of skills as previous initiatives (e.g. strengthening "basic" research methods skills: how to frame research questions, write a high-quality publication, navigate the peer-review process, write a good research proposal and communicate science). Similarly, there is still a need to invest in technical skills tied to the climate field. But to address the needs outlined in the previous section, there is a need to go beyond these and adequately assess which competencies and tools are needed by the 21st century transdisciplinary researcher.

As mentioned above, scientists need to be able to integrate across disciplines and sectors, navigate complexity as well as facilitate and lead processes that foster systems thinking and institutional innovation (Woodhill, 2010; Butler et al., 2017). This calls for a strengthening of process-related skills, often referred to as "soft" skills, or "software" (Woodhill, 2010), which can foster transdisciplinary engagement and learning by doing. These include, for example, partnership building, policy engagement, integration science, cross-sectoral communication, mediation and diplomacy, conflict resolution, motivational coaching, cross-cultural skills, design thinking, event organisation and facilitation (including to encourage double- and triple-loop learning) (Stone-Jovicich et al., 2015; Butler et al., 2017). AfriCLP, which sought to develop leadership skills across research, policy and practice streams, and AIACC's strong focus on relationship building, provide some good examples in this regard (refer to **Box 13** and **Box 14**).

Our interviews also confirmed that critical thinking and leadership skills are lacking as a result of rigid schooling systems that encourage memorising and not reflecting on, or questioning the status quo. Skills and tools to operate in data-poor environments characterised by significant uncertainty are also needed. Theory that accommodates these practical realities is needed.

Going further, Woodhill (2010) argues that to address complex challenges like climate change, a priority must be to develop capacities for "understanding and being critical about social institutions" (i.e. the rules that govern behaviour and action), as this enables one to understand the complexity and dynamics of social change and thus foster institutional innovation. This means that capacity strengthening activities need to "enable different perspectives to be taken and […] to better connect individuals to themselves, to others and to their social environment". The author identifies four critical capacities required for institutional innovation:

1. Ability to recognise complexity (according to Snowden and Boone's (2007) Cynefin framework) and thus understand its implications for planning interventions;
2. Ability to interact with multiple stakeholders, facilitating such processes to enable collaborative learning;
3. Ability to engage politically, i.e. understanding how governance systems and power dynamics work, determining appropriate ways for political engagement, and developing policy influencing and advocacy capabilities; and
4. Given that social change is an emotional process, ability to be self-reflective, by questioning one's assumptions and beliefs, dedicating time and activities to foster introspection, authenticity, and thus the creation of safe spaces and the trusting relations needed for institutional innovation.

All of these "soft skills" point to a need for researchers and end users to be able to communicate in a common language, understand each other's 'worlds', needs, motivations and incentives. The challenges that need to be overcome are not small, as one interviewee pointed out:

"Researchers face various operational and 'cultural' barriers to engaging with decision makers and do not have the skills to do this adequately. At district level in India, for example, where the biggest adaptation needs and gaps occur, researchers are unable to meet officials' demands for knowledge. This is due to the different policy and research timing cycles; researchers' lack of familiarity on how to frame results in appropriate formats, language and as policy-ready documents."

In light of these challenges, the interviewee recommended that organisations who are doing this work successfully in the country context should provide additional training. For example, the Indian Institute for Human Settlements (IIHS) could share lessons from its experience of engaging with decision makers on non-climate topics (e.g. housing, water and sanitation), which could be applied in the climate context. Another option could be to learn from bridging organisations. Such collaborations could enable two-way learning, by promoting the use of more rigorous evidence by boundary organisations, and encourage learning about effective engagement (including tools and techniques) among researchers.

The above points to the importance of working with knowledge brokers and connectors as a way to enhance the skills sets required to address the needs of the age of implementation. **Box 1** below elaborates on the roles played by knowledge brokers.

Box 1: The role of the knowledge broker

The need for knowledge brokers emerged as a result of, on the one hand, some users having more climate information than they could digest, and on the other, users with insufficient relevant information, particularly in developing countries (Bauer and Smith, 2015). According to the Climate Knowledge Brokers (CKB) Manifesto "climate knowledge brokers are those people, organisations or initiatives that use climate related information to facilitate the transfer of climate knowledge from one person or organisation to another" (Bauer and Smith, 2015). Their responsibilities include awareness raising; understanding of user needs and providing feedback to the producers of information and helping to synthesise, translate and contextualise information, making it more understandable and accessible. Other roles include fostering co-production, facilitating collective interpretation of knowledge, or improving the use of knowledge in decision making through learning (Jones et al., 2016). Innovation brokers seek to shift technical, social and institutional relationships at different levels; bridge divides (e.g. values, incentive structures, knowledge systems, power); and help to get access to political support, capital and services (Klerkx et al., 2012). To increase the impact of knowledge, there is a need to move beyond a focus on knowledge products, to "knowledge activities" which revolve around the creation of strong, lasting and reflexive relationships between the science and policy and society (Bielak et al., 2008).

Often referred to as "trusted intermediaries", knowledge brokering is facilitated by personality traits such as adaptability, humility, listening skills, authenticity, empathy, trust and honesty (Phipps and Morton, 2013; Stone-Jovicich et al., 2015; Butler et al., 2017). Such traits are neither the focus of university curricula, nor easily developed through training programmes (Meyer, 2010).

As recognised by Butler et al. (2017), "a cultural shift in how science values and supports these skills" is needed. While some task-specific training (e.g. on communications or facilitation) is provided, training that cultivates the qualities that are outlined above is challenging. Having communities of practice for practitioners to exchange lessons learned may be one way to counter this (Phipps and Morton, 2013). Undoubtedly, more emphasis is needed to understand how to strengthen the range of knowledge brokering capacities that have been discussed in developing country settings and across diverse cultural contexts (Butler et al., 2017).

Finally, understanding the needs of researchers at the outset of a programme is critical, as emphasised by the ECRs interviewed. An assessment of researchers' skills, their aspirational learning needs, and their preferred capacity strengthening modalities can ensure relevance of the training that is offered, and sheds light on the specific skills they may require for their doctoral or post-doctoral research. The AfriCLP, FCFA and BRECcIA skills assessment approaches provide useful

models for conducting needs assessments early on in a programme, and implementing monitoring and evaluation approaches that are able to track progress and enable learning throughout the lifespan of the respective programmes (see **Box 13**, **Box 15** and **Box 16** in Annex 3).

5.1.4 Researcher capacity strengthening modalities

Developing customised modalities is dependent on a rigorous analysis of the particular starting point of a researcher as well as an organisational analysis to characterise the researchers' environments. Often, projects are designed with no recognition of the different starting points of researchers which could include capacities possessed, competing demands such as teaching and supervision, availability of office space, or ability to access fast, reliable internet and online journal databases. This study identified a number of modalities for strengthening capacities. A non-exhaustive list is provided in **Table 1**.

Table 1: Successful Researcher Capacity Strengthening Modalities

Modality	Description	Examples
Fellowships	Support that enables "fellows" to be matched with universities, research centres, and other host organisations where they collaborate with mentors to implement individually designed research projects. Fellowships can be very effective if well designed and resourced. A number of principles based on our reading of different fellowship schemes is presented in **Box 2**.	• START fellowships (e.g. African Climate Change Fellowship Programme see **Box 21**). • CIRCLE fellowships (see **Box 4**). • One planet fellowship. • India Disaster Resilience Leadership Fellowship Programme (see **Box 17**).
Curriculum development	Curriculum development is the process to improve or change courses offered by a school, college or university. It is crucial for equipping the next generation of researchers in the South to grapple with the challenges that face their societies. However, the process is slow and should therefore be run in parallel with other processes.	• SARUA master's curriculum in 17 African countries (see **Box 18**). • See **Box 19**.

Secondments	A secondment is an opportunity to temporarily work in a different department or organisation. Secondments can help temporarily address capacity gaps but also serve to strengthen capacity and improve understanding of how different departments or organisations function, which can have a sustained benefit, such as propagating a culture of evidence-based policymaking.	• Insights and best practices communicated by the Overseas Development Institute's (ODI) RAPID programmes and subsequent analyses.
Embedded researchers and experiential learning	Placement of researchers within end-user organisations (e.g. local government departments) and vice versa. These processes help to create long-lasting relationships and can be effective at facilitating the co-production of climate change research. The approach is based on a set of common principles that underpin emergent ways of working, that need to be tailored to a specific context, the impact of which is ultimately dependent on the openness to learning and unlearning of those involved.	• FRACTAL's Embedded Researcher model (see **Box 20**). • ECRs working with policy and practice actors (e.g. START ProGreen programme).
Improving data quality and accessibility	Data quality and accessibility features regularly as a challenge facing African researchers and decision makers. Various options exist to address this challenge. Examples include investing in making project outputs open access and promoting more North-South-South research collaborations to tackle what is, ultimately, a common global challenge.	• African-based UMFULA teams were given access to a super computer in the UK, which improved the speed at which they could process data and improve its accuracy. But this still fosters a form of dependency.
Other	• Informal mentorships • Competitions and grants • Networks and exchanges	• Examples of informal mentorships that arose from the Adaptation at Scale in Semi-Arid

	• Communities of Practice • Trainings	Regions (ASSAR) project (e.g. see testimonies here). • Innovative techniques used in training courses (e.g. Monsoon Academy). • UKNA exchanges, which allow exchanges between Asian and European academics, of up to three months.

Box 2: Principles guiding effective fellowships

Given that fellowships are one of the most common modalities, there is value in identifying some guiding principles for enhancing the likelihood of positive impact, these include:

- Use modular approach (instead of one-off training), with mix of in-class activities, field visits, exchanges, remote mentorship and peer learning (e.g. see **Box 17**).
- Develop teaching curriculum by, for example, analysing best practice and failures (e.g. see **Box 17**).
- Include non-academic discussants/teaching staff.
- Include innovative tools and methods (e.g. simulations, scenarios) and learning by doing (e.g. development of a fundable project/action plan).
- Mix participants from research, policy and practice (e.g. see **Box 13**).
- Undertake qualitative MEL, including aspirational baseline and career development pathways (e.g. see **Box 13**).
- Follow up fellowship with on-call mentorship and flexible, yet accountable small grant opportunities (e.g. to attend events, maintain networks, access additional learning opportunities). Build on subsequent rounds of fellowships (e.g. **Box 21**).
- Create conditions for alumni to keep collaborating, to play a role in subsequent fellowship rounds, and to share learning back at home institution (e.g. see **Box 21**).

- Link fellows to relevant policy processes (e.g. IPCC).

See **Box 13** (AfriCLP), **Box 17** (IIHS fellowship), and **Box 21** (ACCFP) for more details.

A number of other lessons for assessing the wider range of different researcher capacity strengthening modalities emerged during the interviews, such as the following:

- **It is important to allow researchers to hold multiple, concurrent scholarships**, as one is usually unable to meet all their needs: this allows cross-pollination across initiatives and participation in diverse networks.
- There is substantial evidence indicating **workshops and one-off trainings often fall short** (Mataya et al., 2019; Newman, 2012). According to our interviewees, while these can help increase technical knowledge and skills, and provide space for critical reflection, they are unlikely to lead to longer-term behaviour change. Furthermore, to achieve even these changes, they need to be participatory and learner-centred that treat all participants as equal with contributions to make, moving away from a one-way model of knowledge transfer from expert to recipient (Newman, 2012). More **value has to be given to experiential learning,** to fostering connections between trainers and beneficiaries over a longer period of time and to integrating lessons into work activities and thinking (see for example PlanAdapt's approach in **Box 22**).
- **Secondments can focus beyond researchers by enabling practitioners/government staff** to attend a part-time master's or other certificate programme. This could consist of negotiating a part-time arrangement and paying them out for what is not paid by their institution.
- **Embedded researcher models are generating value and sustained impact**, as a form of experiential learning, and should be based on inputs from transdisciplinary teams, rather than over-representing the views of a single researcher.
- **Enabling improved data quality can empower Southern researchers.** Efforts to improve data quality and to gradually develop a super computer in a Southern institution could enable Southern researchers to become PIs and to host northern researchers, where they could conduct their analyses and also strengthen their capacities from working in the South for an extended period of time.
- **A long-term approach is needed.** Lessons from the Health Sciences and Technology Academy show the importance and impact of working with schools and involving communities over a sustained period as discussed in **Box 3**, below.

Box 3: Learning from the Health Sciences and Technology Academy – Strengthening youth capacities at scale

The Health Sciences and Technology Academy (HSTA) was started in 1994 by the West Virginia School of Medicine to support interested underrepresented high school students to pursue college and health professions careers, and to address the problems of an undereducated workforce and a large medically underserved population in the state. HSTA's goals are "to increase the college-going rate among underrepresented students in West Virginia, to improve students' science and math skills acquisition, to empower communities through the leadership development of their youth, and to increase the number of health care providers in West Virginia's currently underserved communities" (McKendall et al., 2014).

The programme starts with community leaders recruiting students from a pool of applicants, choosing those who show the strongest interest, potential, and need for support. Students enter HSTA in the ninth grade and matriculate if they maintain a specific minimum grade, while attending a range of HSTA activities that form part of the programme. These include summer camps based at different university campuses, which include both formal training and skills-building activities that will assist entry into college. The camps are supported by mentors who are HSTA alumni from similar backgrounds, who now attend health profession schools.

HSTA students attend community-based after school clubs to undertake research projects that target health-related issues relevant to their communities, which are mentored by scientists, peer mentors, and community leaders. In these clubs, students learn leadership, communication, teamwork and resource skills, and at the end of each year, they present their project's findings publicly. The programme also includes 75 hours of community service. To further encourage community involvement, ownership and control, as well as trust-building, HSTA is governed by local governing boards that include at least 51% volunteers from community, local schools, health care professions, and HSTA parents and students.

Successful HSTA graduates are eligible for tuition waivers to a range of state-supported colleges, universities, and graduate schools. From 44 students in two West Virginia counties in 1994, HSTA is now present in more than half of the West Virginia counties, and has seen more than 2700 students graduate. Of all HSTA students, more than half are financially disadvantaged. 99% of HSTA participants matriculated to college, 89% of those graduated and 84% stayed in West Virginia to work in their communities. About 800 students per year participate in the initiative, at a cost of approximately two million USD per year.

To find out more: HSTA website and brochure.

5.1.5 Challenges

The are many and varied challenges associated with capacity strengthening for climate change research in Africa and Asia. This analysis has sought to highlight some of the key challenges that emerged during the course of this study.

Academic incentives

There is little reward for academics to be involved in research for impact due to career progression being tied to publications, teaching and supervision, all of which strongly influence the organisational culture governing universities. If academics move too much between academia and other types of organisations, their academic career may suffer. There are also limits to what researchers can do and this needs to be acknowledged by pairing academics with other actors in the evidence ecosystem such as knowledge brokers or boundary organisations as demonstrated in **Box 1**, above.

This is changing in some institutions, but slowly and requires broader systemic change, as a single university alone cannot determine the incentive and rating systems for academic career tracks. UCT's engaged scholarship programme, an initiative led by the University Social Responsiveness Committee and the Research Office, is a start to recognise and reward engaged research that contributes to socio-economic development. The engaged scholarship task team (ESTT) was set up in June 2017 with the brief to: work towards the development of social and economic indicators and a consistent way of recognising and acknowledging engaged scholarship (especially for Ad Hominem promotion).

Researcher capacity strengthening in isolation of their contexts

Capacity strengthening of individuals often fails to engage with the broader organisational context in which they are situated. It is not sufficient to build capacities of ECRs if they then go back to organisational environments that are not able to support the continued learning or new ways of working that a fellow has developed. This often has to do with hierarchical, archaic organisational structures, the very design of which prevent innovation (Mataya et al., 2019).

Networks and exchanges can be an effective way of addressing the isolation of researchers by enabling staff mobility (e.g. UKRI funds for staff mobility in ARUA, EU intra-Africa mobility scheme) and creating networks of like-minded researchers with similar research interests that can continue to collaborate, after going back to their home organisations. The isolation of researchers can happen at all levels but is typically more pronounced at ECR and mid-career level, where researchers are not yet recognised in their fields and are yet to build their own networks. See **Box 23** (in Annex 3) for an

example with an emphasis on the process of capacity sharing in the African Evidence Network, in which all participants bring a variety of capacities and engage in a process of exchanging these capacities with one another.

Lack of creativity in approaches

There is a general sentiment that despite the substantial funding that has been going into capacity strengthening over the last decades, there is a dearth of creativity in the prevailing approaches. For the most part the core features of capacity strengthening initiatives resemble one another. This is something that needs to change drastically to contribute to the scale of transformation required.

5.2 Organisations

While individuals are generally at the centre of capacity strengthening activities, capacity strengthening is "not as simple a process of merely imparting knowledge or experience to individuals in isolation" (Dagnet et al., 2015). Given that capacity is systemic, to sustain efforts aimed at individual capacity strengthening, there is also a need to address organisations and institutional arrangements (Dagnet et al., 2015).

Many interviewees referred to the organisational barriers individuals have faced back in their home organisations, as they try to adopt new ways of working or skills acquired. These may, for example, include limited technical support (e.g. absence of software), different ways of approaching research and the process of knowledge production (e.g. few organisations are working in a transdisciplinary manner), institutional barriers that prevent working effectively (e.g. the way funds need to be disbursed) or limited support to reduce teaching loads, which constrains the time and resources available for research.

Focusing on organisations is therefore a key aspect of capacity strengthening interventions. It is necessary to achieve and institutionalise the intended impact at a scale not possible for individuals.

The primary mechanisms through which organisations operationalise influence is in bringing together groups of people, and institutionalising ways of working to achieve common goals and sustained impact. Interventions aiming to strengthen the capacity of organisations to deliver on their goals, should endeavour to unlock these features of organisations.

This study explored the pressing need to build organisations in the South, the necessary support to meet technical and operational needs, modalities for strengthening research organisations' capacities and the challenges faced in this regard[4].

5.2.1 The pressing need to build organisations in the South

There is a pressing need for building organisations in the South to strengthen the contribution of Southern voices to global debates and increase the critical mass of problem solvers and critical thinkers that are equipped to respond to the complex challenges facing humanity in the 21st century.

There are numerous examples of leading researchers and thinkers in the South, who are well-recognised and established in their fields and for example, hold positions of chairs and lead authors of IPCC working groups. But there are far fewer examples of organisations in the South that are globally recognised as leaders in their field.

Where organisations in the South are capable, they tend to be overburdened with requests for partnerships and projects. The reputation of these organisations is also often attached to one established and influential researcher. As these researchers reach the end of their careers, a lack of appropriate researchers in the pipeline risks creating a vacuum and eroding the reputations of these organisations.

The CLARE programme needs to include a specific focus on strengthening the capacity of Southern organisations.

5.2.2 Support for technical and operational needs

Organisations need to be able to support researchers to deliver positive climate change adaptation and resilience outcomes. This includes technical capabilities to tackle complex research problems as well as operational capabilities to create a sustainable and enabling environment to support the technical work. There has been slow and limited progress in building relevant organisations in the South partly due to a focus on researchers but also because a variety of support interventions are needed.

As cited by Dagnet et al. (2015), "within the climate context, institutional capacity is used to refer to the level of human resources, administrative and management capacity, and knowledge within and among organisations as well as a country's ability to collect and store statistical information needed

[4] This study prefers to refer to organisations as discrete entities rather than referring to institutions which include organisations as well as a broader set of rules and norms than govern our society.

for effective policy implementation, plan government expenditure, apply for and absorb international financial support, fight corruption and enhance governance, establish and operate the necessary regulatory frameworks, enforce rules and laws, and protect individual rights". Although some of these elements refer to the country-level, it is clear that organisational strengthening moves far beyond enabling the technical research skills of an organisation.

Operational functions of organisations, and particularly universities in the South, require specific attention by capacity strengthening interventions as they have implications for the ability of an organisation not only to manage and coordinate projects, but also to remain sustainable and functional after completion of a project.

Core capacities need to be built in research grant offices, such as relating to the management and disbursement of funds and HR processes to fulfil due diligence requirements. Allocation of funds has as much to do with whether an organisation can produce the necessary research, as to whether it can effectively and transparently manage funds that are awarded. Given that the majority of funding is allocated to principal investigators (PIs), if most of the PIs are in the North, the allocations will be granted to Northern universities. For more Southern organisations to lead projects, strengthening of these operational elements is crucial. CIRCLE's focus on individuals and organisations is a valuable example of an initiative investing in these types of capacities to overcome organisational barriers and is elaborated on in **Box 4**.

In the case of ESPA, the project tried to strike a balance by granting funds to the PIs from Southern organisations. Given the failure of some of these to provide the necessary detailed accounting of how the funding was spent, and the discretionary manner in which decisions on the use of funds were being made, funding was given to the UK PIs (with the systems in place to provide the necessary reporting). However, not only were the UK-disbursement requirements problematic for Southern partners, as fees could only be paid out in arrears, little attempt was made to strengthen the Southern organisations' operational systems. The former problem was addressed by raising invoices in a phased manner (to disburse funds in time so that research teams did not have to incur upfront costs), but the opportunity for organisational strengthening was lost.

An alternative approach to financing North-South climate change collaborations is to learn from the experience with the ERA-Net programmes, originally set up with support from the European Commission. Subsequent examples were based on co-financing secured from national research council's financing national experts to join international consortia to answer questions of common concern, such as climate change, infectious diseases and food security.

Box 4: Addressing technical and operational barriers in organisations - The Climate Impacts Research Capacity and Leadership Enhancement (CIRCLE) programme

CIRCLE ran from 2014 to 2019, funded by DFID, and project managed and implemented by the Association for Commonwealth Universities, and the African Academy of Sciences. The project consisted of a fellowship programme aimed at African researchers working on climate change and the institutional strengthening programme (ISP). CIRCLE emerged out of the need to respond to the challenges African researchers encounter when returning to their home institutions after holding a fellowship at a foreign institution (Buckley et al., 2019; Schultz et al., 2017).

One year fellowships were awarded to fellows to conduct research at a host institution, under mentorship to support research skills and professional development of fellows. The home institutions where fellows were permanently based received support through the ISP to enhance research management activities and support the professional development of researchers. The ISP employed the use of the Researcher Development Framework (RDF) and home institutions underwent a gap analysis, based on which they developed institutional strategies and action plans to address these gaps. Champions were elected in home institutions to implement action plans, while RDFs were utilized to facilitate the personal, professional and career development of researchers. Champions were equipped with an ISP toolkit to assist with implementation of the programme. This included a gap analysis framework template, a strengths, weaknesses, opportunities, challenges (SWOC) analysis template, an ISP planning tool, and an ISP Action Plan implementation monitoring tool (Buckley et al., 2019; Schultz et al., 2017).

Ultimately the programme sought to support the research and professional development of early career African researchers working on climate change, through offering individual support through fellowships, and targeted support to improve the research environment at fellows' home institutions, where fellows return after completing their fellowships. This included investing in formal mentoring mechanisms, developing and implementing policies and strategies that support the career development of ECRs, and setting up quality assurance systems. Key success factors included the involvement of senior staff in home institutions as champions of CIRCLE's ISP, involvement of administrative leaders, budget departments and research offices to assist with mainstreaming and institutionalising recommendations of the programme and to address research managements structures and processes in universities. Given the prevalence with which the barriers that researchers encounter in their organisational environments was raised during this study, CIRCLE represents a valuable example of how to link support at individual and organisational levels so that the changes that occur at these levels reinforce each other, overcome barriers and lead to lasting change.

5.2.3 Modalities of organisational capacity strengthening

Organisations are unique in terms of their contexts, the political economy in which they are situated, their stage of development, size, age, issues they focus on, and history of core grants. Appropriate organisation capacity strengthening modalities will depend on these contextual variables and should also consider what is already in place and the organisation's needs. This section explores different modalities of organisational capacity strengthening through a number of case studies. IDRC's Think Tank Initiative (TTI) and DFID's Programme Partnership Agreements (PPAs) are drawn on as the primary case studies, given that they were found to be rare examples of interventions that include a suite of organisational capacity strengthening modalities. Other case studies were selected to demonstrate how they approached a single modality.

The TTI was a 10-year CAD200 million effort (2008-2019) that was funded by six donors including IDRC to support 43 think tanks in three continents. TTI mainly provided core support (which comprised less than 25% of any organisation's global operating costs) for organisations to strengthen their research capacity, influencing ability, and organisational effectiveness. Alongside the core support, IDRC also supported a range of capacity development and networking activities.

Provision of core support

Given the budget cuts many universities face, soft-funded[5] research centres are becoming more common, which means they have to raise their own funding for core running costs, including operational and administrative expenses, and salaries, with most staff being hired on shorter-term contracts. Furthermore, these research centres have to compete in a commercial environment against consultancies that do not have the teaching and publishing demands of university-based research centres. Generally, however, funders only provide short-term, ad hoc support for targeted activities with clear deliverables and outputs.

In the case of TTI, core support was critical for enabling organisations to have a fixed part of their running costs covered for a sustained period of time. This resulted in several direct benefits, including establishing a critical mass of (high quality) staff that could expand research (and communications) activities. This resulted from investment in basic organisational and physical infrastructure, such as improved offices, libraries, hardware and software and administrative support. In turn, this made them more resilient in the long run; creating attractive working conditions which allowed for the retention of valued staff (Christoplos et al., 2019). In short, providing such support to research organisations in the South can address one of the most fundamental and pervasive barriers to long-

[5] Self-raised funding often through consulting-type projects

term capacity building, namely the start-up operational and running costs to physically host a group of staff, from whom come the ideas, connections, creative solutions and ultimately reputation and influence. This support can also contribute to enhancing the long-term sustainability of organisations in the South that are operating within increasingly constrained funding environments. Furthermore, setting up a collaborative design process, which takes into account the starting conditions of the organisations, their needs and aspirations, establishes a trust-based relationship between donors and project leads, and entrusts lead implementation roles to local actors, have been shown to be key determinants of success of projects.

Similarly, DFID's PPAs provided unrestricted funding to British (and in the latter phases foreign) civil society organisations (CSOs) for over a decade. These have shown similar benefits to TTI including: organisational innovation, improving the quality of CSOs' governance, performance management (though enhanced M&E capabilities and systems), fundraising capacity, learning systems, accountability and delivery (ICAI, 2013). The PPA also enabled organisations to develop a clear theory of change, set their own priorities and to take risks to foster innovation.

Tailored, flexible support which responds to expressed needs

One of the highlights of IDRC's involvement in TTI, which contrasts the PPA experience, was the on-demand advisory support provided by the IDRC regional programme officers (RPOs) to the organisations. RPOs acted as trusted sounding boards, who were external to the context but who had a stake in wanting to see the supported organisations succeed. RPOs also provided strategic planning support, both in terms of advice (e.g. for organisational strengthening, dealing with governance challenges, navigating problems in the external political environment) and through funds to support, for example, annual retreats. The RPOs also played a critical, gentle nudging role in challenging organisations to move beyond their comfort zone. In addition, they monitored progress and helped in dealing with budgetary and management questions. At the end of TTI, many organisations were more concerned by the end of the IDRC support provided by RPOs, than the end of the funding itself (Christoplos et al., 2019). Participants reflected on the efficacy of this type of tailored, on-demand support when compared to more rigid, top-down support processes.

Action learning

The action learning modality was piloted in phase one of the TTI and then rolled out in phase two. This support mechanism revolved around the definition of a common need expressed by organisations. It was then operationalised through an open call in which think tanks presented a proposal identifying a goal that they wanted to achieve within two years and outlining an intended

path to get there. Through an initial joint workshop, the different applicants were levelled off and common issues pertaining to their proposals and action plans were addressed. This was followed by individualised tailored on-call support provided by a resource person (from the region); and joint learning activities at regular intervals to share progress, insights and lessons. In this specific case, financial sustainability improved across all the seven participating organisations. The tailored approach of the TTI showed significant strengths over more general, one-size-fits all approaches.

Peer learning

The TTI experience also found that opportunities for peer learning and collaboration with TTI organisations and others external to the network were highly valued. Other interviews conducted as part of this study confirmed that the benefits of peer learning are substantial and could be enhanced across cross-country consortia as it allows learning between peers who are facing similar challenges. This could be done by pooling resources to enable learning and fostering sustainability and collaboration by promoting peer learning among partners for M&E and knowledge management.

Peer learning is proving crucial for encouraging research collaborations between organisations in the global South that foster South-South knowledge exchange and learning, such as was found in the Least Developed Countries (LDCs) Universities Consortium on Climate Change (LUCCC), discussed in **Box 5**, below.

Box 5: South-South capacity building platforms - Least Developed Countries (LDCs) Universities Consortium on Climate Change (LUCCC)

LUCCC is a South-South capacity-building platform was established in 2017 by 10 founding universities from LDCs, representing all LDC sub-regions and is envisaged to run until 2030. Managed by the International Centre for Climate Change and Development (ICCCAD) at the Independent University, Bangladesh in Dhaka, the network aims to establish a membership that includes universities, research and training institutes from all 47 LDCs. The ultimate objective of LUCCC is to build capacity in the LDCs to adapt to the impacts of climate change and explore win-win mitigation options, through education, training, research and communication. The consortium is developing joint research and teaching programmes as well as demand-driven trainings, working with researchers (faculty members and students), communities and policymakers to enable collaborative learning through South-South partnerships. LUCCC aims to equip universities and research/training institutes to serve as repositories of knowledge and enablers of capacity development in LDCs (LUCCC, 2019). LUCCC's annual Gobeshona conference brings together network members to share their knowledge and experiences of working on capacity strengthening for responding to climate change in the LDCs. CLARE should engage with LUCCC and consider funding activities of the network, given the Southern-led, long term approach and emphasis

on LDCs. Activities that require funding are outlined in their 2019 brochure, included as (LUCCC, 2019) in the references of this document.

Networks

The promotion of networks can also be an effective way of promoting learning, furthering collaboration and exchange between organisations, and to maintain partnerships beyond individual projects. The way this was fostered in TTI was through holding a number of regional and three global learning events (the *TTI Exchanges*), which brought together all participating think tanks. Southern Voice, a global community of practice, emerged from one of these learning events and is elaborated on in **Box 6*: Influencing the global agenda and each other – Lessons from Southern Voice***, below (Christoplos et al., 2019). It is important to note that non-earmarked funding enabled organisations to develop their own networks and collaborative initiatives beyond the TTI group, as a result of participating in conferences, meetings and activities of their own choosing.

Box 6: Influencing the global agenda and each other – Lessons from Southern Voice

One success of the TTI was tied to the emergence of Southern Voice, a Community of Practice (CoP) that was born at one of the initiative's global learning events in 2012. During one open space session, a discussion on how to ensure Southern perspectives would be included in a post-MDG world and into the framing of the Sustainable Development Goals resulted in the formation of this CoP. It's main success has been to create a unified, coordinated approach to bring lessons from Southern national contexts into the global development agenda (McLean and Gargani, 2019). These lessons have also had a horizontal influence, across the network, which often feeds back into members' national policy dialogues. The TTI activities aimed at strengthening the research and policy development capacities of the think tanks have been crucial at enabling the CoP to represent a credible Southern voice. The CoP has grown from 43 think tanks to 50, established in more than 20 countries in the South. Although initially TTI provided support with the development of their strategy, communications and quality assurance, strong leadership and a clear vision have been critical at making it succeed.

The African Research Universities Alliance (ARUA) (see **Box 10**, below), demonstrates a different model, by driving collaboration through establishing Centres of Excellence (CoE) to cluster expertise around specific themes in Africa, such as on climate and development. ARUA's CoE on climate and development grapples with the challenge of enabling development in Africa in ways that enhance resilience to climate impacts, and follow low carbon trajectories to mitigate the causes of climate change. Other networks that can be learnt from include the African Evidence Network (AEN) (see **Box 23** in Annex 3), that brings together a diverse spectrum of practitioners, decision makers and

researchers involved with evidence-informed decision-making (EIDM) in Africa. AEN highlights the role of evidence and networks of individuals and organisations in building shared understanding across actors that make up the evidence ecosystem, to enable growth in capacities, and enhance readiness for change (Stewart, 2018). The Performance Acceleration through Capacity-building Tool (PACT approach now relaunched as CADD) identifies principles and organisational capacities or pathways necessary for delivering improved performance in responding to climate change.

5.2.4 Challenges

Strengthening the capacity of organisations to support climate change adaptation and resilience research in Africa, faces various challenges. This analysis has sought to highlight some of the key challenges that emerged during the course of this study.

It is difficult to ensure the sustainability of investments in core funding for organisational strengthening

The experience of TTI showed that the assumption that a long period of core funding will preclude future funding crises does not hold (Christoplos et al., 2019). While some organisations managed to diversify their funding sources and have more stable core funding to operate with, most organisations remained insecure. However, this was not found to be due to an overreliance on IDRC (which provided at the most 25% of global operating costs) or "temporary escape" from being diligent about applying for other funds. While TTI did enable a number of organisations to focus on quality instead of quantity, and to refuse "research assistant" roles offered by Northern partners, once funding ended, many had to go back to more consultancy-type roles and to a reduced number of permanent staff. The evaluation concludes by stating that "think tanks are likely to always need a modicum of flexible and stable funding to be dynamic and effective. A period of core funding cannot 'fix' this challenge".

In the case of PPA, 80% of supported organisations leveraged additional funds, as a result of DFID support. This was achieved through hiring fundraising staff, using PPA funds as seed funding, or developing more innovative business plans. However, it was also a result of the "accreditation effect" that being a DFID grantee gave to other funders to also invest in the CSO.

Sustainability has been found to be one of the biggest challenges, as it is also affected by external environmental factors, including the global funding landscape, and in the specific case of think tanks, political factors tied to, for example, authoritarian regimes wanting to silence their work. While an investment in resource mobilisation strategies, or in resource endowments at the beginning of a ten-

year funding cycle can work, interviews suggested that it is not as simple as that. In other cases, sustainability comes through being able to write good proposals, having a good information system that can be fed into proposals, strong relationships and networks for positioning themselves, and appropriate exit strategies. The evaluation concludes by saying "If senior researchers can be retained and key research coordination, financial management and support to junior researchers are maintained, prospects are good. If not, research quality, credibility and ultimate sustainability may be increasingly threatened. 'Betting' on think tanks is, by definition, a risky business, but it is a cause well justified" (Christoplos et al., 2019).

The trade-off between autonomy and deciding, top down, what organisations need

There is a difficult balance between allowing organisations full autonomy around the use of funds and challenging them to come out of their comfort zones and ensure they have the ability to do it alone. Organisational strengthening requires a range from pre-determination, co-construction, sometimes a critical friend pushing and questioning, but also encouraging reflection, and learning from action. These are the critical moments where needs emerge and therefore there should be the flexibility to act on these.

Investing in risky organisations

"Risks, such as investments in weak think tanks, require a long-term perspective and a willingness to accept that some will not prove to be sustainable or successful" (Christoplos et al., 2019). The PPA programme itself recognised the challenge of seeking innovation on one side, while demanding concrete results on the other; one of its evaluations concluded that "innovation necessarily involves risk and uncertainty and concrete results cannot be guaranteed in the short term" (ICAI, 2013). The tension between accountability (for reporting results to DFID) and flexibility (to use funds as deemed best) was very real in the PPA, and it also worked to the detriment of collaboration, given that the relationships between DFID and the CSOs was often mostly administrative and not seen as a partnership.

Knowing where to start is difficult given the wide-ranging challenges faced by African universities

Organisational barriers at policy level (within universities) include disciplinary silos, for finance, HR, and contracting. Universities are not only ill-equipped to support transdisciplinary research but their structures, incentives and procedures completely disincentivise such approaches. For example, the ACDI at the University of Cape Town (UCT) has encountered various barriers to setting up a module on transdisciplinarity in their master's course, such as departmental course codes not catering for degrees to be housed across departments.

Establishing a critical mass of critical thinkers from the South

Interviewees highlighted the pressing need to establish a critical mass of critical thinkers from the South, to amplify Southern voices in global debates about capacity strengthening. Co-location is an important part of this, but increasingly difficult given the funding pressures of organisation's in the South. LUCCC, Southern Voice and AEN illustrate the role of networks in bringing together organisations from the global South, while the Climate Systems Analysis Group (CSAG) at UCT offers insights into building sustainable organisation models in the South that allows for co-location of leading Southern researchers.

5.3 End users

This section of the report argues for bridging the gap between researchers and users, as this can increase the opportunities for systemic change, and strengthen the capacities of those involved in the process. It is also argued, based on the interviews conducted, that often what is needed is not new knowledge or solutions, but rather the facilitation of a process that brings end-users together and fosters connections through collaborative ways of working. This highlights the need for skills related to knowledge brokering, a relatively recent concept in the climate sphere, but a role that has existed for a longer time in the health and education sectors, from which we can learn (see **Box 1**).

5.3.1 Reducing the distance between researchers and users: "Acting" in the age of implementation, and strengthening capacities in the process

A strong emphasis of many of the recent initiatives focusing on climate change impacts and adaptation has been on funding researchers to produce and communicate knowledge that can influence policy and practice, and help users to make better decisions to enhance resilience. Capacity strengthening activities have also often been included to increase stakeholders' understanding of the research findings and contribute to their uptake. Beyond a few examples, however, impact in policy and practice at scale (commensurate to the challenges faced) remains elusive. There are a range of inter-related factors at play, including inadequate M&E systems that are unable to take into account impacts that occur after the end of projects, limited skills to deal with complexity and, this study argues, the separation between the research producers on one side, and the users on the other.

As explained by Cash et al. (2003), the effectiveness of research findings to contribute to sustainability outcomes is likely to be enhanced if we consider (a) the credibility of the evidence not only in terms of its scientific adequacy but also through the use of local information that stakeholders

trust, and multiple types of expertise and disciplines; (b) the salience of the information, or how relevant it is considered by the ultimate user; and (c) its legitimacy, which is gained by conducting a process that is transparent, inclusive, unbiased and respectful of diverse values and beliefs. A participatory, co-designed and co-produced process is thus more likely to meet these three criteria, allowing for adjustments along the way – should stakeholder priorities change – and thus avoiding the production of knowledge that addresses "yesterday's problems".

Developing a science agenda that hinges on co-design and co-production also allows a move beyond a focus on knowledge, which, on its own, does not result in changes in adaptation decisions (Gorddard et al., 2016). As explained by Gorddard et al. (2016), adaptation often promotes short-term technological solutions failing to consider the broader social and institutional settings, as well as factors that influence human behaviour, and thus decision making. The authors therefore argue that researchers can achieve limited change unless they consider the values and rules that relate to the new knowledge. The "values, rules and knowledge" model, therefore, allows intervention at a more systemic level, by also considering, and addressing, issues pertaining to formal and informal rules, incentives, motivations, constraints and capacity to change.

In the context of capacity strengthening, this means moving beyond a transfer of technical knowledge and skills, to also understand the broader socio-political and governance context within which capacity development occurs, and particularly the institutions (e.g. societal norms and values, government policies, market incentives, political systems or organisational processes) which need to be transformed to deal with complex challenges like climate change (Woodhill, 2010). Woodhill (2010) claims that - after a focus on technological innovation in the 20th century - we now need to direct human capabilities for institutional innovation, which requires "much interaction and learning between citizens and government, business and civil society players; [...] various forms of multi-stakeholder engagement, and social learning". In this context, one can learn from the approaches used by researchers in Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) that seek to climate-proof projects funded by Australia's Official Development Assistance through co-production of adaptation pathways, as discussed below.

Box 6: Climate-proofing Australia's development interventions: CSIRO's approach

Tackling complex problem such as climate resilience has become an increasing priority of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) team's contribution to Australia's Official Development Assistance objectives tied to meeting the Sustainable Development Goals (SDGs).

According to Butler et al. (2017), the role of scientists in such research is to aim to "generate transformative or systemic change[6] which achieves scale and sustainability". This is achieved through:

a) establishing effective partnerships early on in the projects, which generate knowledge and allow for two-way capacity building for systemic change;
b) promoting participatory processes that encourage double- and triple-loop learning (i.e. a questioning of assumptions, values and beliefs, thus potentially leading to institutional change);
c) the recognition and integration of diverse types of knowledge to gain a systems understanding of the problem;
d) appropriate attention given to scaling up and out, combined with adaptive learning and reflection, to check for unintended consequences;
e) the collective development of incremental and transformative interventions, with an understanding that both are needed (e.g. through adaptation pathways, see Wise et al. (2016));
f) a "fit-for-purpose" Monitoring, Evaluation and Learning (MEL) system (e.g. comprising of a theory of change and impact pathways).

Points (a) to (f) above form the building blocks for researchers to help to transform institutional and policy frameworks into an enabling environment that strengthens stakeholders' capacity to experiment with innovative approaches (Stone-Jovicich et al., 2015).

Such processes are time- and resource-intensive, and require a number of skills which are not currently fostered in traditional educational systems or research organisations (see Section 5.1.3). They will not deliver rapid impacts as might be expected from technological fixes, but can lay the basis for systemic, transformational change, especially if funded as longer-term processes. Unless research is embedded in a broader systems perspective its impacts will likely be bounded (Stone-Jovicich et al., 2015). Learning from CSIRO's approaches could therefore help to bring new thinking in the planning of co-production processes for transformational change, while helping to bring climate resilience considerations into development interventions, through adaptation pathways.

For more information: CSIRO website. Contact: James Butler.

[6] As summarized in Stone-Jovicich et al. (2015), systemic change refers to "types of change that are effective in achieving scale and sustainability of development outcomes (Fowler and Dunn 2014). In other words, systemic change is not an end itself but a means, or a pathway, towards development outcomes (Dunn 2014). […]. Systemic change may involve pervasive change that affects the underlying, systemic causes of the particular challenges/problems being tackled (e.g. institutional arrangements and practices such as land rights) or some particular component(s) of the system (e.g. agricultural policies) or both; it also may involve changes in system structures (e.g. new private/business actors becoming involved) and in system linkages (e.g. network of relationships between farmers and market actors) (Fowler and Dunn 2014)."

Another approach for influencing the decision-making of end users is to leverage behavioural psychology theory and draw on interventions such as "nudges". This type of approach is discussed in more detail in **Box 7**, below.

Box 7: Exploring the use of "nudges" and the application of a behavioural psychology lens

Psychologists have played an increasing role in fields such as economics where traditional models have failed to explain "irrational" behaviour. New theories and practices are emerging that help to understand and influence behaviour. One example is "nudge theory" which proposes positive reinforcement and indirect suggestions as ways to influence the behaviour and decision making of groups or individuals. According to Thaler and Sunstein (2008, p. 6), a nudge is

any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not.

"Nudges" have mostly been applied to consumers and producers (such as farmers). There is little evidence of nudges being applied to government officials. This represents an opportunity for the CLARE programme to play a leading role in exploring its potential application. Nudges in the context of capacity strengthening of end users is a particularly promising starting point as many barriers to intended outcomes are likely to be behavioural.

5.3.2 End user capacity strengthening modalities

The demand for research evidence is linked to the users' capacity to find, access, evaluate and use the research, as well as their motivation to do so (Newman et al., 2012). To counter the capacity gap, the author claims action is needed at three levels:

- Individual capacity that increases "knowledge about what research is and how it can be used; critical thinking skills to absorb, critique and amalgamate information".
- Organisational capacity to support the use of evidence within an organisation, and a culture that supports critical enquiry and the use of evidence in decision making.
- Wider environmental capacity being the broader societal factors that encourage challenging the status quo and power dynamics. These rely on broader campaigns (e.g. national science week, climate awareness month) and working with schools and educational departments.

A number of different mechanisms and modalities exist to reduce the distance between end users and researchers. The bottom line being that end users need tailored, advisory support that helps them to better meet their responsibilities and commitments. These may be tied to climate change, or it may be support for sectoral priorities that need to become more climate resilient. The more researchers and research processes are able to align with these needs, the higher the impact research will have. **Box 24** (in Annex 3) shows an example of how researchers currently support African UNFCCC negotiators through the contribution of rigorous, tailored evidence, through the African Group of Negotiators Evidence Support (AGNES). **Box 25** (in Annex 3) shows an example of how researchers from IIHS are responding to government needs in Tamil Nadu through (i) an initial training needs assessment, and (ii) multi-pronged approaches (i.e. a mix of technical support, training, peer learning, tools, knowledge products) that were (iii) tested in two pilot cities, (iv) institutionalised in government systems and protocols for long-term sustainability, and (v) scaled up.

Co-production

The key to a co-production approach is bringing together the producers of climate information with those who use the information to make decisions, often using intermediaries to help connect these actors (Carter et al., 2019). This process enables collaboration and sharing through a learning by doing approach that delivers capacity strengthening to both end users and researchers.

Carter et al. (2019) suggest a spectrum of co-production approaches from consultative to immersive co-production:

- Consultative co-production is best suited for problems that are pre-defined and co-production is often limited to specific building blocks.
- Immersive co-production is best suited for exploration of problems where the outcome is flexible and might require a series of engagements to understand and solve problems.

While co-production is a modality that is increasingly used to foster collaboration between researchers and users on a shared research question there are still insufficient incentives for both government stakeholders and researchers to collaborate. In a number of cases, despite government users being involved in the co-production process, they still do not use the knowledge that is generated. Often, this may happen due to the skewed ownership and starting points of many co-production processes, which are initiated by research teams who invite users to join the process, in many cases after the research questions have been formulated.

A different model may be to co-design a process that revolves around a government need (aligned with their internal objectives and priorities), thus ensuring ownership, producing tangible benefits for the user, and strengthening their capacity. This may be achieved through setting up a platform through which scientists and policy makers can identify issues and concerns to be addressed. One such example is the GIZ-Climate Analytics project being implemented in 14 African least developed countries, which supports government and researchers in the formulation, implementation, monitoring and evaluation of their NAP processes. In the case of Benin, Climate Analytics facilitated a co-production process whereby the Ministry of Quality of Life and Sustainable Development prioritised increasing knowledge on vulnerability in the agriculture, health and water sectors. The research team then developed the methodological approach, which decision-makers contributed to. During the course of the fieldwork, results are reported back to government and the other stakeholders involved in the platform on a three-monthly basis, receiving advice and feedback.

While it is critical to recognise that co-designed and co-produced processes are time and resource intensive (Carter et al., 2019), this may be the price to pay for decision making to be based on more rigorous evidence and for end users' capacity to be strengthened through learning by doing.

Good examples of co-production can be seen in the BRECcIA project (see below, **Box 8**), the Mitigation Action Plans and Scenarios Programme (MAPS) in Latin America (see below, **Box 9**), and the WISER Strengthening Climate Information Partnerships-East Africa (SCIPEA) project where co-production determined that the timing of seasonal forecasts was too late to be useful to farmers (Carter et al., 2019).

Box 8: Fostering inter-disciplinarity and co-production with stakeholders to influence policy: the Building research capacity for sustainable water and food security in drylands of sub-Saharan Africa (BRECcIA)

BRECcIA (2018-2021) aims to strengthen research capabilities in Ghana, Kenya and Malawi in the areas of water and food security through better understanding of needs, co-creation of research questions, co-generation of research, building of technical and professional research skills, and professional development.

One of the project's core strengths is the way it embeds inter-disciplinarity in capacity strengthening. ECRs are required to engage with research being conducted in other countries, including through field summer schools, during which participatory and interdisciplinary research skills are developed over 4-5 days. Through immersion in a rural community, ECRs run a "mini version" of a research

project in mixed disciplinary teams, beginning with community engagement, and then presenting their findings back to local stakeholders.

BRECcIA sought to influence policy by encouraging a strong link between ECRs and stakeholders from the beginning. ECRs got recruited without a specific work plan in place, which they developed with others, addressing research questions that met the demand of users. The inception phase focused on defining the research question and methodology and engaged partners in relevant ministries to understand the data needs and gaps that need addressing for their intended policy outcomes. As a result, research questions, design, collection and analysis have been strongly influenced by this stakeholder engagement process.

Box 9: The MAPS approach - learning and doing to build communities of practice in the global South

The Mitigation Actions Plans and Scenarios (MAPS, 2010-2015) programme was a collaboration between Brazil, Chile, Colombia, Peru and South Africa that through a government-mandated stakeholder process sought to build an evidence base to inform climate change mitigation and development policy in the participant countries (Kane & Boulle, 2018). Central to these processes was the facilitated co-production of credible, robust knowledge, developed by scenario building teams (SBTs) which consisted of researchers, government and the private sector. Importantly these processes were driven by in-country teams, guided by an approach based on learning by doing and reflection (Boulle et al., 2015, Rennkamp & Boulle, 2017). Professional facilitation and careful process design were important for enabling the outcomes achieved. The MAPS programme heavily informed the NDCs of the participant countries, and developed new information and tools, new capabilities and mindsets, and a Southern-led community of practice based on trust and transparency (Boulle et al., 2015, Kane & Boulle, 2018; Rennkamp & Boulle, 2017). The MAPS experience, in contrast to many of the NDC processes in the global South, was a Southern-led, long-term process, which emphasised South-South knowledge exchange as an approach to learning, and embodied transdisciplinary principles as a way of shaping high-level policy processes. It also demonstrated the multiple roles that can be played by knowledge, particularly in bringing about policy change, and how to equip these knowledge processes to be robust enough to navigate shifting political environments (Kane & Boulle, 2018, Boulle et al., 2015).

Working alongside stakeholders on the frontline of adaptation action

Researchers working alongside stakeholders and organisations that are implementing adaptation and climate resilience measures is a form of capacity strengthening that should be explored further.

Researchers could for example be partnered with an NGO undertaking a community-based adaptation (CBA) project; a port authority manager seeking to reduce the impact of storm surges on their infrastructure; a DFID country office implementing a climate smart agriculture project; a district development officer seeking to increase resilience to floods.

There is no blueprint that can provide an exact process or set of steps to be followed, although there are lessons that could be learned from the approaches used by CSIRO researchers' co-production of adaptation pathways. Important principles in this regard are learning by doing, reflecting and managing adaptively. The benefits of such approaches include:

- Researchers provide rigorous, context-specific, understandable evidence to assist in decision making and the implementation of activities. This is necessary given that many of the stakeholders that are immersed in their day-to-day work do not have time to look for the "best" evidence to inform their decisions, and they often do not understand the knowledge that is available - due to unsuitable language, packaging and relevance to their context and priorities.
- Researchers assist in monitoring the effectiveness of adaptation and resilience actions through reflexive processes which can feed into adaptive management responses, strengthening the capacities of all those involved.
- Everyone involved learns from the experience of those who are implementing adaptation and resilience actions, to help inform others who are in similar situations, and potentially enabling exchanges and peer learning across different stakeholders grappling with similar challenges. See **Box 26** (in Annex 3) on the approach used in the Climate-Smart Villages set up by the Climate Change Agriculture and Food Security (CCAFS) research programme. Lastly, research-practitioner partnerships can lead to the development of learning material based on on-the-ground practical knowledge and include practitioners as trainers. This successful modality was used by IIHS in its disaster risk reduction fellowship scheme referred to in **Box 17** in Annex 3.

It is important to note that all three of the activities mentioned above would still enable researchers to publish and meet their academic requirements. As mentioned by Saleemul Huq of ICCAD, "for every investment in doing adaptation, there must be an equivalent investment in learning, i.e. "learning by doing"" (pers. comm. 21 Nov. 2019). In Bangladesh, for example, university students help practitioners implementing CBA to inquire and reflect about what works and does not. NGOs are sources of experiential knowledge, and together they co-author research, that is therefore not

extractive. These reflections also foster an ability to "learn from failure", which is needed as society grapples with climate challenges.

Mainstreaming climate change into investment decisions

Interviews suggested that capacity strengthening programmes should be built into the climate change adaptation investments of Development Finance Institutions (e.g. the World Bank, AfDB, GCF and others). This should go beyond the existing efforts to mainstream climate change considerations into project design and implementation, but look to target capacity strengthening with impacts beyond the investment projects.

Embedded end users and secondments

"Embedding" models provide a useful "learning by doing" modality. Having government officials, for example, embedded within research institutions can help these end users better understand research processes, challenges and limitations. This would better place them to identify and frame climate research needs. The processes at play are similar to those when embedding researchers within end user organisations (see Section 5.1.4).

Peer learning

As mentioned earlier, often end users do not necessarily require new knowledge but rather a facilitated process which enables them to learn from practice and from what is working elsewhere. In many cases, the most effective way this can happen is by learning from peers who are grappling with similar challenges in similar contexts. Through the Southern Africa Climate Finance Partnership, for example, the NGO SouthSouthNorth recently facilitated an exchange between the Development Bank of Southern Africa (DBSA) and the Development Bank of Namibia (DBN). The purpose was for DBSA to share its learning on how to meet the gender mainstreaming requirements for obtaining Green Climate Fund (GCF) accreditation. DBSA, a recently accredited entity with the GCF, which received its first GCF grant, was in the position to assist DBN that is in the process of seeking accreditation. Thus, having staff from one bank share their approach, lessons and successes with another, has increased the legitimacy and credibility of the evidence and process.

In addition to previous peer learning examples (e.g. in the Tamil Nadu case and the Climate-Smart Villages) the International Institute of Sustainable Development provides useful principles that can guide the design of facilitated peer learning events (see **Box 27** in Annex 3). These include: (i) fostering sustained interactions across the same group of peers over time, to enable relationship building and increased support; (ii) promoting interactive processes which include technical input,

opportunities for peer exchange and reflection about both take-home messages, and how to improve the peer learning process; (iv) supplementing peer learning with other capacity strengthening activities.

5.3.3 Challenges

As Bielak et al. (2008) explain, the notion of a linear research to policy process is no longer tenable. On the contrary, the authors claim that "science must be socially distributed, application-oriented, transdisciplinary, and subject to multiple accountabilities". A number of challenges are however at play, ranging from the inadequate skills on both sides of the spectrum, the incentive structures in place and the need to reconfigure a system that is based on these structural divisions.

The difficult relationship between research and policy

Responding to demand *and* undertaking transformative research

As mentioned in the scoping study on decision makers' demand, it is important to find the right balance between responding to demand and undertaking research that is critical and challenging of the system. Both are needed, and by working together with decision makers to assist them with the evidence they need to increase climate resilience, trust and relationships can be built over time which may allow the introduction of more transformative and challenging ideas. These may include assisting decision makers to think more long term by addressing not only their current knowledge needs, but seeking to bring onto the agenda what scientists know are pressing concerns for the future (e.g. models for radical decarbonisation) or what may be "known unknowns". Or it may be through gradually raising awareness about more contentious topics that challenge the status quo, for example by encouraging a reconsideration of power structures that prevent meeting the needs of the most marginalised. A portfolio approach can help to address this by creating the possibility of undertaking both incremental and transformative research.

Fostering more than just the inclusion of research evidence

As Newman et al. (2012) explain, evidence-informed policy however does not only refer to the consideration of research findings, but also the inclusion of evidence from a range of stakeholders, practice, and the process of policy implementation itself – which can be achieved through transdisciplinarity. This study argues that for such processes to be successful, they need to be led by in-country organisations with knowledge brokering and facilitation expertise that have a better understanding (compared to foreign researchers) of the local context and the skills needed to enhance collaboration across the research-policy spectrum. Such organisations may also include a

policy team charged with scanning for opportunities that relate to the project's intended outcome and for any "policy change" ready environment.

Democratising the process of knowledge production and use

Newman et al. (2012) however go on to note that the research process itself is not without its bias: knowledge is inextricably linked to power, which affects the way research is produced, which questions are answered, and who is included or excluded. It is once again argued that CLARE should explore different ways of democratising the process of knowledge production through more open and participatory processes. The collaboration of meteorologists and traditional rainmakers in Kenya, for example, contributed to bringing indigenous and scientific knowledge closer together, building trust, respect and strengthened learning on both sides (Guthiga and Newsham, 2011).

Capacity strengthening needs to be a self-led endeavour

Unless end users are seeking to strengthen their skills, capacity strengthening programmes are unlikely to be successful (Newman et al., 2012). Therefore, although end users often have inadequate capacities to access, understand and use research evidence, this issue is not resolved through imparting technical knowledge. The process needs to be iterative, with the objectives set by the participants themselves, and where research evidence is analysed and critiqued alongside other types of evidence. This study recommends starting with a diagnostic process aimed at understanding the range of existing capacities, whether there is a desire to change, and which processes support or hinder the use of evidence in decision making. A number of self-assessment and diagnostic tools exist (see in Newman et al., 2012,), as well as different approaches (e.g. PlanAdapt's in Box 23 in Annex 3), which may be worth testing. Once again, learning by doing, and responding to decision makers' evidence needs can also enhance capacities, and result in action at the same time.

Criteria for success include sustained interactions and institutionalisation of processes and approaches

For projects and initiatives to result in long-term action and impact, institutionalisation is critical, as this enables one to counter the challenges tied to, for example, changes in priorities and staff turnover, to bring about impact that outlives the lifespan of a single project. At the local or district government level, this may mean inclusion of the new knowledge or tools into protocols, frameworks, operation manuals or procedures. At the farm level, the new adaptation practices and approaches could be incorporated in the programmes of agricultural extension offices or NGOs active in the area. As Butler et al. (2017) argue, processes for taking innovation or impact to scale, or to facilitate systemic change, vary and need to be context-specific. Undoubtedly, they require long

time commitments and the building of sustained relationships (especially with the technical staff that hold regular positions) to foster trust. Working closely with stakeholders, which enables learning-by-doing, and a strong focus on adaptive learning and reflection, will shed light on the most appropriate mechanisms.

Structural barriers hinder evidence-informed decision making

As discussed in the decision makers' demand scoping paper, and in the literature at large, decision makers often struggle to explain their knowledge needs and formulate research questions (Bielak et al., 2008). In addition, they tend to have little time; are overloaded with information that needs to be significantly synthesised to convince their principals; they are poorly skilled when it comes to looking for information and thus default to trusted sources; and have short-term perspectives, which are often reactive (Bielak et al., 2008).

On the other side of the spectrum, researchers face a dilemma as on the one hand they are increasingly being asked to show the public benefits of their work, yet they need to produce their professions' valued outputs, such as publications, awards, recognition within the science community and ongoing funding (Lacey et al., 2015). The current assessment of research performance through single indices is one of the main impediments to researchers investing more time and effort to promoting the impact of their work.

Furthermore, the timescales at play in the policy and research world are also at odds. There is the need for often short turnaround times to influence policy during a particular window of opportunity, contrasted with the long timescales required to produce high quality research. Similarly, researchers involved in funded projects are often also tied to the requirements laid out in logframes and strict deliverables, which can prevent one from being able to respond flexibly and timeously to requests and policy opportunities.

There is a lack of innovation and creativity in approaches

To result in more evidence-informed decision making and to foster deeper collaboration between researchers and users, there is a need to use more collective sense-making exercises that allow an exploration of the drivers at play, multiple perspectives and sources of knowledge, and potential pathways that may lead to systemic change. These processes may include participatory scenarios and social labs (such as those led by Reos Partners) and the development of adaptation pathways (Butler et al., 2016), which are renowned for strengthening the capacities of those involved. But they may also include the use of experiential learning games (such as those developed by the Red Cross

Red Crescent Climate Centre), theatre of the oppressed, storytelling and community listeners' clubs (as used by FAO, see **Box 28** in Annex 3). Section 5.4.2 below also explores these ideas further.

5.4 Cross-cutting

In addition to the focus on researchers, organisations and end users, this study revealed that many of the themes and positive examples of capacity strengthening for climate change research are cross-cutting. This section covers the key cross-cutting themes and examples that emerged.

5.4.1 Commissioning models

The process of commissioning work and the criteria used for selecting organisations or consortia, has major implications for who is selected and for the design of a programme (Harvey et al. 2019; Jones et al., 2018). The weighting given to criteria such as research excellence, research uptake and capacity building determine how a project or programme is able to deliver on some goals, while neglecting others. If the aim is to fund initiatives that strengthen capacity for the purpose of enhancing resilience to climate change in the global South, then it is critical to question whether selection approaches are ensuring that projects, programmes or portfolios are equipped to contribute to this goal (Harvey et al., 2019; Jones et al., 2018). To assess this, evaluation criteria must be made publicly available. Although there is an awareness of the need to increase the representation and leadership of Southern organisations, when selection criteria are weighted towards research excellence (which has been the tendency in many programmes so far), the same top performing northern organisations (or the usual suspects in the South) continue to be most prevalent. Selection of reviewers is another key factor that needs to be considered, as the make up of reviewers influences the way in which real weighting is distributed across selection criteria.

As one interviewee mentioned, research excellence and capacity strengthening are complementary and the trade-off between the two only exists in the short term; over the medium to long term research excellence is achieved through capacity strengthening. More fundamentally, however, this study questions whether an emphasis on research excellence is fit for purpose in the age of implementation, and suggests that it may be worthwhile reconsidering the relative weighting given to different criteria and perhaps expanding these, to include others (e.g. community engagement). We argue that measuring success mainly through publications, without due consideration to legitimacy (with who) and salience (catalysing action and learning in real time), is inadequate. Similarly, if the weighting given to capacity strengthening and impact increased, consortia composition may also need to shift, with a greater emphasis on practitioners, with academics as knowledge partners and led by actors in the South. If the goal is transformational impact, then a

radical rewiring of dominant approaches is needed, or at least an intention to attempt different strategies, through a diversified portfolio. To enhance more evidence-informed implementation, for example, CLARE may want to experiment with shifting the focus from universities to research institutes and knowledge brokers.

The peer-review process of selecting proposals for the Assessment of Impacts and Adaptation to Climate Change (AIACC) project considered the need for representation of countries with low capacity as a co-criterion to scientific merit. This inclusive selection approach helped to broaden the reach of the climate change assessments to LDC countries where there are substantial knowledge and capacity gaps. The presence of a strong technical support team within the project and the project's emphasis on capacity building helped to support the needs of teams from low capacity countries. This example is elaborated on in **Box 14** (in Annex 3).

5.4.2 Types of partnerships

Partnerships are fundamental to developing responses that incorporate the necessary expertise and skill sets for the challenge of enhancing climate resilience in the global South. To keep pace with the rapidly changing context and to meet the needs of the age of implementation, new and innovative partnerships are imperative. This study argues that there has been a lack of creativity in the formation of consortia thus far, and CLARE should therefore require that future partnerships extend the conversations beyond researchers and few practitioners. Bringing in new perspectives may help to identify pressure points and the novel solutions which are required to address these.

Novel partnerships within academia

The role of the academy will continue to be an important one, but will need to undergo change to prioritise innovation and move beyond the rigid, outdated models that universities often represent. Part of this is establishing new research collaborations between organisations in the global South to foster South-South knowledge exchange and learning, such as those enabled by the LUCCC (see **Box 5** discussed in 5.2.3) and ARUA network in **Box 10**, below. These collaborations are also discussed in section 5.4.5.

Box 10: ARUA – The role of networks and Centres of Excellence

The African Research Universities Alliance (ARUA) has a vision to enhance research and training in its member universities across the continent on thirteen main thematic clusters, including climate and development, food security, water, unemployment and skills development, among others. One of the ARUA approaches is setting up thematic Centres of Excellences (CoEs) to bring together partner

universities to conduct world-class collaborative research and to create career opportunities for graduate students. The ARUA CoE in climate and development comprises the Institute for Climate Change Adaptation at the University of Nairobi, the Institute for Environment and Sanitation Studies at the University of Ghana and the African Climate and Development Initiative at UCT and seeks to grapple with the challenge of enabling development in Africa in ways that enhance resilience to climate impacts, and follow low carbon trajectories to mitigate the causes of climate change. Capacity development; enhancing knowledge systems for climate resilience; and sustainable energy for poverty reduction make up the three main focus areas. In 2020, ARUA's CoE on climate and development will be hosting regional NDC workshops to inform the preparation of NDC updates in west, east and southern Africa. The network will also be hosting workshops to assess the master's curricula for climate change and sustainable development in the member universities, to identify challenges and progress to inform future curricula development.

Climate researchers need to partner with colleagues from different disciplines (ranging from behavioural psychologists to political-economists) to provide more holistic responses to the challenges being faced. Partnerships with business schools and leadership thinkers may help to bring fresh thinking to existing approaches (e.g. the School of International Futures, Wasafiri). This could be a two-way exchange in which CLARE brings climate knowledge into their work. To better monitor and evaluate both adaptation effectiveness and our work in this realm, partnerships with MEL experts are critical.

To strengthen research impact skills, partnerships should be explored both with practitioners working on the ground, who can contribute to capacity strengthening through learning by doing approaches; but also by collaborating with experts in this field (e.g. Fast Track Impact, who provide a range of training opportunities that comprise of workshops linked to post-training accompaniment; or the trainings provided by research institutes like York University's Knowledge Mobilisation Unit).

Partnerships with the private sector

This could include establishing partnerships with the private sector to make use of their unique sets of expertise and resources, and the efficiencies their approaches bring. Various partnerships currently exist in the form of industry associations, many of which are collaborating to explore ways of mitigating climate risks but also developing opportunities associated with the low carbon, climate resilience economic transition.

Partnerships with activists

Mass social movements have led to change. What can we learn from them and how can we collaborate with them, to improve science and leverage their voice? Fridays for the Future and Extinction Rebellion are some of the newest mass movements that have been successful at mobilising millions of people around the world to put pressure on decision makers to act on climate change. Scientists for the Future, is an example of scientists in Germany, Austria and Switzerland starting to make links between scientists and mass movements, which could help to create scientists with more impact orientated approaches, and to elevate the exposure of science to mass movements, thereby enhancing the uptake and impact of science. Such partnerships could also improve the ways in which mass movements understand and make use of science as the basis for their movements.

Closer to a Southern context, Southern Voices on Adaptation (and Southern Voices on Climate Change) are Southern-led civil society advocacy communities of practice linked to the UNFCCC and AGNES. Similarly, the Pan-African Climate Justice Alliance (PACJA) is an established, active, strong voice in influencing civil society groups on climate issues, yet often suffers from using commissioned research that is of questionable quality. Partnering with these types of networks may enable us to both strengthen their work and could allow for learning and an enhanced voice for our research.

Partnerships with the media

Media plays a crucial role in shaping public opinion and translating science and societal problems for the broader public. IIHS for example is collaborating with journalists and climate reporters to improve the evidence base for their reporting, encourage the correct use of terminology and establish how to better collaborate. The learning that happens in these types of partnerships is multidimensional and multidirectional as researchers learn how to communicate better and engage with media, the media improve their ability to use and report on science, and as a result the ways of working within and between professions become more equipped to deliver change inside and outside their communities. One approach that has been found to be effective for training journalists is that of the Earth Journalism Network (EJN).

Partnerships with climate resilience projects

Match-making researchers with implementation projects could assist to monitor the effectiveness of their adaptation approaches, and assist to share lessons with others. In addition, researchers could ensure projects on the ground are using rigorous research findings. Such projects could for example be practitioner-led (e.g. CARE's Adaptation Learning Program), or funded by bilateral (e.g.

PRIME funded by USAID in Ethiopia) and multi-lateral agencies (e.g. BORESHA funded by the EU in the Horn of Africa).

Partnerships with schools

There is a need to work more closely with school systems too, which is where the next generations are being formed. Some positive examples of work with schools exist, which CLARE should learn from and scale out such as IIHS's work with schools on the SDGs in India.

For all of the diverse partnerships mentioned in this section, CLARE could issue a call for proposals which puts the onus on the proponents to suggest innovative, transdisciplinary partnerships aimed at enhancing climate resilience. Elements that could be requested for inclusion in the proposals may be: demonstrable evidence of existing trust and relationships, clear ownership of the project across all those involved, presence of a knowledge broker to facilitate the partnership and provide the skills which researchers often lack.

5.4.3 Nature of the support for innovative approaches: long term and adaptive

A recurring theme that emerged is the crucial role of the nature of support offered by funders and the implications this has on projects. Lack of flexibility of funding and short-term funding initiatives were cited as two of the primary barriers encountered by project participants, which threaten long-term, sustainable impact and hinder the establishment of new ways of working.

Some of the most impactful capacity strengthening approaches are cultivated by funding that creates the space for emergent practices, that are specific to addressing the problems of a specific team and project. Finding an appropriate balance between being explicit and tailored about how to approach capacity strengthening and to create spaces for approaches that emerge in the course of a project, requires flexibility and the ability to adapt approaches to changing circumstances and emergent discoveries.

Articulating the capacity strengthening objectives upfront combined with ring-fencing a dedicated fund for capacity strengthening but allowing those funds to be carried over across years can provide the level of autonomy needed to decide how best to allocate the ring-fenced funds. BRECcIA's Flexible Innovation Fund (FIF) provides a useful example in this regard as does CDKN's light-touch, experiment and phased approach which is elaborated on in **Box 11**, below.

Box 11: Learning from CDKN's approach: Light-touch, experimental, phased

As the Climate and Development Knowledge Network (CDKN) learned from its work in Asia over seven years, the scale of transformational change required for climate compatible development requires "extensive experimentation and learning, both locally and at multiple scales" (Colvin and McDonagh, 2017). Its approach was therefore to fund shorter (one to two year) experimental projects, which ranged from being research-centric on one side of the spectrum to action-research led on the other. Those initiatives that showed early successes received a subsequent tranche of funding (e.g. for a further two years), to build on what had been achieved. An analysis of ten initiatives showed that the research-led approaches increased understanding about the issues that were tackled in the studies but did not result in changes in practice or policy. The four action-research initiatives, on the other hand, resulted in both scaling up (e.g. influencing policy at a higher level from city or district to state-level in India) and scaling out, meaning an intervention is replicated elsewhere. Interestingly, these successes were not part of the initial design, but were emergent and resulted from a learning-centred approach which was flexible and participatory (e.g. through the use of shared learning dialogues, that built shared understanding, capacities and collaboration), responsive to government needs and incorporated the right knowledge brokering skills and processes across scales. Thus, an experimental, light-touch, phased and strategic adaptive management approach, which was tailored in response to local contextual factors proved to bring about positive impact.

5.4.4 Value for money and the importance of monitoring, evaluation and learning (MEL)

There is mounting pressure on donors to prove value for money of their investments. This is typically evaluated based on set criteria, which should ideally capture the impact of a capacity strengthening intervention. There is a growing sense that the criteria and logframe approaches for assessing impact are outdated and not fit for purpose for supporting and assessing approaches that effectively strengthen resilience.

Developing appropriate MEL frameworks that are equipped to track the progress, impact and outcomes of capacity strengthening is an essential part of demonstrating value for money and improving future capacity strengthening efforts. Additional work on how to assess value for money is needed to reflect the weightings of different features of impact of a capacity strengthening initiative, and to balance those that are easily quantifiable and assessed with those that are no less important, but difficult to quantify. Changing the way value for money is assessed, may enable capturing under-represented features of initiatives that lead to high impact and could incentivise new project approaches, which are currently not captured by existing evaluation criteria. This raises

the importance of developing appropriate monitoring, evaluation and learning (MEL) frameworks that can track the progress of capacity strengthening in order to demonstrate value for money. Capacity strengthening often faces significant attribution challenges due to its integrated nature, often-unstructured modalities, the implicit ways capacities are strengthened but not necessarily reported on, as well as the general challenges in tracking capacity.

In addition to a radical rethink of which indicators to use for assessing value for money and impact, there are growing calls for funders to look beyond their own portfolios to allow for cross-pollination across portfolios from different donors. This may mean fellows may receive a number of fellowships in parallel that allow them to participate in concurrent programmes, and enable cross-programme learning. If the intention is for transformational impact, the challenge needs to be approached from diverse angles, that allows for a diversity of approaches that are able to overlap, and build on one another irrespective of which funder they are funded by. While this may represent higher risks and more attribution challenges, such approaches may well fulfil more of the conditions that allow for transformational impact than funding business as usual. Given the pressing need to respond at speed and at scale, and the apparent inadequacy of existing efforts, funding business as usual arguably represents the highest risk investment. Diversity in a funding portfolio, and funding interventions across the value chain and risk spectrum, represent a robust and high impact strategy that should be prioritised. To make the case for such bold funding approaches, MEL frameworks need to be able to capture and demonstrate their value.

Another key ingredient for assessing the value of a project, programme or portfolio is creating space for critical reflection on progress in capacity both during and after a project (Woodhill, 2010). Such reflection allows participants to identify what is working and what is not, which can inform changes in approach during the course of a project, or inform future work after completion of a project. Current indicators and conventional metrics do not capture complexity of capacity building processes, nor the intangible elements that may be some of the most influential drivers for capacity strengthening in a given project. AfriCLP's approach to monitoring and evaluation sought to address a number of the issues outlined above and is discussed in more detail in **Box 13** (in Annex 3).

5.4.5 North-South dynamics

Research projects on climate resilience take place within, and are influenced by, much broader power dynamics of international relations, global trade and politics. The power dimensions between the North and South that are inherent in, and influencers of, the outcomes of climate change research, go far beyond a given project, programme or portfolio (Borland et al., 2018).

The global dynamics of knowledge production for climate change are reflected in the authorship patterns of the IPCC's Working Group (WG) III, which are dominated by northern researchers and research organisations (Corbera et al., 2016). WG I and II also exhibit similar trends. More broadly, in academia high-impact journals, top-rated universities and the most influential funders are located in the North (Connell, 2014; Borland et al., 2018). This means that for knowledge produced in the South to gain recognition and funding, it needs to meet the metrics prescribed by northern organisations, while tailoring research to the local development and intellectual needs of countries in the South, is often only a secondary concern (Hountondji, 2002; Borland et al., 2018).

Based on these metrics, there is a 'gap' between the standard of knowledge in the South and the North, implying the South needs to catch up, to replicate the standards of excellence as defined by northern universities, funders and journals (Connell, 2014; Borland et al., 2018). Whether implicit or explicit, the narrative of a gap, and the need to catch up, is perpetuated by the commissioning, project design and implementation of the overwhelming majority of projects in this area. Critical reflection driven from the South is needed to grapple with how the commissioning, design and execution of research initiatives funded by the North, can address these power imbalances.

Unpacking the narrative that the South needs to catch up

Establishing the features that make knowledge production, transfer and use fit for purpose for enhancing climate resilience in the South, may provide the conditions within which to redefine impact criteria to respond to the realities of the South, rather than northern standards of academic excellence. For example, in cases where the South is pioneering ways of responding to pressing problems under the constraints they face, it is not about support for catching up but support to do things differently.

An extract from an ESPA (2018: 1) states that: "Northern institutions are usually in charge of managing the budget, and this inevitably affects power dynamics. The implications need to be recognised and openly discussed." Critical perspectives from interviewees indicate this is observable in the fact that decades of investments in northern institutions have not developed Southern capacity. If they had, more Southern partners would be leading. A shift in paradigm is needed, along with associated shifts in indicators to ensure fit-for-purpose approaches are supported.

The fact that currently many Southern partners are not able to demonstrate they can manage funds and large projects demonstrates the necessity for long-term engagement and capacity strengthening so that these skills and systems are gradually developed. The number of Southern organisations able to take lead roles in projects will then increase over time, instead of funds consistently being

allocated to the usual suspects (see Sections 5.2.1 and 5.2.2). A first crucial step in building Southern leadership includes prioritising deep consultation that lays the basis for capacity strengthening that enables leadership. This requires “soft skills” of both researchers in the South and in the North (see Section 5.1.3).

Interviewees suggested that there could be greater impact if work is done by Southern institutions. Despite this learning the tendency remains to design programmes in the North and then look for Southern partners. Instead, Southern ideas, interests and priorities must be included right from when an intervention is first being conceptualised. Design should be done collectively through respectful listening, investment in the process itself, including incubation periods to plan, experiment and innovate, to establish goals, trust and new ways of working. As one interviewee suggested, despite its many successes, FCFA failed to deeply engage with Southern voices and include them in the conceptualisation phase of the project, which was reflected in some of the design features of the project.

Another problematic, often unquestioned assumption is whose capacity is being strengthened. The implicit assumption is that the Southern researchers are ‘receiving’ capacity strengthening, but northern researchers need to spend time in Southern contexts to develop the skills to be relevant and impactful, and to cultivate different sensibilities and unlearn old ways of working. There is a need to be cognisant of the fact that in some countries, because capacity is over stretched, some of the Southerners are better at social engagement as they often work alongside policy makers and communities. This ability might be lacking among many northern partners.

Finally, capacity strengthening is needed that aims to help mobilise Southern researchers into the roles of Northern researchers over the course of project implementation. For example, in 2018, the BRECcIA project team set up a sliding scale to enable the project to be less and less driven by UK teams so that African partners end up having full ownership of the project. At the beginning, the various working groups were led by the Southampton University partners. These were then paused in 2019 and 25 Core Investigator (CoI) champions were identified to drive those working groups forward. Each CoI champion has ToRs spelling out what is expected. What is important is for the PI to know when the time is right for this transfer.

North-South dynamics were central to the work of CAASTNET+ (CN+) and other ERA-Net research collaborations funded by the European Commission which were designed in response to various bi-regional summits (including the Africa-EU Lisbon summit in 2007) where great collaboration to address global challenges was agreed upon. Key to equalising the power dynamics between various North-South collaborations is equal co-financing, to overcome the perception and/or reality that

those who finance research set the agenda. To this end the African Union has made various pledges to increase the percentage share of GDP on research and development, as a means to stimulate economic growth and development. Unfortunately, such political commitments have not translated to actual spend, in most African countries. However, CLARE could tap into this political agenda, speak to the commitments of bi-regional financing for climate research and advocate for greater national investment in research capacity. Such investment does not have to be only financial, it can also be in-kind, though this does carry its own limitations.

5.4.6 Sustainability of impact and upscaling

Sustainability of impact consistently emerged throughout the conversations and reviews of projects as an area of concern. While programmes like FCFA and CARIAA were successful at assembling substantial capacities and new ways of working, in cases where there is no follow up to a project, capacities assembled quickly disperse. A number of participants cited the fact that this was predominantly due to lack of other career opportunities to follow up the project. For example, early career researchers lacked opportunities to move into mid-career positions. Sustained impact is heavily dependent on the need for involved individuals to pursue a career trajectory, which would need to be in line with universities' promotion paths, instead of pursuing the next short-term project.

Project sustainability challenges are exacerbated by the working conditions in universities in the global South, which are often short of staff, and senior staff are overwhelmed with requests from international projects, as well as research and teaching demands. Furthermore, the stock of candidates to take over from over-burdened senior staff at the end of their careers is limited. This gap puts sustained pressure on experienced, well-recognised staff, and stunts the development of ECRs.

The "missing middle" were identified as key area requiring funding. These are the researchers that are no longer ECRs nor senior and therefore struggle to access research funding, and often have high teaching loads with little time or funding allocation for research. These candidates often move into consulting, given the poor financial prospects in research.

Consortia-based projects are able to build strong communities of practice, but these are resource and time intensive, leading to questions of the resource requirements for long-term impact and the potential for upscaling through this model. Context-specificity and the need to scale at speed seem to be in direct competition with one another. FRACTAL's 18-month extension phase could provide valuable insights into how to build on the rich foundation of FRACTAL and FCFA. For example, how to experiment with light versions that support continued work through the relationships and

established ways of working, but that start to run themselves and do not require the same time and resource investments as FRACTAL did. Additionally, the continued work of embedded researchers in developing and implementing city strategies, use of virtual platforms and future learning labs, may allow the sustained impact of the project. This could open opportunities for upscaling in less resource-intensive forms. The virtual learning retreat held by FRACTAL may also offer insights into the use of virtual platforms for maintaining relationships and collaboration in the community of practice that has been established.

5.5 Mapping financial flows and actors targeting climate change research capacity strengthening

It is noteworthy that information on capacity strengthening in this area is not readily available. This is understood in part to be due to M&E challenges (disentangling capacity strengthening from other climate research project activities is not always possible and there is a lack of definitional consistency) but also likely reflects the lack of priority afforded to capacity strengthening as a standalone component of climate change research programmes and projects. Further, the challenges are more profound with respect to development loans where, unlike many grant funded programmes and projects, there is no explicit or even implicit focus on capacity strengthening. However, Development Finance Institutions (DFIs) are increasingly including conditions related to the mainstreaming of climate change in their lending criteria. The process of applying for loans, implementing projects and reporting on progress potentially delivers significant capacity strengthening but this is not well tracked and communicated.

Where ODA allocations to climate actions are tracked and reported on, the proportion dedicated to capacity strengthening often is not. Further, it is not clear how much and what proportion of funding is managed, and partly consumed by, northern development partners, including universities, whose capacity is already better established than their development partners, or counterparts, in the global South.

The cost of capacity strengthening interventions and which ones have typically proven to be relatively higher value for money is also not clear. Beyond a better understanding of financial flows directed to capacity strengthening for climate change research, the CLARE design phase would benefit from an understanding of:

- The scale of funding required for different interventions; and
- The typical efficiency (value for money) of different types of interventions.

This study was unable to calculate the value of the funding gap. Defining and measuring the value of investment needed to build sufficient research capacity to address climate change is practically impossible.

The assessment also considered lead donor organisations involved in capacity strengthening for climate change research. The assessment suffered from the same challenges experienced in trying to isolate capacity strengthening for climate change research in the assessment of financial flows.

The World Bank and African Development Bank were found to have funded relevant capacity strengthening initiatives. Various multilateral and bilateral donors also emerged as playing a prominent role in this space but it is clear from the various relevant multi-donor funded programmes that there are many actors involved in this space. The challenges and potential value of mapping financial flows and actors targeting climate change research capacity strengthening is elaborated on in more detail in Annex 4.

6 RECOMMENDATIONS AND NEXT STEPS

Why is there consensus amongst established, critical thinkers in the South, that capacity strengthening approaches have been woefully short of what is required? This study has sought to understand this challenge and presents a set of recommendations for CLARE to respond to the capacity strengthening needs in the context of research that enables doing adaptation and building resilience in Africa. The recommendations call for an innovative approach to funding capacity strengthening that is equipped for impact in the age of implementation through investing in a diverse portfolio of approaches across the risk spectrum, to build on and leverage past successes, and invest in new, out-the-box initiatives for sustained, transformative impact at scale. What is clear is that funding a business-as-usual approach represents the highest risk investment that CLARE could make.

6.1 Recommendations

Priority recommendations for CLARE are presented according to five focus areas. These recommendations include, and refer to, individual recommendations relevant to researchers, organisations, end users and the cross-cutting themes discussed in section 0. The recommendations start with a set of guiding principles, that should be incorporated in the design of capacity strengthening approach under CLARE.

6.1.1 Guiding principles

A number of **guiding principles** are presented to inform all activities planned and undertaken as part of the CLARE programme. Discussing and modifying these principles with all stakeholders involved in the design and implementation of CLARE would be important in creating a shared vision for capacity strengthening.

1. **Greater investment of resources into capacity strengthening is required**. A stand-alone pillar is needed to formally deliver capacity strengthening as a primary objective. Given the complex, multi-faceted and integrated nature of capacity strengthening, a cross-cutting theme is also required to ensure that capacity strengthening is mainstreamed (considered, prioritised and tracked) in all CLARE components (i.e. where capacity strengthening can be delivered but where it does not represent the primary objective).

2. Capacity strengthening approaches need to be **fit-for-purpose, participant-driven and demand-led**, if they are to be owned by participants and deliver transformative impact.

3. CLARE should **consider the interconnectedness of the individual, organisational and systemic/societal levels** to ensure that capacity strengthening interventions are targeted, integrated, coordinated and ultimately address the challenges for which they are designed. A portfolio approach can contribute to this.

4. **Innovation, transdisciplinarity and new, unfamiliar partnerships** can contribute to developing diverse skills while **co-creating the required (and possibly unexpected) solutions** needed to address climate challenges.

5. Capacity strengthening interventions need to be designed to address the features of t**he "age of implementation"**, i.e. an era of **enhanced ambition and action, at scale and speed, under complexity, uncertainty and poor data conditions**. Think creatively, think big!

6. **Flexibility, reflection and adaptive learning** are crucial ingredients for establishing iterative, innovative approaches that are equipped to navigate the rapidly shifting terrain of the 2020s: **provide the space for these ingredients.**

7. Capacity strengthening aimed at the South needs to be **Southern-led and owned, by engaging critical, diverse voices.**

8. To ensure **sustainability and scaling up of impacts**, institutionalisation of successful tools, approaches and methods should guide all interventions.

9. **Nexus or holistic thinking** should represent a reference principle against which the substantive content of any capacity strengthening intervention of CLARE is evaluated.

Priority recommendations for CLARE are presented according to focus areas and based on the identified needs.

6.1.2 Focus Area 1: Long-term, iterative, multi-pronged approach

Recommendation	Explanation	Inclusion in CLARE
1A- Leverage the CLARE lifespan to iteratively strengthen capacities rather than focusing on delivering short-term results.	• **Long-term, sustained support** is a fundamental ingredient for **fostering such learning and the development of trust and relationships** that are essential for lasting impact but take time to develop. • **Putting capacity strengthening first may mean** accommodating lower quality research outputs in the	Area • All areas Timing • Scoping • Start up

Build on and scale up existing programmes, e.g. through the provision of more advanced career options. **Upscaling in diverse ways** including, virtual workshops, institutionalising project processes in **government structures and budgets**, and developing **networks that diffuse new ways of working**.	short to medium term, but could enable more "appropriate" research, in the longer term. • **Provision of on-call mentorship and advisory support** throughout the funding lifespan has been proven to contribute to long-term uptake of programme learning, for example, the provision of IDRC Programme Officers within the Think Tank Initiative (TTI) • TTI showed that **flexible, non-directive calls that allow for proposals to address a range of ambitions**, in line with organisations' needs, priorities, and contexts are best. • Setting up **multi-stage grant-making processes** allows for experimentation, iteration and improvement. • Involving a **diverse range of stakeholders** enables a **ripple effect** through diverse spaces. • A phased, iterative approach enables **tailoring, flexibility and learning-by-doing** that is fit for purpose.	• Implementation
1B- Invest in a diverse spectrum of interventions across the risk spectrum, adopting **a multi-pronged approach.** Aim to balance types of interventions: • safe/low capacity return & risky/high capacity return • large & small • formal & informal	• A portfolio approach allows for investing in a **diversity of approaches**, which are designed to contribute to a **common set of objectives from different angles**, potentially contributing to change in different often unexpected ways. • There is a need to find a balance between **leveraging what works** e.g. fellowships (e.g. AfriCLP, CIRCLE, IIHS) embedded researchers (e.g. FRACTAL) and core grant support, to drive economies of scale and lower transaction costs, **versus piloting/experimenting to explore** unchartered territory to drive innovation. • **There needs to be an openness to failure**. "If funders want to build capacity, they have to be prepared to take risks". • An example of a diversity of interventions can be seen in **PlanAdapt's** mix of face-to-face training with e-learning targeting users who need to understand climate risks.	Area • All areas Timing • Start up • Implementation
1C- Strengthen capacity to undertake flexible, iterative **decision making under**	• It is critical to think about **what type of research (and capacity strengthening) is required for the "age of implementation"**, including a combination of transformative research, and demand-led, incremental research.	Area • All areas Timing • Set up

significant uncertainty in data-poor environments.	• There is a need for adaptation and resilience **research to move beyond problem identification** and increasing accuracy of prediction or levels of certainty (e.g. of models), **to the identification of solutions, their implementation**, and monitoring their effectiveness. • **CLARE should look to leverage the skills of think tanks, consultants and practitioners** who can produce evidence quickly and effectively in the context of uncertainty and data-poor conditions and look to develop these skills in researchers based in academia. • An emphasis needs to be on developing the **abilities of researchers and end users to work together.**	• Implementation

6.1.3 Focus area 2: Consider the full value chain

Recommendation	Explanation	Inclusion in CLARE
2A- Individual capacity strengthening needs to be a long-term commitment accompanied by addressing broader organisational challenges. • **Rotate fellows within a project to break down silos and enable cross-pollination.** • **Post-intervention support** should be offered to assist supported researchers with re-entry into home institution. • **Need to strengthen technical and operational capacities of organisations.**	• **CLARE must recognise the different starting points of researchers** and reflect this in the design of CLARE. • **Planning for diverse career pathways (within and beyond academia)** can retain skills and facilitate their continued development to enhance impact. • Organisations require support to develop **both technical and operational capacities**, this could include undertaking organisational needs assessments at different stages, providing mentoring, and establishing organizational policies and structures to improve the research environment as took place in **CIRCLE**. • TTI showed that **core funding** allows flexibility and enables **short-term tactical decisions and long-term strategic** planning, accompanied by **demand-led advisory and organisational development support** works well. • Developing a clear **theory of change** for how core support funding will lead to the desired climate change adaptation and resilience results in Africa enhances clarity of the logic and value of an approach. • **There is a need to identify southern organisations that have developed strong operational capacities** (e.g. SouthSouthNorth and Climate Systems Analysis Group,	Area • Standalone pillar & Cross-cutting theme • Researchers & end users • Project, Programme Timing • All phases

	UCT) to help develop processes for collaboration and sharing. • **There should be a multi-scale focus**, from individual researcher, to organisational level, to broader environment through promoting south-south learning platforms, networks and exchanges **(e.g. SARUA curriculum development to grow the pool of young researchers, African Evidence Network and ARUA that enhance networked learning).**	
2B- Broaden the set of skills of researchers and end users. • Help actors in the climate change evidence value chain **better understand each other and each other's organisations, objectives, incentives and processes.**	• CLARE should invest in the same set of skills as previous initiatives (e.g. strengthening **"basic" research methods skills** and specific technical skills), but **needs to go beyond** (e.g. partnership building, conflict resolution, understanding complexity, ability to engage politically). • "**Soft skills" are needed to translate research into impact,** working under conditions of complexity, uncertainty and poor data quality and availability. • Fellowships, secondments, exchanges and embedded modalities **(e.g. FRACTAL)** build relationships and improve understanding of each other's contexts.	Area • Standalone pillar & Cross-cutting theme • Researchers & end users • Project, Programme Timing • Set up • Implementation
2C- Reduce the distance between researchers and end users by resourcing for transdisciplinarity. • **Include experts from different disciplines and fields** to co-design and co-produce research and provide support through a **"call down facility".**	• Climate change adaptation needs action, demand-driven research, and moving from theory to practice, it needs to be **less about models and technology, and more about learning with people.** • Priority should be placed on the **co-production of knowledge** to address the needs expressed by decision-makers, offer **tailored, advisory support.** • CLARE should promote participatory processes that **encourage double- and triple-loop learning (e.g. CISRO)** for questioning assumptions, values and beliefs. • **Democratising the process of knowledge production is critical** and can be delivered **by requiring the integration of diverse types of knowledge** (including non-scientific, contextual, tacit knowledge from stakeholders' experience). • Transdisciplinary processes are **time- and resource-intensive** and may **not deliver rapid, countable impacts** but can **lay the basis for systemic, transformational change.**	Area • Researchers & end users • Project, Programme Timing • Scoping • Set up • Implementation

	• Include **knowledge brokers to work as connectors** (e.g. Climate Knowledge Brokers).	

6.1.4 Focus area 3: Foster innovation

Recommendation	Explanation	Inclusion in CLARE
3A- Invest in developing and implementing **innovative approaches** to capacity strengthening. • Focus on enabling social learning, learning by doing & action. • **Move beyond central focus on climate researchers.**	• CLARE needs to be explicit and specific about the capacity strengthening objectives of a call and issue some calls that exclusively focus on capacity building, including through novel partnerships. • Incentivising **creativity and innovation can be achieved through commissioning models that promote diverse** teams and **by outlining specific criteria in funding calls** (e.g. demand-based action research, fostering two-way learning, led by a knowledge broker). • CLARE should encourage the use and development of **collective sense-making tools** (e.g. participatory scenarios & social labs by Reos Partners) & **cutting-edge methodologies** such as **adaptation pathways** (e.g. CSIRO), **experiential learning games** (e.g. Red Cross Red Crescent Climate Centre), **theatre of the oppressed, storytelling and community listeners' clubs** (e.g. FAO).	Area • All areas Timing • Set up • Implementation
3B- Foster experimentation and risk taking. • Allow for **small-scale experiments** that leave the design and modality of capacity strengthening in the hands of the participants.	• Offering **small opportunity funds** (e.g. FRACTAL and START) for exploring different modalities, to target candidates, followed by larger grants for good-performing candidates, accompanied by mentorship can help to strengthen proposals, for organisational development. • The required scale of transformational change **needs extensive experimentation and learning**. CDKN achieved this through a light touch, experimental and phased approach (funding shorter experimental projects over time) • To experiment effectively requires a strong **learning lens, with adaptive management.** • Gaps were identified with respect to organisations and work in the Fourth Industrial Revolution, experience of incubators and support platforms targeting enterprises, insights from impact venture capitalists, change	Area • Researchers & organisations • Project, Programme Timing • Set up • Implementation

	management experts and others (consider for additional scoping).	
3C- Foster **unusual partnerships** that bring in new, diverse skills and expertise, and promote **mutual learning.** • Promote collaborations across **different disciplines and types of expertise through transdisciplinary approaches.** • **Crowd in the private sector.** • Explore partnerships with **activists and the media.** • Encourage collaborations with **universities and schools.**	• There is a needed to partner with diverse sources of expertise outside the climate field **e.g. behavioural psychology (for influencing decision-making), political economy (engaging with interests), Monitoring, Evaluation and Learning (MEL), complexity and systems thinking, social and institutional change.** • **Partnerships with business schools and leadership thinkers** should be explored (e.g. the School of International Futures, Wasafiri). • **Partnering researchers with adaptation/climate resilience projects** enables the monitoring of effectiveness of interventions and provides research findings and lessons that can be shared (e.g. CSIRO approach, ICCCAD's master's programme). • **Partnering researchers with practitioners and decision-makers** enables learning from tacit knowledge about implementation (E.g. IIHS fellowship, PlanAdapt, AGNES). • **Partnering researchers with development implementer**s can help climate proof interventions. (e.g. working with DFID's country offices, learning from CSIRO support to Australia's ODA programmes) • **CLARE should target the next generation** through curriculum development, mentorship programmes and competitions that foster climate awareness and research skills through student-led community projects (e.g. SARUA, HSTA, IIHS) • There is a need to invest in the establishment of **new ways of working and communities of practice** (e.g. MAPS programme) • Research centres and funding sources in the private sector could be crowded in based on mutual objectives.	Area • All Timing • Set up • Implementation

6.1.5 Focus Area 4: Address imbalances of power

Recommendation	Explanation	Inclusion in CLARE
4A- Prioritise Southern researchers & organisations through **preferential selection criteria, designing governance structures that shift responsibility to** Southern organisations & applying targeted **& alternative funding approaches.**	• There is a need to identify and target Southern candidates that are less resourced and less established but that have the potential, with capacity strengthening support, to take over Principal Investigator roles over time (e.g. AAS and CIRCLE). • There is a need to offer opportunities for northern researchers to develop their capacities and sensibilities for working in the global South. • CAAST NET+ and other ERA-Net programmes demonstrated potential alternative funding approaches through co-financing from national sources (from EU and countries in the South) for international research consortia, which can enhance ownership and address power imbalances.	Area • All Timing • Scoping • Set up • Implementation
4B- Strengthen **Southern organisations' technical** capacities to successfully accommodate the necessary researchers **and operational capacities** to manage projects and remain sustainable in the long term.	• **"Non-earmarked" core funding** can address systemic deficiencies within organisations (e.g. IDRC through TTI and DFID through the PPA approach). • Facilitating **Southern organisations as leads** and ensuring consortia are made up of **diverse Southern voices** (e.g. CIRCLE and LUCCC) can be achieved through modifying selection criteria in funding calls.	Area • Standalone pillar & cross-cutting • Organisations • Project, Portfolio Timing • Scoping • Set up • Implementation
4C- Exert influence over broader institutional barriers such as academia's favouring of publishing over applied research for improved decision making. Targeted advocacy engagements should be explored.	• Structural barriers hinder evidence-informed decision making. • **Researchers face a dilemma**: there is pressure to produce the professions' valued outputs but also to show the public benefits of their work (e.g. supporting decision makers to better address the complexities of climate change). • A number of countries have started considering the value of **engaged scholarship** alongside academic publishing (e.g. South Africa).	Area • Standalone pillar & cross-cutting • Organisations • Project, Portfolio Timing • Scoping (interrogate key barriers) • Set up

	• From an **ethical point of view**, there is an obligation to ensure that adaptation research results in social benefits.	• Implementation
4D- Invest in platforms that **bring together and amplify critical voices from the South** and enable South-South collaborations and networks.	• **Southern critical voices** are in short supply, over-subscribed and **platforms are needed to amplify** their voices and **bring them together.** • Investing in existing **South-South networks** is a way to foster South-South collaborations, knowledge exchange and learning (e.g. LUCCC, ARUA and AEN). • **CLARE should consider funding a gathering of established critical thinkers/voices from the South to work with DFID and IDRC to brainstorm key features and principles** for CLARE's approach to capacity strengthening. • There is a need to strengthen the links between the Intergovernmental Panel on Climate Change (IPCC) and Southern researchers.	Area • Individuals, Organisations Timing • Scoping • Set up • Implementation

6.1.6 Focus Area 5: Co-design, track, assess & learn

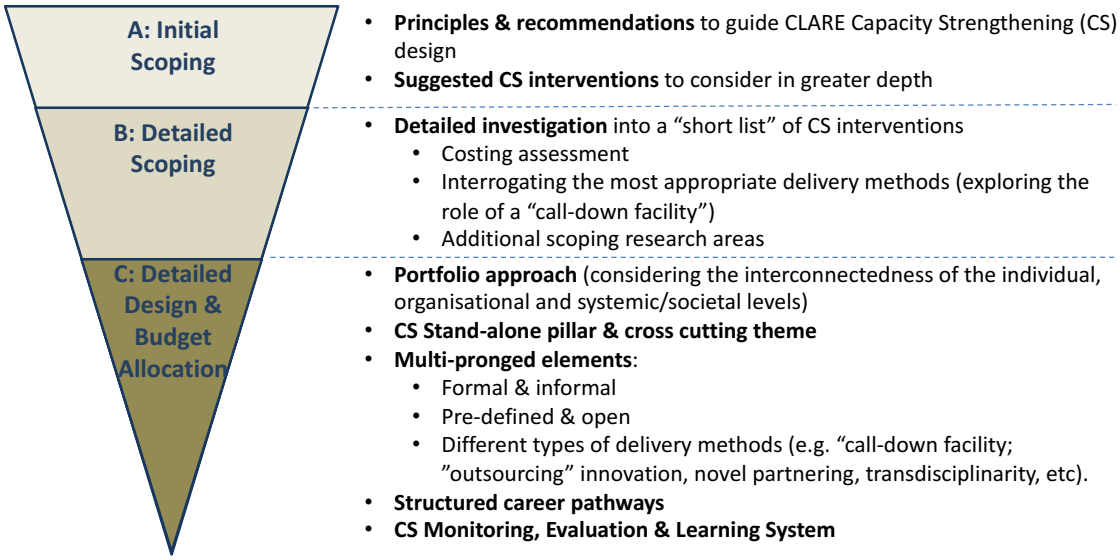
Recommendation	Explanation	Inclusion in CLARE
5A- Promote the **co-design and co-definition of participants' capacity strengthening needs,** to ensure **support is demand-led and tailored,** and reflective of **different starting points.**	• A starting point should be to employ dedicated capacity strengthening / **education/ pedagogy & MEL experts** to help design & set up CLARE's capacity strengthening pillar (including MEL approaches) • There is a need to conduct **baseline assessments** of researchers' **skills,** their aspirational **learning needs**, their preferred capacity strengthening **modalities**, and **organisational constraints**, track these over the project lifespan (AfriCLP) and FCFA). • Success of a capacity strengthening initiative depends on **setting up a collaborative design process, which considers the starting conditions** of the individual/organisation, their needs and aspirations (lessons from PPA). • A strong focus on **adaptive learning and reflection**, will shed light on the most appropriate mechanisms. • A good example of this is the benchmarking survey for BRECcIA Co-Is/PIs	Area • Standalone pillar & cross-cutting • Individual, organisations • Project, Programme, Portfolio Timing • Scoping • Set up • Implementation • Consolidation

5B- Invest in MEL approaches that are equipped **to capture the evolution** of capacity strengthening during a project to make the case for **value for money** of an intervention. • Enable a **flexible & adaptive** approach. • For long term, sustained impact promote **institutionalisation** of practices.	• Investing in MEL approaches that adequately capture **quantitative indicators**, combined with **rich qualitative storylines** (ASSAR) can illustrate and differentiate the **evolution of impact** (AfriCLP). • There is **limited information** on investments in and **effectiveness of capacity strengthening** for climate change resilience. • **Tracking and publicly reporting on the impact** of funds invested in capacity strengthening is needed to ensure the broad community of actors investing in research for climate adaptation and resilience in Africa can align, avoid gaps and duplication of effort, and deliver a more efficient, effective and transformative collective effort. • **Institutionalisation** refers to the inclusion of the new knowledge, tools and practices in operation manuals or procedures of organisations to ensure capacity strengthening approaches become engrained and remain active after the completion of a project.	Area • Start up: Indicators, frameworks and methodologies can be co-produced • Project, Programme, Portfolio Timing • Set up • Implementation • Consolidation

6.2 Proposed next steps towards the design of CLARE's Capacity Strengthening interventions

This study represents the first step towards the design of the capacity strengthening components of the CLARE Programme. It is beyond the scope of the study to provide concrete recommendations regarding specific interventions to undertake, their extent and what budget and resources to allocate to each. This section aims to inform how the findings and recommendations of this report should be taken into subsequent scoping and ultimately into the final detailed design and budget allocation of CLARE.

Figure 2: Steps towards the design of CLARE's capacity strengthening interventions



6.2.1 A: Initial scoping (this study)

This study confirmed the value of a long-term, portfolio approach with respect to capacity strengthening needs. If there was a single most dominant reflection from interviewees, it would have to be the imperative of long-term investments in capacity strengthening, and hence the importance of CLARE being implemented over a ten-year time horizon and designing the portfolio approach accordingly. Such time horizon opens up possibilities that would not be possible in shorter, project-based approaches.

The study further found evidence to support both a standalone pillar (where capacity strengthening is the primary objective) and a cross-cutting theme (where capacity strengthening is mainstreamed into all aspects of CLARE) to deliver the necessary capacity strengthening. CLARE should establish mechanisms, budget, time and space to bring together different components to enable learning and sharing of experiences between different portfolio components.

This study focused on principles and recommendations to guide the design of specific capacity strengthening interventions. These should be used as a basis for agreeing on a "short list" of preferred interventions and subsequent scoping activities, as outlined below.

6.2.2 B: Detailed Scoping

The next phase of scoping work should focus on further refinement and prioritisation of the capacity strengthening interventions based on a detailed investigation into a "short list". Various tasks need to be undertaken as part of this process. This study proposes a costing assessment (to build on initial

efforts to try and track financial flows associated with climate change research capacity strengthening) and a number of specific additional scoping research areas.

Costing assessment

A detailed assessment of the costs associated with capacity strengthening interventions is needed to further prioritise and then resource those included in CLARE's capacity strengthening standalone pillar. Cost should by no means be the only criterion used in determining the relative emphasis placed on different interventions but could contribute to an understanding of gaps (where less funding has been directed) and the extent of funding that CLARE could commit to different activities. Such an assessment was not possible based on a high-level mapping exercise conducted as part of this study and thus a deeper dive may be desired, with the following objectives:

- To identify capacity strengthening funding gaps that could be bridged by CLARE;
- To assess the relative costs of different capacity strengthening interventions based on experience to date; and
- To inform the prioritisation of, and levels of investment in, different interventions to be included within CLARE.

Initially, it is suggested that a short list of capacity strengthening interventions or programmes is developed, informed by the outcomes of this study. Rather than aiming to give a holistic picture of who is funding what in this sector, the idea would be to zero in on the spread of funding allocations to climate change capacity strengthening for selected programmes or capacity strengthening modalities (types). The research would seek to classify these funding values according to pre-identified "budget items" related to capacity strengthening.

<u>Potential approach:</u>

The tracking of financial flows related to climate research capacity strengthening, in this study, revealed a number of challenges. There is a clear lack of publicly available information due to M&E complexities associated with attributing capacity strengthening to specific spending (especially where capacity strengthening is not the primary objective of an intervention) and due to a lack of priority afforded to capacity strengthening. Therefore, the required quantitative data can only be extracted from direct stakeholder engagement.

It is suggested that a questionnaire be designed and sent to the select funders to better understand this granularity of funding. This could be followed by semi-structured interviews to better appraise some qualitative aspects of these funding streams and assess where gaps exist. Finally, an

appreciation of the scale of funding required for a given capacity strengthening intervention will help in determining the relative extent or budget thresholds of different interventions to be delivered by CLARE.

Interrogation of the most appropriate delivery methods

The short list of options can inform how best to deliver these within CLARE. An interrogation of methods should consider formal and informal approaches. Formal approaches may be favoured in the stand-alone pillar and represent more tangible interventions where capacity strengthening represents one of the primary objectives (e.g. fellowships, secondment or mentorship programmes, peer learning). Informal approaches, where capacity strengthening is a by-product, are more likely to be a result of the cross-cutting theme. For example, capacity strengthening may arise from undertaking co-production processes, research or participatory stakeholder engagement activities. Exploring informal approaches requires that a capacity strengthening lens be applied to the current activities planned under CLARE to unpack where capacity strengthening will likely be delivered but is not the primary objective. This should inform MEL system design and contribute to an appreciation of, and commensurate commitment to, positive capacity strengthening outcomes.

Various delivery methods will need to be adopted. One mechanism that has been explored is a potential "call-down facility", which is further discussed in **Box 12**. Further work is required to better understand this potential and how the design of the facility might be amended to maximise the potential capacity strengthening benefits[7].

Box 12: Exploring the role of a "call down facility" in delivering capacity strengthening benefits through CLARE

A call down facility is a potential mechanism to deliver capacity strengthening interventions included in both the stand-alone pillar and cross-cutting theme.

Some examples to be considered include:

1. **Centralised strengthening of broadly relevant skills.** The facility could act as a mechanism to deliver capacity strengthening interventions that are applicable across projects and programmes. If the capacity required, or the method of strengthening the capacity, is generic (i.e. relevant across projects and programmes) it may be more efficient to deliver these interventions in a centralised way. An example could include training related to co-production

[7] It is recognized that the call down facility, as conceptualized at the time of this study, is envisaged to have a role that is broader than just delivering CLARE's capacity strengthening components.

approaches or how to respond to a call. The disadvantage of this approach is that the service provided will not be tailored to each participant and is therefore likely to be less cognizant of their different starting points, and consequent needs.

2. **Centralised provision of services.** The call down facility could provide a mechanism to deliver certain services to plug skills gaps in the short term. Over time, through learning by doing and additional targeted interventions, these skills and capacities would be developed "in-house". For example, operational capacities related to HR or accounting could be provided as a service to organisations on a limited time basis. This would need to be coupled with specific interventions to transfer the skills and build up the resources of those organisations to be able to undertake those operational tasks in-house, on a sustainable basis. A strong, on call, mentorship or advisory programme, could help in this respect (and may be desirable throughout the duration of CLARE, such as was provided by TTI).
3. **Centralised repository of tools and other resources, for example:**

- A source of templates and teams that can assist in drafting terms of reference (TOR) / calls that can drive innovation, transdisciplinary approaches, etc.
- A source of templates and other resources to further research into use (e.g. for communications outputs).
- A smart repository of potential service providers that projects and programmes can draw on. "Smart" in this context refers to functions that provide an objective assessment of skills and expertise, strengths and weaknesses, suitability for different types of working arrangements, etc. This would assist users in identifying and drawing on the most effective service providers for a given research requirement.

4. **A platform to drive innovative capacity strengthening.** An example could be a service provider network or platform that facilitates the coming together of the most appropriate teams for a given piece of work (driven by an explicit call / TOR that requires a particular combination of skills and experience).

- This should look to iteratively build on the kinds of networks that currently exist at small scales. For example, current consortia / teams assemble themselves based on a) experience of working with people in past projects and b) seeking referrals / recommendations from their networks with appropriate skills to fill team gaps. As suggested in this report, more innovative partnerships are required to address climate challenges in more holistic, transdisciplinary ways. This platform could aid in suggesting a range of different partners that provide new and required skills in this regard.

Additional scoping research areas

A number of additional scoping activities are proposed, based on the findings of this study.

Expand the scope of researchers and organisations that can contribute to the delivery of CLARE's objectives

- Investigate the research and capacity strengthening projects and programmes outside of the typical climate adaptation and resilience space. Identify specific individuals and organisations that can plug gaps or deliver cutting edge solutions related to CLARE's objectives. These could include, for example:
    - Organisations researching the Fourth Industrial Revolution;
    - Incubators and support platforms targeting enterprises of relevance to CLARE (e.g. social entrepreneurship);
    - Leadership, institutional innovation, social change, design and systems thinking experts.
    - Impact venture capitalists investing in businesses offering products and solutions that will meet the demands of customers in decarbonising and adapting markets; and
    - Change management experts and behavioural psychologists exploring ways to effect change.

Better understand the "cutting edge" of Monitoring, Evaluation and Learning (MEL) for capacity strengthening

- Investigate what is required for capacity strengthening MEL systems specifically. Attention should be paid to approaches that can measure and evaluate capacity strengthening that results from activities where it is not necessarily the primary objective.
- Draw on an assessment of efforts to identify best practice MEL of capacity strengthening in other disciplines / sectors (this study attempted to do this but due to time and resource constraints, was not able to reach the required level of depth). This should include a broader set of interviews with MEL specialists.
- Following the next iteration of the CLARE design, a detailed benchmark and capacity strengthening needs assessment should be undertaken.

Further unpack North-South dynamics

- Further investigation is needed, at this point, to understand the systemic barriers to having more southern leadership.
- This should draw on a facilitated dialogue involving established critical thinkers / voices in the South (as outlined in Focus Area 4).

Explore gender dimensions of CLARE's objectives and identify where capacity strengthening needs to focus on women in particular. Key questions include:

- How do we ensure capacity strengthening efforts are gender-transformative and empowering for less-represented groups (for women, ethnic groups, etc.)?
- How do we empower women researchers to have the confidence to challenge more senior academics to be recognised for their work?
- How do we assess women-specific challenges/differences and then consider how to design capacity strengthening programmes that tailor support for women?
- How do we ensure gender-sensitivity is mainstreamed in all projects to ensure they are not perpetuating entrenched gender inequality?

Explore opportunities for CLARE to support climate change work in the humanitarian sector, where there is a paucity of research capacity or funding in refugee hosting countries.

6.2.3 C: Undertake detailed design and budget allocation

A portfolio approach can also contribute to a greater consideration of the interconnectedness of the individual, organisational and systemic/societal levels to ensure that capacity strengthening interventions are targeted, integrated, coordinated and ultimately address the challenges for which they are designed. The design of the portfolio approach should be explicit about a phased, flexible approach, indicating which components will be funded at what time, how different components relate to one another, and how they inform the design and iteration of one another.

There is no capacity strengthening "silver bullet", thus calling for the need to include a multi-pronged approach. The design needs to include both formal and informal approaches, pre-defined and open arrangements, and various methods through which capacity strengthening is delivered. This is necessary to ensure research is fit-for-purpose, innovative, flexible and leads to positive climate adaptation and resilience outcomes in Africa.

A sustained, diverse portfolio, with an explicit objective of promoting the career development of its diverse cohort, is likely to enhance the likelihood of impact during the ten-year time horizon of CLARE, capitalise on its phased approach and promote sustainability of impact and upscaling. Given that a criticism of project-based approaches is that they do not support medium to long-term career development of participants, and many project beneficiaries are lost to the system, CLARE should prioritise establishing career pathways for its participants. This could include:

- Providing opportunities for master's graduates to move on to PhDs and then take up early-career opportunities within the programme towards its end.
- Similarly, PhD students could move on to funded post-docs and mid-career level positions as part of CLARE. In both this and the previous example, CLARE fellowships for both master's and PhD students may include a condition to commit to being part of the programme for a number of years, but with the provision of sufficient flexibility to either remain in one organisation, or move across organisations or countries.
- Similarly, senior researchers may be enabled to move into roles as PIs over the CLARE lifespan.
- Career pathways should not be limited to academia, but also foster more collaboration between researchers and users. This could be done by inserting conditions (as part of fellowships) to undertake secondments in government or boundary organisations for certain periods of time. Such opportunities may appeal to individuals wanting to move into new career areas, such as from research into policymaking or into the NGO space and vice versa. But they should be promoted, as part of the need to shift into the age of implementation.

This study has begun to identify and motivate for the capacity strengthening "spaces" that need to be created. These "spaces" encompass not only the types of capacity strengthening interventions but also the nature in which they should be designed and delivered. The next iteration of scoping and design work should look to determine the scale (relative emphasis and associated budget) of each of these spaces. This should be informed by the additional work outlined above and undertaken with reference to the principles and recommendations put forward in this report.

Given the complexity of the challenges at hand, and the need to catalyse action at scale and speed, bold funding approaches will be required that move away from an obsession with attribution of piecemeal impact, to participating in bringing about transformational impact, which no single portfolio can claim full attribution over, but may lead us closer to where we need to be heading.

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8 ANNEXURES

8.1 Annex 1: Programmes, projects, initiatives and organisations included in this scoping assessment

The following tables do not represent a complete picture of what each programme, project, initiative or organisation has done that is of relevance to climate change research capacity strengthening. Rather they represent the elements associated with each programme, project, initiative or organisation that were included in this assessment and informed the findings and recommendations of this study.

Table 2: Programmes, projects, initiatives and organisations included as primary, secondary and sister programme assessments in this study

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
Primary	ACDI (African Climate and Development Initiative)	Organisational, Researcher	Master's programme, Fellowship, Training, Curriculum development	Africa	GLEF, WRC, AXA, ARUA CD,

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
Primary	AEN (African Evidence Network)	Researcher, Organisational	Network, workshops	Africa	Various
Primary	AIACC (Assessment of Impacts and Adaptation to Climate Change project)	Researchers	National assessments of climate change impacts, vulnerabilities, and adaptation, learning by doing	Africa, Asia, Latin America, SIDS	Various
Primary	ACCFP (African Climate Change Fellowship Programme)	Researchers, End-users	Fellowships, Workshops, Trainings	Africa	IDRC
Primary	AfriCLP (Africa Climate Change Leadership Program)	Researcher, End-users: Policymakers & Practitioners,	Fellowships	Africa	IDRC

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
Primary	AGNES (The African Group of Negotiators Expert Support)	Researchers, Negotiators	Workshops	Africa	IDRC
Primary	ARUA (African Research Universities Alliance)	Researcher, Cross-cutting	Enhance research and training in its member universities across the continent, workshops.	Africa	Various
Primary	BRECCIA	Researchers, End-users	Co-creation of research, scholarships (?), funded fieldwork for ECRs	Ghana, Kenya, Malawi	Various
Primary	CAAST NET+ - Science, Technology and Innovation Cooperation Between Sub-Saharan Africa and Europe	Researchers	Workshops (targeting African researchers interested in joining EU-based partners)	Various within African and European Unions	Various

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
Primary	Climate Smart Villages (Research Program on Climate Change, Agriculture and Food Security)	Researchers, End-users	Participatory action research, Learning by doing, Peer learning, Workshops	West Africa, East Africa, South Asia, Southeast Asia and Latin America	CGIAR
Primary	Community listeners' clubs	Communities, Researchers	Workshops, radio shows	Democratic Republic of Congo, Niger, Burundi, Mauritania and Senegal	FAO
Primary	CR4D (Climate Research for Development in Africa)	Researcher, End-users	Fellowship run with the AAS, platform to bring together stakeholders	Africa	Various
Primary	CSIRO approach (Commonwealth Scientific and Industrial Research Organisation)	Researchers, End-users	Co-production, Learning by doing, Triple-loop learning, adaptation pathways	Australia, Asia-Pacific	Various

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
Primary	GCRF (Global Challenges Research Fund) - Growing Research Capability	Researchers	Enhancing Africa's scientific and institutional capacities, collaboration and interactions	Africa	Supported by UNECA (United Nations Economic Commission for Africa), ACPC (African Climate Policy Centre), AMCOMET (African Ministerial Conference on Meteorology), WMO (World Meteorological Organisation), and GFCS (Global Framework for Climate Services)
Primary	HSTA (Health Sciences and Technology Academy)	School students	Training, summer camps, mentors, community-based after school clubs	United States	Various

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
Primary	IIHS (Indian Institute for Human Settlements) work	Researchers (incl. ECRs), End-users, Practitioners, Professionals	Fellowships, Training, Curriculum development, Workshops, Technical support to government, Research	India	Various (e.g. Bill and Melinda Gates Foundation, Rockefeller Institute, SDC, IDRC, DFID)
Primary	LUCCC (Least Developed Countries Universities Consortium on Climate Change)	Researchers, University Students, Organisations	Networks, Conferences, Curriculum development, teaching programmes, joint research	LDCs	Various
Primary	MAPS programme (Mitigation Action Plans and Scenarios)	Researchers, End-users	Tools, methods & models; equity and climate negotiations; implementation, Scenario Building Teams	Brazil, Chile, Colombia, India, Peru, South Africa	CDKN; Danish Ministry of climate, energy and building; Swiss Agency for Development and Cooperation SDC; PNUD; The Children's Investment Fund Foundation; Helvetas; Low emission capacity

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
					building programme; IDB; US|AID; EU; Australian Government; Santander
Primary	NAP Global Network	End-users	Peer learning exchanges, Networks, Targeted Topic Forums, Knowledge Clinics	Developing countries	Various
Primary	PlanAdapt	Advisors, Researchers, Experts, Professionals, End-users	Mentoring programmes, Matchmaking app, learning toolkits, online and offline learning, learning by doing	Africa, Asia	Various
Primary	Rainwatch - Walker Institute	Researchers, End-users	Monsoon, rainfall monitoring and early warning systems	Burkina Faso, Chad, Ghana, Guinea, Mali, Mauritania, Niger, Nigeria, Senegal,	Walker Institute's AfClix (University of Reading)

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
				Sierra Leone, Sudan, The Gambia	
Primary	SARUA (Southern Africa Research Universities Alliance)	Researchers, Organisational	Curriculum development, Networks	Southern African Development Community (SADC)	Various
Primary	START – strengthening capacities to advance sustainability	Organisational, Researchers	Fellowships, Research, Integrating skill building and networking with opportunities for experiential learning	Africa and Asia	United States Global Change Research Program
Primary	Think Tank Initiative	Organisational, Researchers	Organisational core funding, research skills and methods, training (e.g. on policy engagement and	Uganda, Nigeria, Guatemala, India, Bangladesh, Sri Lanka, Senegal, Paraguay,	Hewlett Foundation, DFID, Bill & Melinda Gates Foundation,

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
			communication), general organisation and effectiveness, peer learning, mentorship, advisory support	Tanzania, Ethiopia, Honduras, Bolivia, El Salvador, Ecuador, Peru, Nepal, Kenya, Ghana, Rwanda, Bolivia, Pakistan	Ministry of Foreign Affairs of the Netherlands, Norad, IDRC
Secondary	Programme Partnership Arrangement	Organisational	Core funding	Afghanistan, Ethiopia, Niger ia, Pakistan and Uganda	DFID
Secondary	CKB Group (Climate Knowledge Brokers)	End-users	Access to quality information, call to action	Global	REEEP, CDKN
Secondary	Climate Outreach Science Comms	Cross cutting, Communicators, Researchers, End-users	Partner with leading academic teams to research central questions about climate change communication and	UK	European Climate Foundation, HT and LB Cadbury Charitable Trust, Joseph Rowntree Charitable Trust, KR Foundation, Polden Puckham Charitable Foundation, The Ratcliff

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
			translate this work into practical resources and workshops for our partners.		Foundation, Wates Family Enterprise Trust
Secondary	The Africa Academy of Science Affiliates programme, AESA (Accelerating Excellence in Science in Africa)	Researchers	Fellowship, Supports the development of promising African early and mid-career scientists into world class research leaders	Africa	Various
Secondary	UKCDR African Fellowships mapping exercise	Researchers	Fellowship, research capacity strengthening community of practice which brings together UK funders and project	UK based, data covered Africa	NA

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
			managers with interest in international development		
Secondary	Wellcome Trust's African Institutions Initiative	Researchers	Fellowship	Africa and Asia	Wellcome Trust
Secondary	WASCCAL (West African Science Centre on Climate Change and Adapted Land Use)	Researchers	Graduate Studies Programme, (GSP) and In-service Training (including research grants).	West Africa	German Federal Ministry of Education and Research (BMBF), WASCAL is implemented in a collaborative effort by West African and German partners.
DFID Sister Programme	AgMIP (Agricultural Model Inter-Comparison and Improvement Project)	Researchers	Strategies for agricultural development and adaptions in the wake of climate change.	Sub-Saharan Africa and South Asia	DFID

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
			Engagement and collaboration.		
DFID Sister Programme	CARIAA (Collaborative Adaptation Research Initiative in Africa and Asia)	Researchers, Organisational, End-users	Research, Scholarships, Trainings, Mentorship, Learning by doing, Funded fieldwork, Experiential learning	Africa, Asia	DFID and IDRC
DFID Sister Programme	CCMCC (Conflict and Cooperation in the Management of Climate Change)	End-users: Policymakers and NGOs	Research, Workshops	Africa, Asia	DFID, NWO-WOTRO
DFID Sister Programme	CIRCLE (Climate Impacts Research Capacity and Leadership Enhancement)	Researchers, Organisational	Fellowship, Training	Sub-Saharan Africa	DFID

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
DFID Sister Programme	ESPA (Ecosystems Services for Poverty Alleviation)	Researchers, Facilitators	Advancement of scientific knowledge, deliver evidence-based policy and investment decisions.	Africa, Asia, Latin America and Caribbean regions	DFID, Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC).
DFID Sister Programme	FCFA (Future Climate for Africa)	Researchers, End-users Organisational	Research, scholarships, training, embedded researchers, learning labs	Botswana, SA, Mozambique, Zimbabwe, Namibia, Zambia, Malawi, Tanzania, Kenya, Rwanda, Uganda, Burkina Faso, Senegal	DFID, UKRI, Natural Environment Research Council

Assessment category	Programme, Project, Initiative, Organisation	Elements considered in this study		Countries / Region	Funder/s
		Target level (e.g. researcher, organisational, end user, cross cutting etc.)	**Capacity strengthening modalities** (e.g. fellowship, workshop, training etc.)		
DFID Sister Programme	SHEAR (Science for Humanitarian Emergencies and Resilience)	Researchers, End-users	Supports improved disaster resilience and humanitarian response by advancing the monitoring, assessment and prediction of natural hazards and risks	Sub-Saharan Africa and South Asia	DFID, NERC
DFID Sister Programme	WISER (Weather and climate Information and Services for Africa)	Researchers, End-users, Cross-cutting	Enhance the resilience of African people and Africa's economic development to weather-related shocks.	Africa	DFID, W2-SIP, Daraja and Rwandan Green Fund-FONERWA

Table 3: Programmes, projects, initiatives and organisations included in the funding flows assessment of this study

Assessment category	Programme, Project, Initiative, Institution
Funding Flows Assessment	Adaptation Finance: Linking Research, Policy and Business
Funding Flows Assessment	Africa Academy of Science Affiliates programme - AAS mentorship scheme
Funding Flows Assessment	Africa Climate Change Adaptation Initiative (ACCAI)
Funding Flows Assessment	Africa Climate change fund (AACCF) (2018 programme)
Funding Flows Assessment	Africa Higher Education Centers of Excellence Project
Funding Flows Assessment	African Capacity Building Foundation (ACBF Strategy 2017–2021)
Funding Flows Assessment	African Centre of evidence (ACE)
Funding Flows Assessment	African Climate Policy Centre (ACPC)
Funding Flows Assessment	Assessments of Impacts and Adaptations to Climate Change (ABACK) in Multiple Regions and Sectors
Funding Flows Assessment	Building Stronger Universities II - SUZA

Assessment category	Programme, Project, Initiative, Institution
Funding Flows Assessment	Building Stronger Universities III - KNUST
Funding Flows Assessment	CLAP- Africa programme
Funding Flows Assessment	Common Market for Eastern and Southern Africa (COMESA)
Funding Flows Assessment	Education and Research to Improve Climate Change Adaptation (ERICA)
Funding Flows Assessment	First Africa Higher Education Centers of Excellence for Development Impact
Funding Flows Assessment	Higher Education Support Project for Burkina Faso
Funding Flows Assessment	NAP global Network - Peer Learning & Exchange programme (NAP Global Network's Targeted Topics Forums + Peer learning summits + SS Peer exchange awards)
Funding Flows Assessment	Next Einstein Initiative Foundation (UK), United Kingdom: Mathematical sciences for climate change resilience (MS4CR)
Funding Flows Assessment	Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED) - Water and Society (WaSo-Africa) –Water Management and Climate Change Adaptation in the Nile Basin.
Funding Flows Assessment	Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED) - Water and Society (WaSo-Asia) – Water management and Climate Change adaptation in Sri Lanka, Bangladesh and Cambodia
Funding Flows Assessment	One Planet Women strengthening research and leadership skills of African women at the intersection of CC and AFS

Assessment category	Programme, Project, Initiative, Institution
Funding Flows Assessment	Paris Committee on Capacity Building
Funding Flows Assessment	REACH: improving water security for poor people
Funding Flows Assessment	Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL)
Funding Flows Assessment	Strengthening, through partnerships, of the contribution of academic actors to sustainable human development, of Cambodia_ARES "Renforcement et valorisation, par des partenariats, de la contribution des acteurs académiques au développement humain durable du Cambodge_ARES"
Funding Flows Assessment	University of Johannesburg-led programme to Build Capacity to Use Research Evidence (UJ-BCURE)
Funding Flows Assessment	Wageningen Centre for Development Innovation
Funding Flows Assessment	Water and Energy Security in Africa – WESA

*Note: all programmes, projects, initiatives and institutions were included in the assessment of funding flows and donors. Those in the “Funding Flows Assessment” category were only considered, at a high level, as part of this sub-component of the scoping study.

8.2 Annex 2: Study Interviewees

#	Contact person	Organization	Relevance
1	Obed Ogega	AAS	CIRCLE
2	Frank Rutabingwa	ACPC	CR4D, ClimDev Africa, WISER
3	Yosef Amha	ACPC	WISER, CR4D
4	Verity Buckley, Ben Prasadam-Halls and George Lakey	ACU	CIRCLE, various
5	Judy Omumbo	AAS	CR4D, various
6	James Murombedyi	African Climate Policy Centre (ACPC)	Various
7	Bruce Hewitson	CSAG, UCT	FRACTAL (FCFA)
8	James Butler	CSIRO	General
9	Nick Brooks	DAI	Cross-cutting scoping study and workshop design
10	Ken De Souza	DfID	CLARE
11	Rachel James	Environmental Change Institute, University of Oxford	FCFA

12	Saleemul Huq	ESPA / IIED / ICCCAD	Various
13	Bruce Currie Alder	IDRC	CLARE and CARIAA
14	Georgina Cundill-Kemp	IDRC	CLARE and CARIAA
15	Edith Ofwona	IDRC	AGNES
16	Peter Taylor	IDRC / TTI	General
17	Amir Bazaz & Chandni Singh	IIHS	Part of ASSAR, strengthening capacities in India
18	Daniel Morchain	IISD	NAPs, country strengthening
19	Eva Ludi	International Water Management Institute	CARIAA
20	Kate Schreckenberg	King's College London	Ex-ESPA Director
21	Benjamin Apraku Gyampoh	KNUST, Ghana	CIRCLE
22	Katharine Vincent	Kulima	DECCMA project & others
23	Declan Conway	London School of Economics (LSE)	UMFULA (FCFA)
24	Dr. Revocatus Twinomuhangi.	Makerere University Centre for Climate change Research and Innovations (MUCCRI)	Coordinator of round three of ACCFP at University of Dar
25	Blane Harvey	McGill University	Programme Design/Functions scoping study

26	Fiona Percy	NIRAS	CARE
27	Paul Watkiss	Paul Watkiss Associates	Value for money scoping study
28	Jon Lawn	Southampton Univ.	BRECCIA (under GCRF GROW)
29	Beth MacKay	SSN	FCFA
30	Shehnaaz Moosa	SSN - CDKN	General
31	Jon Padgham	START	Capacity Strengthening Expert
32	Mary Thompson-Hall	START	ASSAR
34	Mariama Camara	START/WACSAL	Project manager at START and an alumnus of WACSAL
35	Anjal Prakash	TERI/ Ex ICIMOD	General
36	Rondrotiana Barimalala	UCT	FCFA (UMFULA)
37	Leigh Cobban	UCT - ACDI	Various
38	Mark New	UCT - ACDI	Various
39	Mark Tebboth	UEA	Tyndal
40	Edmond Totin	University of Benin, ex-ICRISAT	CCAFS, general
41	Chris Gordon	University of Ghana	General
42	Fatima Denton	UNU	General

43	Ros Cornforth	Walker Institute, University of Reading	FCFA, RainWatch
44	Carina van Rooyen	African Evidence Network	AEN
45	Mzime Murisa	START	CIRCLE, TWAS, ACCFP, FRACTAL
46	Chris Jack	CSAG, UCT	FRACTAL
47	Alice McClure	CSAG, UCT	FRACTAL
48	George Wamukoya	AGNES	AGNES
49	Wilfried Pokam	University of Yaounde	CR4D, FACFA – IMPALA/UMFULA
50	Michael Gerhard	SSN	Various
51	Martin Rokitzki & Jessse DeMaria-Kinney	PlanAdapt	Various
52	Eunice Muthengi & Leah Mwai	East Africa Research Hub, DFID	Deltas Initiative

8.3 Annex 3: Additional findings

Box 13: AfriCLP - Developing leaders in policy, practice and research, sustainability of impact and MEL

The three-year African Climate Change Leadership Programme (AfriCLP) seeks to develop leadership capacity for long-term adaptation to climate change in Africa. Launched on the back of two previous programmes funded by IDRC (managed by the University of Nairobi and the University of Dar es Salaam), AfriCLP sought to build on the capacities developed under these programmes, contribute to their sustained impact and take capacity strengthening to the next level by selecting the top candidates in these cohorts and enrolling them in a rigorous training programme aimed at developing exceptional leadership skills.

To do this AfriCLP was designed around three integrated streams - policy, practice and research – which comprise 10 fellows each. Running in parallel, the three streams bring together policy advisers, practitioners and researchers, that go through various trainings to enhance their leadership capabilities in their respective fields and to enable learning – and collaboration – across the streams.

Another key feature of the programme is the approach to monitoring, evaluation and learning (MEL), which seeks to supplement quantitative indicators, with systematically collected qualitative data. A capacity baseline for the fellows was established at the start of the programme against which progress could be assessed. Fellows articulated their aspirational trajectory for the fellowship and where they wanted to be by its end and beyond, to identify the career development they were aiming for. To assist with MEL, a capacity strengthening, and leadership framework was developed against which to track the fellows' progress. Importantly M&E and data experts worked individually with fellows to accurately represent their development over the course of the programme. This approach has also allowed fellows to identify gaps in their development that require specific attention. The programme (which runs until 2021) has also sought to create links between the cohort and various bodies under the IPCC, to enable the long-term involvement of fellows in the IPCC.

Box 14: Assessment of Impacts and Adaptation to Climate Change (AIACC) project: "learning-by-doing"

The Assessments of Impacts and Adaptation to Climate Change (AIACC) project (2002-2007) aimed to develop a wide-ranging programme of assessments that would address knowledge gaps in key sectors, enhance scientific capacity in developing countries, and inform and support effective adaptation

planning. The AIACC project was jointly executed by the global change SysTem for Analysis, Research and Training (START) and The World Academy of Sciences (TWAS) on behalf of UNEP.

Twenty-four regional and national assessments of climate change impacts, vulnerabilities, and adaptation in Africa, Asia, Latin America, and small island states were developed under AIACC. These were conducted by multi-institutional teams of scientists, stakeholders and students from more than 50 developing countries, and were selected through merit review of submitted proposals and received endorsements from relevant GEF national focal points. The project produced more than 200 publications and provided critical inputs to the 4th Assessment Report of the IPCC, which contained more than 100 citations of AIACC publications.

Capacities were strengthened through a strong focus on developing working relationships, an emphasis on 'learning-by-doing', cross-project learning and sharing of methods, expertise, data and experiences, with strong technical assistance, training workshops, regional science and policy workshops, and engagement in international science and policy activities. Through execution of the assessments and participation in project capacity building and networking activities, the participating institutions and individuals gained scientific and technical capacity, and forged links between scientific institutions, key stakeholder organisations, and agencies responsible for policies related to climate change and the management of climate hazards.

A flexible, bottom-up management of the project devolved important responsibility to the developing country teams that executed the assessments. While a technical committee provided guidance, teams were given wide latitude to set their specific objectives, focus on sectors and issues of their choosing and select the methods and tools to be applied. This allowed for a high degree of innovation and matching of the focus and design of each assessment to the priorities.

Source: START and TWAS. 2007. Assessment of Impacts and Adaptation to Climate Change. Final Report of the AIACC Project.

Box 15: FCFA's approach to determining skill needs

Future Climate for Africa's (FCFA) Scientific Capacity Development (SCD) programme aimed to develop greater capacity in the scientific community to deliver demand-led, relevant and actionable information; stronger multi-disciplinary and international collaboration; and greater capacity of African scientists. The particular focus was on improving the individual capacity of ECRs within FCFA partner institutions, and to some extent, institutional capacity.

As part of the SCD strategy, a needs assessment was conducted in 2017 to establish initial ECR technical skills and competency needs at the outset of the programme, followed by subsequent surveys in 2018 and 2019.

The soft and hard skills that were viewed by ECRs to be the most useful for their climate work were paper writing, communication skills, and grant proposal writing; and data plotting and coding, respectively. The most significant needs expressed by ECRs included:

- Impact and research into action: Practical examples of engagement with policy makers, decision makers, or users of climate information.
- Knowledge Frontiers: Advancing frontiers of scientific knowledge within their field of expertise.
- Research generation: number of publications/proposals generated.
- Career advancement: number practical examples where new skills were acquired or used in subsequent job/research activities; new formal qualifications obtained.
- Scientific community: number of conference abstract submissions, conference presentations, new research collaborations formed.

Importantly, the surveys found that support received as part of the FCFA programme matched the needs identified.

To find out more: FCFA website Key contact: Beth MacKay.

Box 16: Promoting South-South training and capacity development: the "skills matrix" developed by the Building research capacity for sustainable water and food security in drylands of sub-Saharan Africa (BRECcIA) experience

BRECcIA conducted a thorough needs assessment of its ECRs to find out what they need to better manage a research project. All respondents indicated a desire to enhance provision in selecting and developing postdocs; building research teams and collaborations; managing diversity; and strategic thinking/influencing skills. However, these needs assessments also recorded their skills. From this exercise, a "skills matrix" was developed and used to encourage peer learning, which helps identify "matches" among the ECRs. It works through colour coding: fields that the ECRs know a lot about are highlighted in green and those where they require support are in red. Red highlighted areas reveal training/development needs, which BRECcIA meets through webinar series and invited guest speakers and COIs to provide training.

This system has also proved useful in promoting peer learning: although BRECcIA enabled some match making to some extent, many ECRs seamlessly found support among their peers. A similar process is being rolled out at the institutional level (pairing financial officers across universities/ university deans, etc.).

Box 17: Designing robust fellowship programmes – Lessons learned from the India Disaster Resilience Leadership Fellowship Programme

The India Disaster Resilience Leadership Fellowship Programme sought to strengthen leadership and the capacities of practitioners, private sector actors, government, early career researchers and professionals in urban or community-based disaster resilience in India. The fellowship sought to increase understanding of the role of strong and effective leadership in dealing with the devastating effects of disasters, the mitigation of their impacts and promoting resilient outcomes.

Run by the Indian Institute for Human Settlements (IIHS) and the Tata Institute of Social Studies (TISS), in collaboration with The George Washington University and with funding from the Bill and Melinda Gates Foundation, the fellowship was set up by first conducting a study on Disaster Resilience Leadership across the country. Development of the course curriculum, which took one year, included an assessment of 40 individuals/initiatives/institutions that were identified to demonstrate individual or institutional leadership in dealing with disasters in India. These assessments formed the basis of 40 case studies which enabled the development of principles for disaster resilience that were included in the teaching and learning materials of the course (including as case material videos). In addition, a number of the case study leaders joined parts of the course as discussants and teachers.

In this nine-month fellowship, 35 fellows were exposed to the political economy of disasters and developed hands-on skills in ideating and developing fundable community-based and urban-centric disaster resilience projects. The fellowship was structured around two residential one-week workshops that took place over four months; two field trips; and the development of an action plan for resilience building in a chosen area and scale of work, which they focused on between the two workshops. Through immersion in a working group, regular discussions were held on progress and course correction through Q&A-based webinar sessions with mentoring from faculty members from IIHS and TISS. 'Interactive dialogue' was a core mode of learning where fellows explored, debated and discussed contextualised case studies and team-based simulations were explored as part of curated, in-class activities.

To find out more: Course brochure.

Box 18: SARUA – curriculum development for capacity development

The Southern African Regional Universities Association (SARUA) is a membership network consisting of universities in the Southern African Development Community (SADC) with the aim of developing institutional and human capacity in universities to enhance the contribution of universities to the development of the region. The SARUA Programme for Climate Change Capacity Development has a particular emphasis on enhancing resilience and adaptive capacity for responding to climate change.

SARUA's Curriculum Innovation Network (SCIN) aims to develop capacity through curriculum development in the SADC region, with a specific focus on master's curricula through processes of co-creation. The first regional master's curriculum on climate change and sustainable development was launched in 2017, available open access in English, French and Portuguese. The initiative was a response to SARUA's capacity needs analysis that included 15 country case studies and identified the capacity gap at master's level that exists to address climate change and development in the region. Given the pressing need to broaden the stock of researchers working on climate change and development, this was envisaged as a key intervention for addressing this gap. In order to ensure master's curricula are fit-for-purpose in the different country contexts in SADC, curriculum capacity building workshops were carried out in Harare and Dar es Salaam to offer support to the 22 participating institutions to adapt and implement the master's curricula in each country. Although the curricula continue to be used, up until now, no additional funding has been invested and participants indicated the need for follow-up funding to build on the progress achieved so far.

Box 19: Using curriculum development to meet climate change researcher needs

Curriculum development is crucial for building the stock of the next generation of researchers in the South that are equipped to grapple with the challenges that face their societies. Not only is there currently a lack of researchers to take over from senior professors, but their academic training has generally failed to equip them with the necessary skills sets to excel working under uncertainty on complex problems. Or indeed linking their traditional disciplinary focus to that of others, which has been a trend within social sciences in most OECD economies. For many researchers in the South, their first opportunity to build their capacities, is their involvement in a research project or programme, usually with a northern research partner. A researcher from UMFULA raised the point that while such capacity strengthening is important, given the time and budget constraints of a single project, too great a burden is placed on a project if it is expected to build these types of capacities and deliver on the project at the same time. Traditional

research funding is not set up to deliver such 'on the job' training and there needs to be a broader base of researchers with these competencies that are equipped to learn-by-doing, but also contribute to a project's deliverables.

On a related point, another interviewee from a university on the continent indicated that a radical change in how university curricula are set-up and delivered would have a transformative effect on research capacities. A more modular approach to post-grad training is needed, along with demand-driven courses, personalised training, and fewer face-to-face lectures. SMass interactions can be done virtually to create space for more face-to-face interactions such as case study approaches and workshops for research tools. Modules could be split across universities (e.g. Bologna process) with exchanges and mobility to ensure researchers are trained in diverse environments, with varied subject matter and access to a broader more diverse range of critical thinkers.

But changing curricula is a long process and requires many government stakeholders to agree. Given that progress on this will be slow, it would be worth running other processes in parallel to support these aims. For example, working closely with schools through mentorship programmes and school competitions that foster climate awareness and research skills through student-led community projects could be an option.

Box 20: FRACTAL's Embedded Researcher model

Central to the challenge of enhancing climate resilience of southern African countries is ensuring this concept becomes incorporated in the development objectives of cities. For this to happen, varied approaches are required to enable researchers and decision makers to work collaboratively and in so doing learn from each other (Van Rooyen et al., 2019). To bridge the gap between scientists and decision-makers, the FRACTAL project facilitated the placement of seven early career researchers in the role of embedded researchers within six of the partner municipalities in southern Africa (Van Rooyen et al., 2019, p. 4).

FRACTAL's embedded researcher model and innovative learning processes (the "learning labs") were particularly strong at creating connections to make possible deep collaboration between universities and city departments, establishing strong relationships and networks made up of diverse individuals and backgrounds. Co-producing new knowledge and building a culture of learning built trust between participants and enhanced the receptivity to, and uptake of new knowledge. It was also notable in the way that it tailored capacity strengthening of individuals according to the organisational contexts they were situated in (Van Rooyen et al., 2019).

The FRACTAL experience in the city of Windhoek led to the development of the Integrated Climate Change Strategy and Action Plan. As a result of the learning process core to the project, strategic executives are now allocating city budget line items to learning spaces that cultivate horizontal co-learning, based on the learning lab experiences. Opening up ways of learning and capacity strengthening also fosters opportunities for diverse and sustained impact that is not limited to the scientific community. This may contribute to a more diverse form of upscaling that would not be possible by an overemphasis on the research community and research excellence. But perhaps the most fundamental learning from the embedded researcher model, was that it is not a recipe to cut and paste. Rather it represents a set of common principles that underpin emergent ways of working, that need to be tailored to a specific context, the impact of which is ultimately dependent on the openness to learning and unlearning of those involved. The 18-month extension of FRACTAL will explore less time and resource-intensive models for institutionalising learning and scaling up impact, and is a key area to watch.

Box 21: Immersion/exchange-based capacity building: African climate change fellowship program (ACCFP)

The ACCFP (2009-2011) was managed by START, in partnership with the Institute of Resource Assessment at the University of Dar es Salaam and the African Academy of Sciences (AAS) with financial support by the Climate Change Adaptation in Africa (CCAA) programme. ACCFP supported African professionals, researchers, educators and graduate students to enhance their capacities for advancing and applying knowledge for climate change adaptation in Africa through small grants that enabled them to visit "host institutions" where they collaborated with mentors to implement individually-designed projects.

Round 1 of the programme (2009-2010) was concluded by the formulation of research questions relating to knowledge gaps which guided the work of the fellows during round 2 (2011). By requiring that every fellow respond to one of more of these questions, the ACCFP aimed to link uniquely designed fellowship projects in their simultaneous attempts to address critical issues and contribute in meaningful and innovative ways to local, national, regional and international climate change adaptation discourses.

All ACCFP fellows participated in periodic programme workshops and seminars that include targeted training sessions to add value to the research experience. The capacity strengthening assets of the programme resided in the training of researchers by researchers; for instance one of the fellows taught crop modelling techniques to other researchers at his home institution, after having mastered this skill during his one-year fellowship with host supervisors at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Bamako, Mali.

Box 22: PlanAdapt's Capacity Development Approach

PlanAdapt, a global network-based not-for-profit organisation, promotes a decentralized approach to 'Capacity Development (CD) for Effective Adaptation' that follows a set of underlying principles:

- CD should be long-term (i.e. at least one-year learning programmes);
- CD activities should be embedded in the learners' daily professional activities and should be governed by the learning conditions and aspirations of the learner him/herself. The learner should be in the driving seat, with trainers, coaches, mentors adjusting to the speed, required content, pre-knowledge of the learner (demand-driven);
- CD should be trust-based, contextualised and culturally sensitive;
- CD should focus on a smart mixture of offline/ face-to-face, coaching, training, collective sense-making and online/ e-learning;
- CD should use the latest findings given pedagogy and didactics;
- Adaptation Science contributes to the knowledge pool for effective adaptation. However, it remains important to capture and integrate the more hands-on and tacit knowledge of practitioners. More work is needed to develop knowledge products and CD materials that incorporate knowledge from both sources.

PlanAdapt's CD approach focuses on a networked-approach that facilitates two-way learning exchanges between (a) experienced advisors, researchers and experts and (b) professionals in climate-sensitive sectors in the Global South that grapple with real-world adaptation challenges. For example, this may include a global mentoring programme for learners in the Global South that can choose an experienced mentor through a match-making app; or learning toolkits that offer a range of customizable online and offline learning which the learner will customize to suit his or her needs. PlanAdapt aims to develop various forms of match-making tools to support this customised and innovative learning by professionals who are not usually exposed to climate risk management and adaptation knowledge (e.g. port managers, foresters, structural engineers that operate in climate hotspots).

The approach attempts to go beyond the institutional or professional role of an individual by also addressing the individual's values, aptitudes, convictions and personal agency. This would mean that methods that integrate personal motivations into collective action and sense-making will be used (e.g. participatory scenario planning, innovation and social labs, theory-U based approaches, serious games). Adaptation in most cases is a combined creation of a private and public good. This is the base for PlanAdapt's methods that aim to speak to and mobilize the learners' ambitions to go beyond the professional role, by reaching out to and influencing professional and non-professional peers.

To find out more: PlanAdapt's website. Key contact: Martin Rokitzki.

Box 23: The importance of networks - African Evidence Network

The AEN brings together a broad spectrum of practitioners, decision makers and researchers who are concerned with evidence-informed decision-making (EIDM) in Africa. The Secretariat to the AEN is the African Centre for Evidence at the University of Johannesburg. The network has three focus areas: synthesising and producing evidence base; capacity sharing for production and use of evidence; and networks (Stewart, 2018).

At the core of the capacity strengthening mission is understanding it as a process in which all participants bring a variety of capacities and engage in a process of exchanging these with one another.

Underlying the AEN's work on capacity strengthening is the importance it attributes to the role of networks of individuals and organisations, which includes their ability to build shared understandings across actors that make up the evidence ecosystem, the ways in which they enable growth in capacities, and their role in enhancing readiness for change (Stewart, 2018). In addition, networks are able to connect otherwise isolated individuals or organisations with peers in their field. Establishing communities of practice within networks is a new area of development for the network, which are envisaged to be smaller and tailored towards specific research areas for collaboration.

The network also hosts the Africa Evidence Week and webinars, which are opportunities for individuals and organisations to connect virtually and share their experiences of supporting EIDM on the continent.

Box 24: AGNES – strengthening Africa's position in the UNFCCC through evidence

The African Group of Negotiators Expert Support (AGNES, 2015-2023) aims to bring together negotiators and scientists to enhance the use of evidence as the basis for negotiation positions of the African Group of Negotiators under the UNFCCC. Scientists prepare position papers for every UNFCCC meeting and present these in pre-SBSTA and pre-COP meetings, where negotiators interrogate the evidence presented to them and translate it into negotiating language. This has improved issue-based negotiating stances of the AGN and allowed them to take lead roles in negotiations around key issues for the continent such as agriculture and gender. Emphasis on two-way learning is key to AGNES. By embedding scientists in negotiating delegations, they are exposed to the demands and limitations of evidence in the negotiations; while the capacity of negotiators to work with scientists and make better use of evidence to inform their positions is also enhanced. This learning has been supported by the relationships and trust that have

gradually been built and through establishing an appreciation for the different roles that each play. Consistency of relationships has also assisted with enhancing the consistency of negotiating positions which is a key part of enabling long-term impact in the negotiations. AGNES provides a valuable example of how pooling diverse skills and connecting them through relationship building enhances impact. Ultimately the experience of AGNES highlights the need for specific vehicles for evidence to influence high-level policy processes. Establishing what is politically feasible, and packaging evidence accordingly increases its likelihood of having impact.

Box 25: Research projects need to be rooted in government to contribute to implementation- The case of Tamil Nadu's Urban Sanitation Support Programme

The Tamil Nadu Urban Sanitation Support Programme (TNUSSP) has been aiding the Municipal Government of Tamil Nadu in its Sanitation Mission since 2015 by improving urban sanitation through demonstrating innovations in two model cities and then scaling it up across the state. Funded by the Bill and Melinda Gates Foundation, the Indian Institute for Human Settlements (IIHS) supports the government through three Technical Support Units (at the state level, and in the two model cities), in partnership with three NGOs, all under the coordination of the Directorate of Town Panchayats.

The type of support provided has been wide-ranging and targeted at multiple scales and sectors, with the inter-disciplinary research partnership providing planning support; information on innovations, tools and appropriate technologies; undertaking institutional, regulatory analyses and behavioural studies in communities to address behaviour change across the sanitation supply chain; undertaking innovative community engagement activities; as well as knowledge management and rigorous monitoring of the success of its activities (see for example an assessment of its training programmes).

Not only have capacities been strengthened as a result of working together to address these different priority areas, but capacity strengthening has also been a structured, standalone activity. This started with a training needs assessment of the key actors involved in the sanitation supply chain, aimed at identifying organisational structures, staffing capacity, human resource competencies and training needs in the state's urban institutions. Masons and government officers at the urban level were the two key priority target groups for which tailored trainings were organised. For the government staff, an activity-based orientation programme focused on practical, operational aspects of planning, and included group work aimed at tackling urban sanitation challenges along the value chain. It also included one domestic and international field visits to understand and propose the changes required in rules, regulations and other implementation solutions for their cities. For masons, it included a one-day practical training aimed at improving building procedures.

The success of these diverse activities has led to the Tamil Nadu Government scaling out the work in other cities in the state, based on the lessons learned in the two model cities. Success factors included a relatively long-term (five-year) project with structured components (studies, tools, knowledge products in different areas) aimed at institutionalising systems and protocols in government structures, which are demonstrated by innovation and testing in two pilot cities. Researchers have provided subject expertise, but have also strengthened several process-related skills (e.g. facilitation, communications) that could enable them, in future, to become trusted government advisors and a community of influencers.

To find out more: Project website, Summary brief. Key contact: Kavita Wankhade.

Box 26: Learning from the approaches used in CCAFS Climate-Smart Villages

Climate-Smart Villages (CSVs) are sites where farmers, researchers, practitioners and other partners explore and test different climate-smart options for that village (e.g. climate-smart technologies, climate information services, local development and adaptation plans, supportive institutions and policies). The principles that guide the activities revolve around participatory action research aimed at developing tailored and context-specific measures, which the communities (particularly vulnerable groups within them) choose; generating evidence in real-life settings; working in areas where there are existing relationships between partners; exploring holistic approaches that may be scaled. Lessons between CSVs are shared through peer learning, and training of trainers is one of the modalities used for scaling.

To find out more: Climate-Smart Villages brochure (including contact details).

Box 27: Peer learning is most effective when long-term and embedded in broader processes – Learning from the (NAP) experience

The NAP Global Network supports developing countries in advancing their National Adaptation Plan (NAP) processes, including through the facilitation of sustained South-South peer learning and exchange. Since 2015, eight Targeted Topic Forums (TTFs) enabled representatives from 23 countries to share their technical know-how, exchange discussions about progress and challenges, and inspire each other to make advances in their respective NAP processes. They covered topics ranging from sectoral and vertical integration to financing, gender, strategic communications and M&E. Each country participated in these multi-day events through a three-member team composed of a climate change focal point, Ministry of Finance or Planning representative, and a sectoral representative (e.g. from agriculture). This meant that trust and support could develop over time both among the country representatives (across ministries that

were often not yet collaborating closely on the NAP process) and across the overall cohort of peers that reconvened annually for four years.

The highly interactive TTF processes were framed around (i) a technical pillar that included expert presentations and discussions, (ii) a relational pillar in which peers exchanged experiences, and (iii) a reflexive pillar which encouraged reflection and the development of take-home messages based on the lessons learned from both the technical content and the peer exchanges (Fischer and Harvey, 2019). TTFs linked theory and practice and aimed to make participants think strategically, whilst also practically, about NAP implementation and national adaptation planning and action at home. Importantly, participants' reflection processes from each TTF enabled the NAP Global Network to adjust, build on and keep improving each subsequent event, as well as further tailoring the support they provided to countries in between the TTFs. For example, one of the resources that the group requested was a guide that summarized the different facilitation methods used during the TTFs (e.g. knowledge clinics, participatory timelines, world cafes, etc.) to enable country representatives to facilitate more purposeful, interactive and effective meetings back home, given the need for NAP processes to foster collaboration across a range of diverse stakeholders (Fischer and Harvey, 2019). Knowledge clinics, in which participants presented real challenges being faced in adaptation planning and implementation in their countries, and received feedback from peers and experts, also encapsulated the essence of these exchange processes.

TTFs were part of a larger capacity strengthening process, which also included the provision of knowledge products and practical case materials, resources for taking action at the national level (following the lessons emerging from the TTFs), and expert advice from staff members of the Network Secretariat or through more targeted technical assistance.

To find out more: NAP Global Network. Key contact: Anne Hammill.

Box 28: Fostering different types of collaboration

It may be worth exploring linkages between ECRs' work and community listeners' clubs (CLC) – established by the FAO, to provide a space for information and knowledge sharing, discussion and collective decision-making. "The concept is to encourage everyone – especially women and youth – to become more involved in the economic, social and political decisions that affect their lives, livelihoods and communities. The CLC meet regularly and choose a theme or topic of interest which can range from updated agricultural practices, land issues, water access or nutrition, to HIV prevention. Subsequently, a journalist or facilitator prepares an interactive radio programme based on the chosen topic, which is aired in local languages via community or rural radio – a good way to reach remote communities in Africa." This is the type of platform through which ECRs could root their research questions, linking with stakeholders / users engagement.

8.4 Annex 4: Mapping financial flows and actors targeting climate change research capacity strengthening

This section maps a range of programs and funding windows related to capacity strengthening for climate change research, both recently completed and ongoing. Rather than an exhaustive picture, this information provides a snapshot of the funders and executers of climate change research programmes and when available, the volumes of funding. This information essentially stems from the programmes that were investigated in detail, for the purpose of unearthing valuable insights for the scoping study.

Research limitations and inherent challenges to sizing the value of needs and interventions

This mapping exercise did not aspire to be exhaustive, as doing so would require a much greater and dedicated research effort. Generating an overall picture of development assistance for research, in general, is challenging, let alone for capacity strengthening for climate change research. Research often does not figure as a distinct sector in development assistance. Research rather finds itself embedded in aid budgets under education. Education allocations in turn remain generic and tend not to feature specific research for early or mid-career researchers. And capacity building is an inherently cross-cutting issue. Furthermore, where organisations have little focus on research, it will be categorised according to the sector under which the research is conducted, such as agriculture. It has therefore proved difficult to retrieve data on the major donors of capacity strengthening for climate change research in the OECD DAC statistics[8].

Regardless of the lack of data, the volume of development assistance for research would also not convey a realistic picture of the landscape of development assistance in this field (let alone with a focus on climate change research capacity strengthening), as a general definition of what is considered to be support to research remains lacking. The criteria used to classify what is a research project can vary across organisations and, very often, a focus on 'pure' research excludes strengthening the capacity of researchers. Expenditure is also likely to be a weak indicator of the volume and quality of research produced, given the huge variation in the costs of employing

[8] A study conducted by the Overseas Development Institute in 2007 gives a broad indication of the heterogeneity of donors funding development research (across sectors). The study reveals that the Bill and Melinda Gates Foundation was the largest funder to development research in 2006, followed by USAID, European Union, IRD, DFID, Wellcome Trust, Sida, Medical Research Council UK, IDRC and World Bank. This highlights the variety in funders for research, with foundations, national governments, multilateral organisations and research councils all present in the top ten funders.

researchers in different countries, and the extent to which researcher's overheads and other costs are covered by other sources of funds.

An important caveat pertains to the definitional ambiguity of public spending on climate change actions and the complexity of public funding flows. Actual expenditure often ends up being difficult to track. Any research on climate finance flows tends to look at allocations to support "hard" (mitigation or adaptation) projects as opposed to capacity strengthening. Ideally, ODA allocations to climate actions should be tracked but in many developing countries a significant amount of international funding does not pass through the national budget. Instead, funding is often managed and partly consumed by northern development partners, including universities, whose capacity (both institutional and individual) is already better established than their development partners, or counterparts, in the global South.

Even international publications dedicated to tracking financial flows into climate change adaptation or mitigation often don't make room for capacity building in this field. Fairly recently the Overseas Development Institute (2016) scanned public spending on climate change according to whether they contributed to mitigation or adaptation[9], with no consideration given to financial allocations to capacity building of climate research. Similarly, a 2007 UNFCCC report on *Investment and financial flows to address climate change*[10], a background paper on analysis of existing and planned investment and financial flows relevant to the development of an effective and appropriate international response to climate change, does not provide any information on climate research capacity strengthening investments.

Lastly, broad statements on a programme's allocations to capacity strengthening do not spell out what portion is allocated to research capacity development, so the financial information provided might be the reflection of the entire programmatic investment as opposed to the research capacity development portion only.

Despite these caveats, a reasonable picture of current funding flows in the sector of interest could be generated, based on the programmes that were looked into to inform the report. This

[9] Overseas Development Institute 2016. Public spending on climate change in Africa

[10] United Nations Framework Convention on Climate Change. 2007. Investment and financial flows to address climate change. Available from: https://unfccc.int/resource/docs/publications/financial_flows.pdf

information was further enriched with a review of individual donors' support to capacity strengthening for climate change research, when this information could be found.[11]

This assessment found quantitative information for 23 of the 40 programmes listed (see Annex 1), totalling over £2bn. In reality, this is a crude indicator and should, at best, be described as a mix of 'direct and indirect' support for climate change research capacity building. In particular, that £2bn figure is heavily skewed by including all £1.5bn of the GCRF funding. However, since climate change is an inherently cross-cutting and global challenge, arguably all GCRF-supported research projects have a climate change element.

This study was unable to calculate the value of the *funding gap*. Defining and measuring the value of investment needed to build sufficient research capacity to address climate change is practically impossible, as it is subject to the range of issues and caveats discussed in this section.

Lead donor organizations in capacity strengthening for climate change research.

Financial institutions

The World Bank has, since the turn of the millennium, recognised the importance of capacity building in science, technology and innovation for achieving the MDGs and reducing poverty (World Bank, 2007). Among the climate research capacity strengthening funded by the World Bank, the research identified the following: the Africa Higher Education Centres of Excellence Project, the First Africa Higher Education Centres of Excellence for Development Impact and the Higher Education Support Project for Burkina Faso.

In 2008 the African Development Bank issued a Strategy for Higher Education and Technology that was aimed at accelerating sustainable economic growth through capacity development and strengthening science and technology in African countries (AfDB, 2008). The Bank funds the Africa Climate change fund (AACCF).

[11]Some donors' information portals have the same limitations as described above and would for instance only allow research criteria for "post-secondary education" (see for instance GIZ' search platform https://www.giz.de/projektdaten/index.action?request_locale=en_GB and searches often yielded mitigated results)

Multilateral donors

Multilateral donors involved in funding included the United Nations Economic Commission for Africa (UNECA) (which funds the African Climate Policy Centre), the Global Environment Fund (Assessments of Impacts and Adaptations to Climate Change (AIACC) in Multiple Regions and Sectors).

Another important donor that shapes the agenda for development assistance for research is the European Commission. The European Development Fund (EDF) is one of the core European instruments for providing technical and financial assistance to developing countries. The 11th (and current) EDF (2014-2020) has allocated 60 million euros to objective 1.5: "contribute to the improvement of ACP countries' development policies, research and innovation and TVET capacities" (including inter alia "multi-disciplinary evidence-based studies on development and research and innovation policies carried out and disseminated"). However, research capacity building does not feature as an isolated component. Additionally, the funding for climate change, resilience building and the environment do not have a dedicated allocation for research in these fields (save for capacity building aimed at institutions and MEA secretariats to implement MEAs)[12]. It remains difficult to extract what specifically pertains to climate research capacity strengthening.

Bilateral donors

With regards to European countries' development aid allocation to capacity strengthening for climate change research, the research identified the following leading players:

- The Belgian Development Cooperation funds a programme called "Strengthening, through partnerships, of the contribution of academic actors to sustainable human development, of Cambodia (ARES)".
- The Ministry of Foreign Affairs of Denmark, through which Denmark's development cooperation (DANIDA) funds the Building Stronger Universities in Zanzibar and in Ghana.
- The German Federal Ministry for Education and Research funds the Water and Energy Security in Africa – WESA, the West African Science Centre on CC and adapted land use (WASCAL), the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL), the CLAP- Africa programme.
- The Norwegian Ministry of Foreign Affairs, which has a dedicated Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED), and which funds the Water and Society (WaSo-Africa) –Water Management and Climate

[12] Intra-ACP Cooperation, 11th EDF, Strategy Paper and Multiannual Indicative Programme, 2014-2020. Available from: . https://ec.europa.eu/europeaid/sites/devco/files/intra-acp-strategy-11-edf-2014-2020_en.pdf

Change Adaptation in the Nile Basin and the Water and Society (WaSo-Asia) – Water management and Climate Change Adaptation in Sri Lanka, Bangladesh and Cambodia.

- The UK Government has pioneered the integration of research into traditional Official Development Assistance (ODA). Most significantly, DFID funds the 1.5bn Global Challenges Research Fund (GCRF), where impact-oriented funds are managed by various academic Research Councils to invest in cutting-edge research that addresses the challenges faced by developing countries, in partnership with southern universities. As such, strengthening the capacity of applied researchers and their hosting organisations is an intrinsic objective of the GCRF. Funds are disbursed via calls, several of which have an explicit focus on climate change research capacity strengthening, such as the Building Research Capacity for Sustainable Water and Food Security in Drylands of Sub-Saharan Africa (BRECCciA) and SWIFT (Walker Institute).
- In September 2019 the UK announced a new £1bn 'Ayrton Fund' to be jointly managed by DFID and BEIS, which will operate in a similar fashion to the GCRF, i.e. UK-led impact-oriented research projects with southern partners. However, the focus is exclusively on research and innovation for clean energy technology and access, as part of commitments to mitigate climate change.
- The UK also funds the University of Johannesburg-led programme to Build Capacity to Use Research Evidence (UJ-BCURE), REACH: improving water security for poor people; Future Climate for Africa (FCFA).

USAID funds the Education and Research to Improve Climate Change Adaptation (ERICA), the IDRC funds the “Adaptation Finance: Linking Research, Policy and Business” programme and the Africa Climate Change Leadership Program (AfriCLP) (as well as other programmes featured under mixed funding below).

Several programmes are multi-donor funded, such as:

- the One Planet Women strengthening research and leadership skills of African women at the intersection of CC and AFS (Bill & Melinda Gates Foundation, the BNP Paribas Foundation, and the European Commission & IDRC and AWARD).
- the Think Tank Initiative (DFID, BMGF, Min. of foreign affairs of the Netherlands, Hewett Foundation, NORAD, IDRC)
- the Next Einstein Initiative Foundation (UK), United Kingdom: Mathematical sciences for climate change resilience (MS4CR) (IDRC and UK)

- the NAP global Network - Peer Learning & Exchange programme (United States, Environment and Climate Change Canada, and Germany's Federal Ministry for Economic Cooperation and Development

A mapping of African-UK Partnerships in Physical Sciences was undertaken recently and shows programmes focused on physical sciences (which includes climate and weather research capacity strengthening, alongside Big Data and Artificial Intelligence (AI), Facilities and Energy). Although there is a wider focus here, this picture gives some further indication of these funding trends.