ARA Evidence Review 2

GOOD PRACTICES FOR ADAPTATION ACTION RESEARCH

Adaptation Research Alliance

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PlanAdapt
Creating a Climate for Change

* PlanAdapt is an independent global network-based organisation that provides knowledge services in support of effective, economically just and socially inclusive climate change adaptation and climate risk management around the world, with a particular focus on the Global South.

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Abbreviations

AFD	Agence Française de Développement
AR	action research
ARA	Adaptation Research Alliance
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters
BRICS	Building Resilience in Chad and Sudan
CBA15	Conference on Community-based Adaptation to Climate Change
CBNRM	community-based natural resource management
CBO	community-based organisation
CCAFS	Climate Change, Agriculture and Food Security
CFF	C40 City Finance Facility
CGIAR	Consultative Group on International Agricultural Research
COMPACT KZN	Central KwaZulu-Natal Climate Change Compact
COP26	26th Conference of the Parties
CSA	climate-smart agriculture
CSO	civil society organisation
CSP	climate service provider
DANIDA	Danish International Development Agency
DARAJA	Developing Risk Awareness through Joint Action
DFID	Department for International Development
EbA	ecosystem-based adaptation
EWS	early warning system
FCDO	Foreign, Commonwealth & Development Office
FFEM	French Facility for Global Environment
FRMC	Flood Resilience Measurement for Communities
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HIGHWAY	High Impact Weather Lake System
IFAD	International Fund for Agricultural Development
IFRC	International Federation of Red Cross and Red Crescent Societies
KASRB	knowledge, attitudes, skills, relationships, and/or behaviour
KDI	Kounkuey Design Initiative
LDC	least developed country
MEL	monitoring, evaluation and learning
MHT	Mahila Housing Trust
MRED	Managing Risk through Economic Development
NAP	National Adaptation Plan
NGO	non-governmental organisation
PAR	participatory action research
PAU	Programa de Agricultura Urbana
PAS-PNA	Projet d'Appui Scientifique aux processus de Plans Nationaux d'Adaptation
TAL	Terai Arc Landscape
TRMP	Transformative River Management Programme
USAID	United States Agency for International Development
WISER	Weather and Climate Information Services for Africa
WOTR	Watershed Organisation Trust
WWF	World Wide Fund for Nature

Executive summary

For climate change adaptation to be effective, it needs to be context-specific and driven by both social and environmental considerations. Adaptation must also be based on the ever-evolving field of climate change science, and able to incorporate new research and knowledge continually throughout the adaptation process. Research can help to inform adaptation actions towards incorporating predicted changes in the climate, potentially reducing the risk of maladaptation, as well as enhance the understanding of climate risks and their interactions with other societal risks. For these reasons, the role of research is central to successful climate change adaptation. Action research (AR) can provide a well-established framework for linking adaptation research to practice. It refers to a broad field of research focused on two objectives: contributing to the practical concerns of people in a problematic situation and advancing social science. AR offers a promising means of ensuring that adaptation meets the requirements of ever-changing local social and environmental contexts.

To catalyse increased investment and capacity for action-oriented adaptation research, the **Adaptation Research Alliance** (ARA) was officially launched at the 26th Conference of the Parties (COP26) in Glasgow in 2021. The global coalition of researchers and practitioners believes that a new paradigm of action-oriented research is needed to inform effective adaptation, which is southern-led, collaborative and co-developed. The Alliance has designed six **Adaptation Research for Impact Principles**, which should help to overcome the barriers in adaptation research, such as a disconnect between research and the needs of the most vulnerable, or limited learning from implementation.

This report showcases evidence of adaptation AR in practice while offering preliminary insights into how the principles emerge and interact in particular contexts. The findings are based on an analysis of twenty projects and initiatives which have – intentionally or not – incorporated the principles into some elements of their work on adaptation. The projects that were scrutinised predominantly have a primary focus on research outcomes, while others are action projects that have a complementary or aligned research component. Directed by a set of indicators, the analysis is aimed to generate a better understanding of how the principles can be operationalised in different ways. This should enable funders, actors and scholars to integrate the principles into their work by learning from existing projects and experiences.

JC McIlwaine/UNMISS

The analysis showed that the projects sit along a **continuum** where some tend to meet the criteria for several of the six ARA principles simultaneously, with others less so. Even though the number and selection of projects only display a very limited spotlight in the vast areas of adaptation AR projects, **climate information services** and **early warning systems** had a high occurrence or focus among both rural and urban projects. Some adaptation projects utilized a **multi-sectoral approach**. For example, BRACED (Building Resilience and Adaptation to Climate Extremes and Disasters) – and its component project BRICS (Building Resilience in Chad and Sudan) – focuses on agriculture and food security, public health and hygiene, as well as gender sensitivity in practices, in addition to early warning systems. Similarly, the Urban Flood Resilience project in Kibera, Kenya concerns itself with several gaps in the informal settlements of Nairobi, such as economic opportunities, attention to early childhood development and community empowerment, in addition to physical and natural solutions for flood risk mitigation.

While some projects have been initiated from the bottom up and attracted donor **funding** and multiple institutional partners during their tenure, such as the Mukuru Special Planning Area (SPA) process in Mukuru, Kenya; others have had to stop, or reduce their activities, when external funding is no longer available or is reduced. This is true of the Terai Arc Landscape programme in Nepal and the Climate-SDG Integration project in Maharashtra, India. At the opposite end of the spectrum is an initiative such as PhytoTrade, which is financially self-sufficient in its operations and delivers on several of the criteria, simultaneously. Projects that applied **participatory approaches** and aimed for a close collaboration of researchers and the most vulnerable, by putting their needs and voices at the centre, often fulfilled multiple principles. This can be seen in the Mahila Housing SEWA Trust's project on Women's Action towards Climate Resilience for Urban Poor in South Asia in Ahmedabad, India.

Moreover, projects and initiatives that were rated as exemplary in fulfilling one of the principles, almost always incorporated similar values into their project design or research process **right from the beginning**. The intentional integration of criteria at the beginning of the programme design is therefore crucial to succeeding in intended outcomes. When the principles are put into practice, there are often **overlaps and strong synergies** between them, showing how the application of one or more principles often leads to the facilitation of another.

Along with the consultation of academic and grey literature, the authors present good practices for operationalising and applying Adaptation Research for Impact Principles. Such practices include the following:

Principle ① Research is needs-driven, solutions-oriented and leads to a positive impact on the lives of those at risk from climate change (Who or what is the research for?)

Placing vulnerable people and their needs at the core of the project ensures that research is demand-driven and solutions-oriented. Operating only on demand of communities, as in the case of the Chinantla Forest Monitoring project in Oaxaca, Mexico, ensures that activities address the needs of the beneficiaries and creates ownership and leadership. This increases the likelihood that activities are taken forward independently after the project cycle has ended. Collaborating with local partners, such as civil society organisations (CSOs) that have been rooted in the community for many years (as in the case of the Mahila Housing SEWA Trust in Ahmedabad) allows for problem identification based on the community's needs.

Principle ② Research is transdisciplinary and co-produced with users (How should research be carried out?)

Finding innovative and democratic ways for incorporating the voices and views of local communities enables their participation in the research process as equal partners. The Urban Flood Resilience project by the Kounkuey Design Initiative in Kibera and the Mukuru Special Planning Area (SPA) process by the Muungano Alliance in Mukuru are examples of co-producing research with stakeholders, and thereby incorporating elements of transdisciplinarity. Additionally, involving local CSOs in meaningful and co-creative ways helps researchers to learn from those who are closest to the lived experience of climate change and vulnerability.

Principle ③ Research emphasises societal impact (How is research valued?)

This principle relates to the accountability, relevance and rigour of research produced to have not only a scientific impact, but also societal impact. Knowledge partnerships between different actors increase the uptake of co-benefits, as seen in the Transformative River Management Projects in eThekwini (Durban), South Africa, where economic benefits (for example, creating jobs) and environmental benefits (for example, improved waterways) were created. The Buffelsdraai Landfill Site Community Reforestation Project, also in eThekwini (Durban), offered a triple-win opportunity for addressing biodiversity loss, carbon sequestration and enhancement of ecosystem services through land restoration.

Principle ④ Research builds capacity and empowers actors for the long term (What can research enable?)

To ensure that research outputs have long-term impact, they should go beyond strengthening the capacities of individuals by informing changes within organisations or policies. For example, the PAS-PNA (Projet d'Appui Scientifique aux processus de Plans Nationaux d'Adaptation) project in Benin and Senegal strengthens the national science–policy interface, working collaboratively with scientific institutions, universities and government agencies to integrate informed research data into policy planning.

This kind of collaboration has been institutionalised in the region of KwaZulu-Natal in South Africa by creating the Central KwaZulu-Natal Climate Change Compact (COMPACT KZN), a multi-level platform facilitating interaction between researchers and cities. Also, the Climate-SDG Integration project produced case studies of ecosystem-based adaptation (EbA) in India and Guatemala to inform policy processes, while the Terai Arc Landscape project in Nepal informs national planning policies to ensure long-term activities. Additionally, sharing and disseminating research outcomes with a wider audience through, for example, application-oriented toolkits as well as toolkits in local languages, enhance the broader uptake of findings and lessons learned.

THE ADAPTATION RESEARCH ALLIANCE (ARA) HAS DESIGNED SIX ADAPTATION RESEARCH FOR IMPACT PRINCIPLES, WHICH SHOULD HELP TO OVERCOME THE BARRIERS IN ADAPTATION RESEARCH, SUCH AS A DISCONNECT BETWEEN RESEARCH AND THE NEEDS OF THE MOST VULNERABLE, OR LIMITED LEARNING FROM IMPLEMENTATION.

ADAPTATION RESEARCH FOR IMPACT PRINCIPLES

- **P1** Research is needs-driven, solutions-oriented and leads to a positive impact on the lives of those at risk from climate change.
- **P2** Research is transdisciplinary and co-produced with users.
- **P3** Research emphasises societal impact.
- **P4** Research builds capacity and empowers actors for the long term.
- **P5** Research processes address structural inequities that lead to increased vulnerability and reduced adaptive capacity for those at risk.
- **P6** Learning-while-doing enables adaptation action to be evidence-based and increasingly effective.

Principle ⑤ Research processes address structural inequities that lead to increased vulnerability and reduced adaptive capacity for those at risk (How can research address root causes of risk?)

Within adaptation research, different drivers of vulnerability should be considered as vulnerable people are located within a complex system where different causes of risk interact. Such vulnerability can be gender-based, economic and political, with particular social groups facing an intersectionality of multiple vulnerabilities, preventing them from meaningful participation towards shaping adaptation action. The Muungano Alliance in Mukuru, the Kounkuey Design Initiative in Kibera, and the Watershed Organisation Trust (WOTR) in India integrate the multiple ways in which the climate crisis overlaps and intersects with public health risks, sanitation needs, food security and the nutritional needs of communities. Additionally, being inclusive of vulnerable and marginalised voices and incorporating their perspectives into the research process can go some way in addressing root causes of vulnerability. For example, a gender-transformative approach in the BRICS project enabled the participation of women stakeholders as key informants in the research process.

Principle ⑥ Learning-while-doing enables adaptation action to be evidence-based and increasingly effective (How can research–action links be strengthened?)

A rigorous monitoring, evaluation and learning (MEL) process is a key component in ensuring that actions are evidence-based. Feedback loops by stakeholders and practitioners enables constant improvement of activities while also informing the theoretical development of frameworks for uptake and upscaling. For instance, evaluation of projects at intermediate phases can inform and improve ongoing project processes, while impact assessments and feasibility studies can feed into new programme design. In the BRICS project, researchers build on learning from decades of development practice while collaborating with local organisations, remaining flexible towards learning feedback from stakeholders, implementers and partners. Projects such as Developing Risk Awareness through Joint Action (DARAJA) – in Nairobi, Kenya, and Dar es Salaam, Tanzania – incorporated regular feedback in their pilot phases, while the Managing Risk through Economic Development Phase-II (MRED-II) Programme in Nepal and Timor-Leste, was able to measure positive impacts on their communities, through various activities and measures, during the second phase of the project.

Further analysis is needed to get a better understanding on the processes and enabling factors that lead to impactful outcomes. This paper can be used as a starting point to further operationalise the principles in exchange with researchers and practitioners, including agreed definitions of key terminology and development of indicators. The outcomes of this paper should be consolidated with practitioners, in order to understand and learn from the finer details on how project outcomes were achieved, the challenges encountered and how they were overcome. **For adaptation researchers,** this review should provide key references for learning how to design and conduct exemplary projects, while being guided by the key principles and ways for engaging with adaptation action projects. **For adaptation funders**, the review puts forth the wide array of action research initiatives, which are innovating, piloting and implementing new ways of bridging the research-to-practice dichotomy, and how funding could assist in scaling and unlocking long-term co-creation of adaptation with affected communities. **For adaptation practitioners**, the review hopefully provides examples of how adaptation projects in the action domain could benefit from the involvement of the research community for collaborative knowledge production, informing future adaptation project design and implementation, and generating evidence to uphold or change processes. **For the broader adaptation community**, this review is a call for greater collaboration towards generating evidence, which supports the wider application and validation of the Adaptation Research for Impact Principles.

1

Introduction

1.1 Relevance of action and impact-oriented adaptation research

Countries and communities most vulnerable to climate change impacts need transformational adaptation, which is informed by local needs. To foster systemic change and just transition to sustainable economies and societies, decision-making and adaptation measures should be informed by climate research, which focuses on actionable knowledge (ARA, 2021a). As climate change adaptation policies and science are still evolving, there is a strong perceived need for policy-relevant information, applicable in a given local context (Van Buuren, Van Vliet & Termeer, 2015). Research outcomes should therefore not only focus on identifying the risk of climate change, but also provide and foster tangible solutions for local stakeholders and communities. To ensure that scientific outputs serve the needs of the most vulnerable, research should be guided by radical collaboration,[1] led by the Global South, and provide long-lasting, real-world solutions.

To build a climate-resilient future, there is a need for adaptation research, which results in both scientifically sound and application-oriented knowledge, while also dealing with much complexity and uncertainty (Van Buuren, Van Vliet & Termeer, 2015). **Action research (AR)** can be a suitable methodology to deliver on these outcomes as it primarily follows two objectives: (a) contributing to the practical concerns of people in a problematic situation and (b) advancing social science. AR is different to similar forms of problem solving, such as consulting, in its eager inclusion of scientific outcomes informing practical action, and the time and attention AR gives to theoretical and methodological frameworks and tools (O'Brien, 2001). To produce research outcomes that inform policy and practice while fostering co-production of knowledge and solutions, the concept of **research-for-impact** can provide additional guidance in adaptation research (Prakash et al. 2019).

1 The term 'radical collaboration' has been put forward in the conceptualisations of the ARA as a key ingredient for research that serves the needs of the most vulnerable (SouthSouthNorth, 2021). The first output of the Evidence Review Workstream entailed examples of action research, with strong elements of radical collaboration. Such examples, collated by the ARA Secretariat, contributed towards the ARA's session on radical collaboration at the fifteenth Conference on Community-based Adaptation to Climate Change (CBA15) and Asia-Pacific Climate Week in 2021. Examples of radical collaboration include Daraja, an award-winning, city-community, forecasting service and partnership, and the work of the Muungano Alliance, in Mukuru, Nairobi.

The term 'radical' in adaptation and science–policy interface literature is closely associated with transformative adaptation, through which adaptation leads to radical social and political change, reshaping future power relations in society (Pelling, 2011). Building on existing social and political movements, and enacted from the ground up, through the actions of people at risk (Pelling, 2011), radical collaboration seeks to dismantle the root causes of vulnerability. In the context of leveraging knowledge for impact, actors from the movements for social and political change, serve the role of 'pressure builders'. The youth, activists or those directly impacted by climate change, 'bring an ingredient of urgency that enhances the focus and commitment of knowledge-producers and decision-makers' (Bojer, 2021).

The **Adaptation Research Alliance (ARA)** strengthens and advocates the need for a new paradigm of action-orientated research to inform effective adaptation to reduce the risks from climate change, particularly for countries and communities that are most vulnerable – at the scale and urgency demanded by the science (ARA, 2021a).

To better align knowledge and action, the ARA has designed six **Adaptation Research for Impact Principles** (see table 1). The adoption of the principles should help to overcome barriers in the uptake of AR, such as a disconnect between research and the needs of the most vulnerable, limited capacities in communities or misaligned incentives (ARA, 2021b). Against this backdrop, there is a need to share current knowledge, best practices and lessons about how adaptation AR should be conducted. Whilst there is extensive literature on AR as well as on adaptation, literature focusing on adaptation AR is limited, an area that this report can contribute to. Even though this report roots its analysis on the concept of AR, there are several methodologies discussed in adaptation research, which have similar objectives – such as co-production, solution-orientation or informing real-world outcomes – at their core. As mentioned above, research-for-impact represents one of them and shows many synergies and overlaps with AR.

Overall, this report bridges the ARA's Adaptation Research for Impact Principles with examples of projects from the Global South that have incorporated some (or all) of these principles into their work. Whilst the projects have not knowingly worked to integrate the ARA Principles, they illuminate how the principles are manifested in real-world contexts. Beyond this, the projects provide valuable insights into how the principles (whether incorporated knowingly or unknowingly) have the potential to shape the type of adaptation AR that is happening and can provide guidance into how adaptation AR should be conducted going forward.

TABLE 1: Adaptation Research for Impact Principles

1	Research is needs-driven, solutions-oriented and leads to a positive impact on the lives of those at risk from climate change (Who or what is the research for?)
2	Research is transdisciplinary and co-produced with users (How should research be carried out?)
3	Research emphasises societal impact (How is research valued?)
4	Research builds capacity and empowers actors for the long term (What can research enable?)
5	Research processes address structural inequities that leads to increased vulnerability and reduced adaptive capacity of thos at risk (How can research address some root causes of risk?)
6	Learning-while-doing enables adaptation action to be evidence-based and increasingly effective (How can research–action links be strengthened?)

Source: ARA (2021b)

This report is part of a broader evidence review stream of work within the ARA, which will help to support and inform key activities during the early development of the ARA, as well as contribute towards the longer-term agenda of synergising adaptation research and action, guided by the Adaptation Research for Impact Principles. Through building on the collection and analysis of project examples, the ARA is co-developing a knowledge portal, which aims to engage adaptation funders, actors and scholars, as well as to generate more understanding of how the principles are operationalised in different ways, and thereby support their incorporation into future projects. This will further guide an enhanced design and implementation of both action and research projects geared towards positive adaptation outcomes as well as support mutual learning between the two associated communities.

1.2 Towards a definition of action research in adaptation

Arwin van Buuren, Mathijs van Vliet and Catrien Termeer (2015, p.2) define AR rather broadly as 'a research methodology in which researchers enter real-world situations and aim both to improve it and to acquire knowledge'. It is 'founded on a partnership between action researchers and participants, all of whom are involved in the change process' (Waterman et al., 2001, p.7). It is considered a participatory process that tries to empower and understand, involving a dynamic approach in which problem identification, planning, action, observation and evaluation are interlinked (German & Stroud, 2007; O'Brien, 2001). Kurt Lewin is often mentioned as the person to have first introduced the concept of AR in the 1940s, primarily in the discipline of psychology (Campos et al., 2016).

Collaborations between researchers and communities are often strained by a mutual lack of understanding of each other's goals and expectations. AR tries to overcome these barriers by fostering collaborative and equitable partnerships between stakeholders. It requires coordination between multiple stakeholders from a variety of backgrounds, being located in a transdisciplinary environment. It is therefore characterised by a perspective of looking outwards towards society, rather than internally within one discipline. This is what makes transdisciplinary AR an appropriate and valuable way to approach adaptation (Stokols, 2006), especially the collaboration between researchers from different fields and community members to co-develop scientific evidence into new interventions aimed at reducing societal problems.

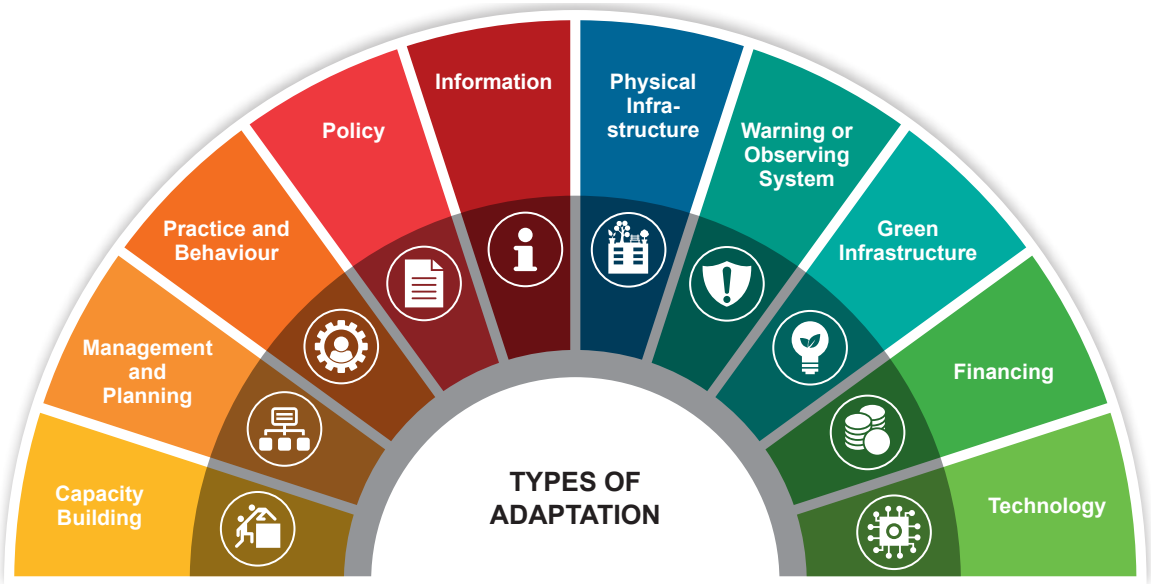
There is a significant portion of adaptation literature that argues for participatory approaches to be embedded into research practices. These participatory approaches should incorporate multiple types of knowledges, support flexibility and adaptability within the research process, be characterised by continuous interactive cycles of research and action-engagement and promote a co-evolving process between stakeholders (Campos et al., 2016).

> A RESEARCH METHODOLOGY IN WHICH RESEARCHERS ENTER REAL-WORLD SITUATIONS AND AIM BOTH TO IMPROVE IT AND TO ACQUIRE KNOWLEDGE.
>
> Arwin van Buuren, Mathijs van Vliet and Catrie Termeer

An important point that frames the underlying relationships of actors and stakeholders involved in the co-development and project design of either action-oriented and research-oriented projects is the role and the expectations of the funder or donor. Many bi- and multilateral donors and funders of action projects have specific administrative requirements and management procedures that shape the way knowledge inputs based on research-type activities can be included. There are, for example, standardised ways of designing projects and programmes, which include design missions, consultations and expert-based reports, that could be called AR. They are often conducted as part of design or appraisal missions, feasibility or background studies, and so on. The requirements, schedules and procedural arrangements often have significant impacts on the ability to consult, enable participation or non-expert knowledge types or views of the 'research element' of the respective action project. Similarly, more action-oriented stakeholder engagement, advocacy and communications activities as part of a research project are strongly framed by the sometimes donor-driven, institutional and procedural settings of the project. This analysis tries to incorporate these considerations when selecting AR examples for the review and also in the review itself.

The pathways from research findings transitioning into the design or the implementation of real-world adaptation solutions vary a lot between the various types of adaptation action (see figure 1). For example, the type of research needed for planning capacity development with local communities varies substantially from research outcomes that inform the planning of green infrastructure measures. It also depends on whether the adaptation solution is generated, financed and implemented as a private good/service or as a public good/service. As can be seen in the analysis, the projects that have been selected cover different adaptation types, such as adaptation resulting from the establishment of a value chain or the informing of public policies, linked to a great variety of AR approaches and outcomes.

FIGURE 1: Types of adaptation



Source: Biagini et al. (2014)

1.3 A theory of change for research and research impact

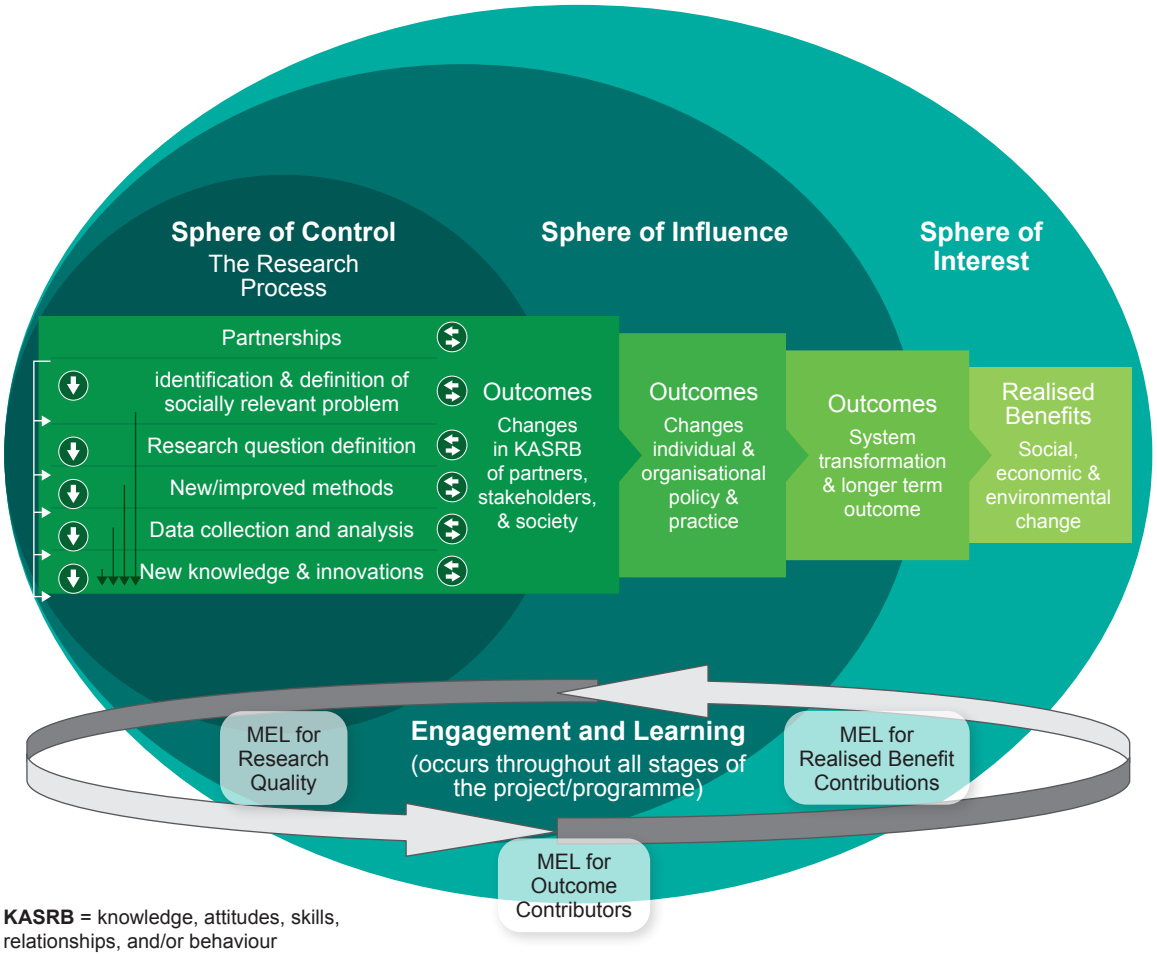
With the design of the principles, the ARA coalition calls for more effectiveness and enhanced impact of adaptation research for local stakeholders and communities that deal with the adverse consequences of climate change. Brian Belcher and Janet Halliwell (2021) respond to the need for clarity around concepts and definitions, in order to understand, evaluate and improve the *impact* of research. Based on their own experience of the temporal dimensions of definitions, which are not helpful for analytical purposes such as research design, evaluation, learning and accountability, they take a systems approach to research impact, and offer precise subcategories of impact to improve clarity. Furthermore, recognising that research happens in complex systems, it can be modelled as a series of interrelated steps in a results chain, or results web (Belcher and Halliwell, 2021). This yields a classification of the types of contributions of research and scholarship within a theory of change (figure 2).

WITH THE DESIGN OF THE PRINCIPLES, THE ARA COALITION CALLS FOR MORE EFFECTIVENESS AND ENHANCED IMPACT OF ADAPTATION RESEARCH FOR LOCAL STAKEHOLDERS AND COMMUNITIES THAT DEAL WITH THE ADVERSE CONSEQUENCES OF CLIMATE CHANGE.

These types of contributions include: (1) research outputs such as products and services of research, produced directly from a research programme; (2) research outcomes, which include changes in the agency of other actors, when they use or are influenced by research outputs; and (3) realised benefits, which include tangible changes in social, economic, environmental, or other physical conditions within the sphere of influence of the research programme. By highlighting the three levels, Belcher and Halliwell want to specifically focus on the 'locus of change' (2021, p.2), which goes beyond academic outputs.

The Adaptation Research for Impact Principles can be linked to different levels of the proposed theory of change. As principle 1 describes, the research should be needs-driven and produce solutions for those at risk of climate change. Looking at figure 2, the 'identification and definition of a socially relevant problem' as well as the definition of the research question very much resonate with this principle.

FIGURE 2: Generic research theory of change



KASRB = knowledge, attitudes, skills, relationships, and/or behaviour

MEL = monitoring, evaluation, and learning

Source: Belcher and Halliwell (2021)

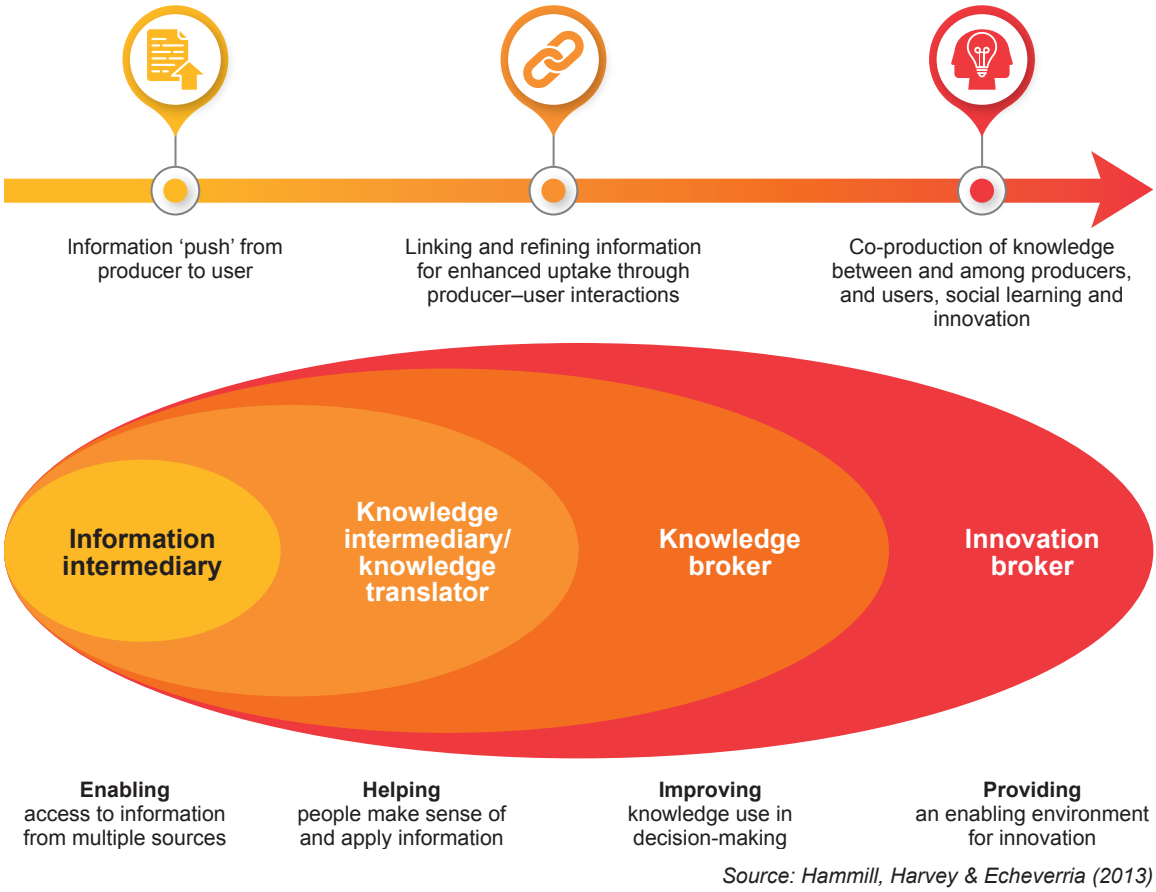
The development of partnerships, the collection of data, application of methods and the integration of different knowledge types and innovations are depicted as part of the research process itself. All these components can be found in the second ARA principle, putting transdisciplinarity and collaboration at the centre of the research. Monitoring, evaluation and learning (MEL) is a core component of AR and occurs throughout all stages of the project. The corresponding principle highlights the importance of action being evidence-based, informing research activities as the project proceeds (principle 6). The question of what research can enable over the longer term, also related to sustainable capacity building (principle 4), can be seen in what are called 'outcomes' in the theory of change. These go beyond changes in knowledge, attitudes and skills of individuals, manifesting in policies and practices within organisations or whole systems. As it is evolving into societal change (as in principle 3), it has to be kept in mind that research is embedded in complex social, economic and environmental systems and might be influenced by many other factors beyond the sphere of the researcher's control. Conducting research in the area of adaptation, research should not only focus on vulnerabilities to climate change, but also consider the entangled web of inequalities, addressing the root causes of risks (as stated in principle 5). In designing the theory of change, Belcher and Halliwell (2021) explicitly mention the decreasing scope of influence, meaning that the relative influence of any intervention declines as interactions with other actors and processes increase. Structural inequalities and mutual influences by factors outside of the research process should therefore be considered when looking at the research impact.

1.4 The co-production of actionable knowledge

The pathway of (research) information turning into a solution is not only determined by the *type* of adaptation (see figure 1), but also the *process* by which the information is translated, often referred to as, for example, knowledge intermediary, knowledge transfer or knowledge brokering. Blane Harvey et al. (2021, p.4) use the term 'knowledge mobilisation' to describe 'a range of approaches and processes used to organize, translate, and present information for users at the science-to-decision interface'. In their study, the authors looked into knowledge outputs and found a range of strategies and engagement approaches that are core to the translation of knowledge into action. To depict the wider landscape of knowledge mobilisation, Harvey et al. categorise different forms of user engagement and mobilisation of climate information along a knowledge co-production spectrum (see figure 3). Information intermediation (left in figure 3) is a comparatively linear form of information provision, with the aim of making information available in a suitable format, as opposed to innovation-brokering approaches (right in figure 3) that aim to influence the decision context.

As we move along this spectrum, information provision to the user gives way to knowledge uptake, through increased producer–user interaction, culminating in the co-production of knowledge and social learning (as captured in the user engagement strategies above the spectrum). At the same time, knowledge is mobilised in corresponding ways, ranging from access to multiple sources of information, making sense of this information, to finally affecting innovation (as captured in the categories below the spectrum). In order to eliminate subjectivity when placing approaches along a continuum, the author team reviewed its own assessments collectively and against practitioners' interpretation of knowledge mobilisation approaches (Harvey et al., 2021).

FIGURE 3: A spectrum of knowledge mobilisation approaches



Source: Hammill, Harvey & Echeverria (2013)

... IN ORDER FOR KNOWLEDGE TO EFFECT CHANGE, IT NEEDS TO BE EMBEDDED INTO THE LARGER ENGAGEMENT PROCESS.

(Harvey et al., 2021)

The broader lessons from this study relate to the improved contribution of climate research programmes to positive social and political outcomes. One of the key insights from their analysis of knowledge co-production is that in order for knowledge to effect change, it needs to be embedded into the larger engagement process (Harvey et al., 2021). Supported by the theory of change (see section 1.3), Harvey et al. state that even time-bound and closely focused, project-based initiatives try to effect system-scale changes. Projects and initiatives nested within larger research programmes lead to a shift in local practices and institutional norms within collaborating research institutions. The production of actionable knowledge requires an epistemological shift towards co-producing climate services and linking research practices to local contexts to enable long-term change and learning among producer and user groups.

Rafiqur Rahman Raqu/DFID

1.5 Analytical scope of the review

This analysis is part of the Evidence Review Workstream and supplements the assembling, reviewing and synthesis of evidence of AR projects and initiatives in the adaptation and resilience sector. These include long-term programmes and time-bound projects funded by a variety of donors. The analysis will provide insights into the extent to which the different projects and initiatives constitute 'good practice' for AR, utilising the ARA principles as the framework for analysis. The analysis will explore the programmatic and institutional reasons for projects identified as AR, in addition to clearly outlining the criteria for inclusion of programmes that may not identify themselves as AR. This analysis does not aim to be exhaustive, but rather to showcase good practice and lessons to learn from.

The analysis began with a potential pool of AR examples, gathered from the self-identification of ARA members, and then built upon contributions by active participants from the ARA community, pre-selected by the ARA Secretariat, or PlanAdapt expertise. Each example was screened in a first step to see whether they met the basic criteria: (i) linking research and action, (ii) located in the Global South, and (iii) having a focus on climate change adaptation.

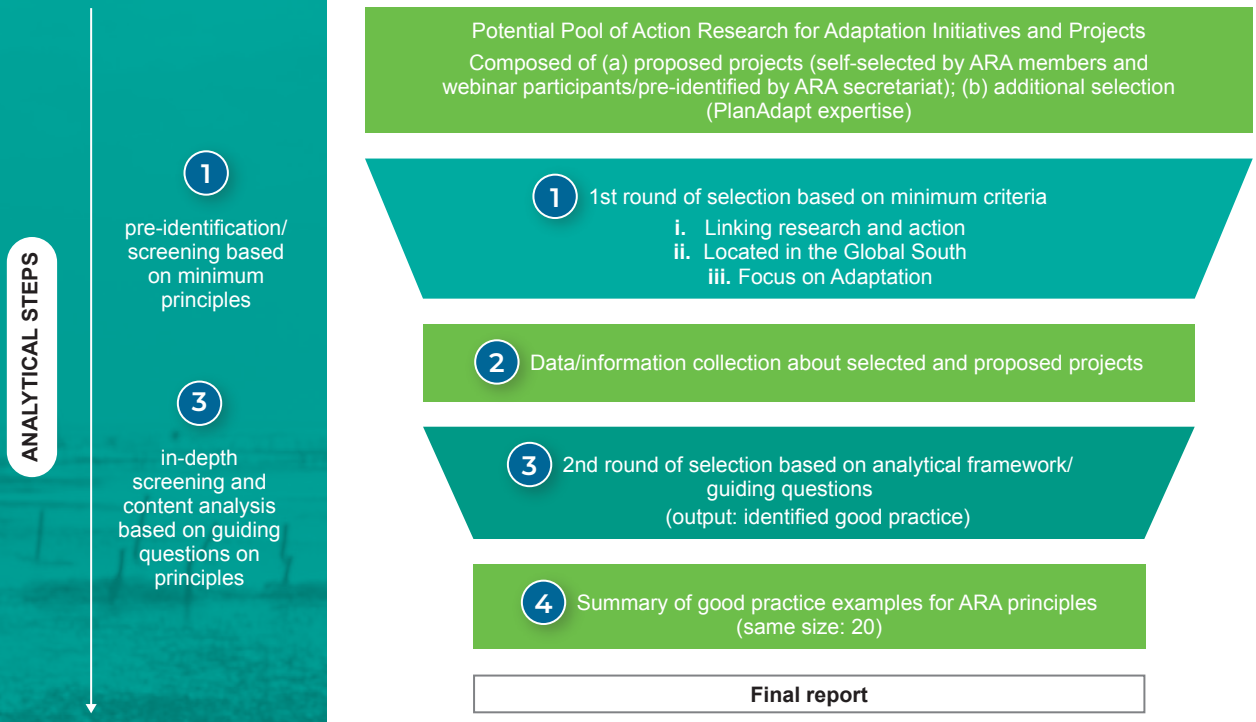
Based on the ARA principles, a set of indicators was developed (see annex 2). Projects and initiatives meeting the minimum criteria underwent a second round of screening, where each example was analysed against a set of guiding questions, relating to the indicators (see figure 5). In the final sample, 20 projects and initiatives have been included (see figure 4 and annex 1).

FIGURE 4: AR projects and location

PROJECTS

1. Terai Arc Landscape Programme: Successfully conserving critical corridors and bottlenecks using community-based adaptation
2. Mukuru Special Planning Area (SPA)
3. DARAJA
4. Women's Action towards Climate Resilience for Urban Poor in South Asia
5. Managing Risk through Economic Development Phase-II (MRED-II)
6. Community Empowerment and Resilience in Chinantla: Building capacity for locally led forest monitoring
7. Buffelsdraai Landfill Site Community Reforestation Project
8. Sustainable Food Production for a Resilient Rosario
9. Central KwaZulu-Natal Climate Change Compact (Compact KZN)
10. CFF Transformative River Management Programme
11. ResilNam – Coastal: Ecology and gender-based flood-resilience building
12. High Impact Weather Lake System (HIGHWAY) Project
13. BRICS: Improving community resilience through climate-smart agriculture, health and early warning systems
14. PAS-PNA: Science-based National Adaptation Planning in sub-Saharan Africa
15. PhytoTrade Africa
16. CGIAR Research Programme on Climate Change, Agriculture and Food Security (CCAFS)
17. Faecal Sludge Field Laboratory
18. Zurich Flood Resilience Measurement for Communities
19. Building Urban Flood Resilience
20. Climate-SDG Integration Project: Supporting the implementation of the Paris Agreement and the 2030 Agenda through EbA

FIGURE 5: Analytical framework



1.6 Structure of the report

The report is structured along the lines of the ARA principles. Each section showcases the relevance of the principles for adaptation research as well as the set of questions that guided the analysis and selection of projects. Additionally, good practice projects and initiatives that stand out in terms of showing evidence of the principles are presented. Section 8 presents a short conclusion and recommendations for next steps.

Marcos Villalta/Save the Children

2

Research that is needs-driven, solutions-oriented and leads to a positive impact on the lives of those at risk from climate change

An important part of AR relates to the *purpose* of the research project. As highlighted in the introduction (section 1.2), Van Buuren et al. (2015) describe AR as a methodology that aims to find solutions in real-world situations while also gaining knowledge for further application and upscaling. Real-world application of scientific knowledge is very much needed in situations where local and individual solutions are required. Research results should therefore be easily translated in activities and measures to reduce climate risks and vulnerabilities, serving those who suffer from the impacts of climate change and maximising their benefits. Research outcomes should be designed in a way that is adapted to the needs of the end-user to improve resilience to climate variability and shocks. (ARA, 2021b). AR should therefore aim to contribute to the practical concerns of people on the local level, while also advancing social sciences (Van Buuren et al., 2015).

To have an impact on the ground and serve those who need to apply the research outcomes in practice, co-production between scientists and practitioners is essential for the planning, implementation, evaluation and designing of interventions. The solutions and knowledge needed should be co-defined with those vulnerable to climate change, to ensure that the solutions are responsive to their needs (ARA, 2021b). Also, the demand should be raised by local practitioners and communities, based on the needs of those who suffer from climate impacts. By responding to a certain demand, the disconnect between research and the *needs* of the most vulnerable should be overcome.

Laura German and Ann Stroud (2007) specify different purposes for different forms of AR (see table 2). Participatory action research (PAR)[2] aims to *empower* local actors (individuals, communities) to identify bottlenecks and how to overcome those, in a process owned by the actors themselves. The primary purpose of PAR is therefore to solve localised problems (German et al., 2012). A second way in which AR can be carried out is to enable better *understanding* of barriers and how to overcome them: 'Key research questions focus on *how* things were done to enable successful outcomes, including key bottlenecks encountered, how they were addressed and the derivation of key elements of successful change processes' (German & Stroud, 2007, p.3). The objectives of such research may range from advancing theoretical considerations to deriving principles for broader uptake, therefore aiming to derive lessons for the global community (German et al., 2012).

TABLE 2: Characteristics of different learning approaches

PURPOSE		
Participatory action research	Action research	Conventional (empirical) research
Solve localised problems	Derive lessons for the global community on how to solve certain types of problems	Characterise current or future situations and trends

Joe Saade/UN Women

2.1 Research approach

To solve localised problems, a core prerequisite is that the research is **demand- and needs-driven**, meaning that the research is rooted in local challenges and informed by them. Questions relating to this aspect of research are the following:

- *Have the research design, questions and objectives been endorsed by local stakeholders/beneficiaries?*
- *How were local and grassroots organisations engaged?*
  - *direct partners (paid by funder)*
  - *indirect/subcontracted partners (paid by funded agency)*
  - *informants through interviews/workshops*
- *Have stakeholders/beneficiaries been consulted early in the process?*
- *What percentage of the funding goes to actors close to vulnerable populations?*

2 PAR is also often referred to as participatory research, experiential learning, social learning or participatory action learning.

To transform research outcomes in practical action, research should be **solution-oriented**:

- *Were concrete outputs – that go beyond written research outputs/ knowledge generation – defined ahead of the research?*
- *What were the concrete outputs that were defined in the proposal?*
  - *academic publications*
  - *policy briefs*
  - *blogs, infobriefs, infographics (accessible to users)*
  - *toolkits for implementation*
  - *other innovative solutions.*

In adaptation research, outcomes and targets should be aimed at having a **positive impact on the livelihoods of the people at risk**. Questions here relate to the following:

- *Which techniques and approaches have been used for the programme design and planning (that target those at risk)?*
- *Were developmental output indicators proposed? What were they?*
- *Were specific policies and strategies targeted for change? Which ones?*
- *Which aspects of the enabling environment were mentioned to ensure a positive impact?*

2.2 Findings

The two research objectives, *empowering* and *understanding*, were seen in the project of the Mahila Housing SEWA Trust's (MHT's) project, Women's Action towards Climate Resilience for Urban Poor in South Asia. In seven cities of South Asia, women from slum communities have been empowered to undertake climate vulnerability assessments and develop resilience action plans to implement pro-poor and gender-sensitive climate solutions. As informal settlements are often at risk of climate impacts, such as extreme heat, flooding or vector-borne diseases, the project aimed to build the capacities of slum communities and local governments to assess vulnerabilities and risks and transform them into resilience plans. The project fostered partnerships of slum communities, community-based organisations (CBOs), technical experts and local governments, aiming to translate scientific knowledge into practical action (Elliot et al., 2018). Within the research setting, a crucial condition was the existence of internal slum and city-wide social networks (especially women-led initiatives) to build the necessary social capital, policy influence or technical expertise to implement pro-poor climate solutions. This condition is present in Ahmedabad, India, where MHT has been working in slum communities for more than twenty years. To derive lessons for enabling similar resilience actions elsewhere, different cities were considered, where social networks were either emergent or established by different CBOs. Applying a case analysis approach, the project could derive key learnings and create a better understanding of community engagement for resilience or replication (Elliot et al., 2018).

THE TWO RESEARCH OBJECTIVES, EMPOWERING AND UNDERSTANDING, WERE SEEN IN THE PROJECT OF THE MAHILA HOUSING SEWA TRUST'S (MHT'S) PROJECT, WOMEN'S ACTION TOWARDS CLIMATE RESILIENCE FOR URBAN POOR IN SOUTH ASIA.

Similar purposes can be seen in the Chinantla Forest Monitoring project in Oaxaca, Mexico. Focusing on community empowerment, it engages in forest restoration and community-led protection of land and monitoring activities. An important component of the project is that only the local partners engage and work with communities who have asked for support, so that the solution is driven by the priorities of the community, rather than imposing outside targets or values (Vallarino, 2021). This highlights two central aspects of (participatory) action research: the research is driven by the demand and needs of the community, while also focusing on solutions tailor-made to their challenges. Thus, when communities express a need in terms of threat to their local ecosystem or livelihood, contextually appropriate plans are co-developed jointly with the communities, which leads to an increase in ownership and sustainability of activities. Local organisations provide the initial technical and financial support to residents for sustainable and self-governed forest monitoring and restoration activities, enabling them to qualify for environmental stewardship incentive payment programmes. The identification of communities in the first place happens through participatory processes and is highlighted as a critical variable in the success of the project. Building trust and partnership right at the beginning is stated as central for ensuring better and more sustained outcomes. Moreover, the partner organisation, EcoLogic, focuses on strengthening the local communities by designing practical and locally contextualised strategies (EcoLogic, 2021).

To design solutions, tailor-made to the needs of the local partners, requires early-stage consultation. This could be seen in the following two projects:

- DARAJA (Developing Risk Awareness through Joint Action): in Nairobi, Kenya and Dar es Salaam, Tanzania locally contextualised weather forecasts were co-designed by national meteorological offices, local community organisations and residents of urban settlements to the needs of the end-user. Local partners and vulnerable urban residents were considered core partners in the project and were consulted early in the project. This ensured that the weather and climate information produced, accessed and used by the local communities helped to build their resilience through better planning and preparedness in extreme events.

- The Urban Flood Resilience project by the Kounkuey Design Initiative (KDI) in Kibera, Kenya, strongly emphasised early-stage consultation with local residents in informal settlements opposed to flooding hazards. Having laid out a detailed methodology for consultation and data collection, they proposed three-level consultations with the community, local actors and national level actors. KDI recognises that residents have the best knowledge about challenges and potential solutions, seeing them as informants, but also as analysts of their own vulnerability (Mulligan, Harper & Ngobi, 2015).

Especially in adaptation research, the involvement of vulnerable communities in planning and implementation is of great importance. The Terai Arc Landscape (TAL) project, which conserves the ecosystems of the Terai and Chirua hills in Nepal, has a strong focus on the inclusion of vulnerable groups. It wants to ensure the integration of traditional knowledge and respect for local decision-making, with proactive empowerment of women, the poor and disadvantaged in governance, implementation and access to resources (Ministry of Forests and Soil Conservation, Nepal, 2015). Gender and equity concerns were specifically addressed in the design and planning phase, to make sure that women, the poor and other marginalised groups benefit from the programme. This should include the expansion of property rights to women, the poor and other marginalised groups, as well as including these groups in decisions about where to create community forests and how to run them (Poudel, 2021). However, even though women, marginalised and socially excluded people will be increasingly involved in the implementation or management of the strategy, the *active* integration of these social groups and their needs in the planning and design process of the programme remains in question. Moreover, the medium-term evaluation indicates that there is still a lack of integration of ultra-poor, particularly landless and marginalised groups of people in the mainstream development process (Thapa et al., 2017), revealing a gap between good planning intentions and implementation.

In other cases, research results are situated within ongoing initiatives and programmes, and respond to specific needs that arise throughout the process. This was seen in the Rosario Urban Agriculture Programme, which was started by the Municipalidad de Rosario, Argentina, after the economic crisis in 2001. Beginning as a solution to poverty and hunger, the project was initiated when the municipality turned abandoned spaces within the city into agricultural farmland. As the demand on open spaces evolved, scientific research pointed out the potential of vacant and underutilised urban land for agricultural production, directly influencing the advancement of the programme. The research outcomes influenced municipal decision-making and strategies and, as a result of the scientific research, the municipality could grant temporary tenure of farmland to the urban poor. After heavy rains in 2007, the city realised that future flood events will increase with climate change, highlighting the need for urban flood strategies. The green spaces of urban farmland helped to absorb stormwater, and since the city already had an inventory of available land, two additional green vegetable gardens opened, strengthening the city's resilience against flooding (WRI, 2021).

3

Research that is transdisciplinary and co-produced with users

Transdisciplinary and co-produced research goes beyond interdisciplinary and multidisciplinary research. Multidisciplinary research is conducted utilising the knowledge, tools and research approaches of several disciplines, towards solving a research or societal problem. Interdisciplinary research ensures that there is an exchange of learning approaches across the different disciplines involved in a research process. Transdisciplinary research takes this a step further and aims to integrate knowledge and experiences, which may not be categorisable into a discipline, towards solving a particular societal problem, in addition to 'expert' and discipline-specific knowledge. Transdisciplinarity, co-production and co-design approaches are most suitable to AR since they ensure that the knowledge and experience of intended beneficiaries of research projects is incorporated throughout the problem definition, pilot application and implementation phases. The more culturally sensitive these research processes are, the more successful they can be in incorporating nuanced knowledge that can translate into mutually owned and culturally relevant findings and recommendations. Even when projects have a large technical or technological manifestation, they still stand to benefit from knowledge co-production, for the solutions to be embraced by local communities and groups.

Moving away from knowledge approaches that prioritise 'formal' science, transdisciplinary research marks a continuation of approaches, such as PAR (Knapp et al., 2019), and indigenous and local knowledge (Johnson et al., 2016), which place value on insights and inputs from different knowledge producers. This orientation of research and knowledge towards co-production and collaboration is highlighted by William C. Clark et al. (2016: 4574, cited in Knapp et al., 2019), who suggest that 'to manage sustainability issues, researchers must shift from knowing to learning'. Literature on transdisciplinary AR is prevalent across climate change and environmental disciplines and tied to ideas of knowledge sharing (Hellin et al., 2020; Manjula & Rengalakshmi, 2021). Specifically, within climate adaptation literature, transdisciplinarity and knowledge co-production are emphasised as important for overcoming barriers to adaptation (Wamsler, 2017). The most successful transdisciplinary AR fosters reciprocal relationships between actors and attempts to balance the power asymmetries inherent in knowledge production and exchange. As a result of the social context of climate adaptation, which determines that certain groups of society are more vulnerable to climate change than others, research processes must make provision not to exacerbate these vulnerabilities or reinforce the imbalance of power. The ARA principle calls for actors to be involved and participate in all stages of the research process to ensure that adaptation AR is more informed, reflective, just and equitable.

In this section, we looked for evidence relating to transdisciplinarity as it translates into consultation with stakeholders, co-production and collaboration in adaptation research. We also looked for inclusiveness and integration of multiple knowledge types, in the research design and the implementation processes. Through these criteria, we tried to establish correlations where projects demonstrate an alignment with the ARA principle. Some of the questions, listed below, refer to different approaches for user engagement and knowledge mobilisation, and are therefore reflected in/related to the knowledge co-production continuum framework (see figure 3).

3.1 Research approach

To identify **transdisciplinary** research, we sought evidence of the following:

- *What was the composition of the research team?*
- *Did the research team consist of more than five people?*
- *What were their disciplinary backgrounds?*
- *Did the researchers have backgrounds (university degrees) covering at least three distinctively different disciplines?*
- *Has the research team been trained in transdisciplinary research methods/processes?*

To identify **consultation with stakeholders**, we sought evidence of the following:

- *Has a variety of stakeholders been involved in the project design and implementation?*
- *Has a variety of stakeholders been consulted?*
- *Which methods/approaches have been applied to integrate stakeholders meaningfully?*

To identify **co-production and collaboration**, we looked for the following:

- *Has the research design process involved a diverse group of actors?*
- *Have minorities been involved?*
- *Was co-production a stated aim of the project?*
- *Was a specific facilitation method applied? If yes, which one?*
- *Have different methods and techniques of collaboration been applied? If yes, which ones?*
- *In what way have equitable relationships been promoted?*

To explore **inclusiveness of research design**, we sought the following parameters:

- *Have inclusive (non-hierarchical) forms of decision-making about the research design been applied?*
- *What was the scale of decision-making?*

Integration of multiple knowledge typologies was sought through the following questions:

- *How was anecdotal/grey literature incorporated into research findings and during implementation?*
- *How was tacit, tangible, experiential knowledge included?*
- *What kind of methods/approaches have been used to integrate different types of knowledge?*

3.2 Findings

Sara Hylton/Climate Visuals Countdown

The Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme aims to build the resilience of up to 5 million people across the Sahel, East Africa and Asia against climate extremes and disasters. Many BRACED projects have formed strategic partnerships to link the efforts of various organisations working at different levels, since there are limits to what can be achieved by simply working at a local level. The BRACED programme component Building Resilience in Chad and Sudan (BRICS) is delivered by a consortium of Concern Worldwide, World Agroforestry and Tufts University to improve the resilience of communities through improvements in agricultural production (including conservation agriculture) and a range of interventions for improving the overall health of the communities (through increasing the provision of nutrition services and access to safe and sustainable water sources). Within the project, local soil scientists collect 'land health data' that is representative of the diversity of soil and vegetation found across a project area. Scientific analysis includes collecting *multiple knowledge types* on land use, slope, vegetation cover and structure, soil erosion and hydrology, going beyond the basic physical and chemical analysis of the soil. Lessons learned through decades of development practice on how to support communities, build on existing livelihood strategies and capacities used by households to deal with climate variability and disaster events are being applied. The project indicates that significant effort was spent in understanding the local context of communities and giving them a say in research design and implementation of pilots. Non-governmental organisations (NGOs) working in Chad, Sudan and elsewhere have made great advances in sharing information with communities who tend to be left out, using creative approaches such as mobile phone messaging, theatre, and radio in accessible formats. Educational games, to support experiential learning and dialogue on climate-smart disaster risk reduction, have also been used. However, researchers feel that more can be done to bring community knowledge into climate services, such as local observations and traditional knowledge to anticipate climate trends. When local voices and knowledge shape future investments and initiatives, trust can be built.

'EBA IS THE USE OF BIODIVERSITY AND ECOSYSTEM SERVICES AS PART OF AN OVERALL ADAPTATION STRATEGY TO HELP PEOPLE TO ADAPT TO THE ADVERSE EFFECTS OF CLIMATE CHANGE.'

(Secretariat of the Convention on Biological Diversity, 2009)

In a case analysis of four long-term projects in India and Guatemala, based on the Climate-SDG Integration Project, it was discovered that as the projects adapted to new challenges and sought to manage the inevitable trade-offs between nature conservation and human development, they became more closely aligned with ecosystem-based adaptation (EbA) (Stiem-Bhatia et al., 2021). Key project activities include research on the effectiveness of EbA and its enabling conditions, building political and societal support, capacity development for local communities, and knowledge exchange and dissemination. Larissa Stiem-Bhatia et al. (2021) acknowledge the sharing of experiences and knowledge held by the communities underpins the analysis of the enabling and hindering factors for the implementation of EbA.

Local networks in all four case studies in Guatemala and India served as platforms to pool labour and local knowledge required for EbA-related activities. They facilitated information exchange and the dissemination of knowledge, technologies and inputs. Community-run seed banks are one example of such a community-based knowledge resource. Thus, local institutions were involved in the scaling of ecosystem restoration. Research by Stephen Woroniecki (2019) underscores a phenomenon whereby strong social organisation leads to community members becoming protagonists in EbA. However, this requires greater attention, effort and resources directed towards planning and realising tangible benefits for local communities through adaptation projects. In all four cases, local CSOs served important roles as knowledge brokers and intermediaries, crucial in scaling and organising EbA activities. The Watershed Organisation Trust (WOTR) in India was crucial in bringing diverse stakeholders, such as village committees, and decentralised government bodies together. In San Francisco, Guatemala, a farmer organisation involved in the project provided farmers' voices and interests to local climate change planning and embedded relevant technical knowledge to supplement traditional knowledge and EbA-related practices.

The Urban Flood Resilience Project in Kibera 'has been an important next phase in KDI's work on bringing together the issues of public space, water, sanitation, flooding and watershed remediation, from the perspectives of community, but also from the perspective of supporting appropriate governmental engagement' (Mulligan & Harper, 2016, p.4). The process brought together residents, planners and policymakers with experts in vulnerability, flood risk assessment, community participation and the human impacts of infrastructure. These collaborations resulted in the creation of an open-source, one-dimensional flood model of Kibera, a data set of household survey information from close to 1 000 respondents, a mapping of institutions involved in disaster risk management and flood risk management in Kenya and Nairobi, and pilot projects that demonstrate the appropriate use of these elements. In addition to risk mapping and flood modelling appropriate to an informal settlement, and incorporating elements of social cohesion, resilience and green infrastructure, building the capacity of institutional stakeholders to engage in effective flood risk management was also recognised as a necessity. The overall objective of this project was to 'create a "toolkit" that could be used to implement flood risk reduction strategies in Kibera (and ultimately in other informal settlements) while incorporating local perspectives' (KDI, 2016) – incorporating the element of scalability across the Global South. The detailed design for the consultative methodology utilised in engaging communities in Kibera drew on a range of key reference frameworks, including integrated urban flood risk management (Jha, Bloch & Lamond, 2012); community-based disaster risk management (UNCRD, 2003; Abarquez & Murshed, 2004); participatory vulnerability analysis (IFRC, 2006; Yates & Chiwaka, 2010); and the sustainable livelihoods approach (DFID, 2001).

The Central KwaZulu-Natal Climate Change Compact (COMPACT KZN) was created in 2014 and showcases a unique model of collaboration between cities of different sizes in the province of KwaZulu-Natal. COMPACT KZN is an exemplary regional platform for multi-level climate change governance in South Africa, fostering horizontal and vertical integration. It comprises of members of different municipalities, local and provincial levels, as well as research institutions. The objectives of the regional platform are to promote a sub-national, collaborative approach to climate action, especially adaptation; to create a knowledge-exchange hub at the regional level, involving local and national research institutions; and to promote capacity building and knowledge exchanges in the field of climate change amongst its members (Urban LEDS, 2020).

4

Research that emphasises societal impact

With the complexity of challenges, such as climate change, facing society today, the need for research to have actionable outcomes and serve society is increasing. This principle brings into focus the value of research, seeking for it to not only have scientific impact, but also to have societal impact. Research outputs have societal impact when they produce social, cultural, ecological and economic benefits, with these categories often overlapping (Bornmann, 2013). Social benefits indicate that research has contributed to social capital, such as informing public debate and improving policymaking. Cultural benefits refer to the support of cultural capital, where research, for example, can help to develop understandings of relationships within different societies and cultures. Ecological benefits are demonstrated when research can contribute to natural capital by offering insights, for example, into climate-smart technologies. The economic benefits of research are contributions to economic capital, such as supporting livelihoods and improving productivity (Bornmann, 2013). Definitions of impact, and interpretations of what constitutes a benefit, should be co-defined by all stakeholders to ensure that solutions are sustainable and relevant.

Action research is accountable to a broader set of stakeholders, seeking to be both *relevant and rigorous* (Hegger & Dieperink, 2015). There has been a marked shift within research from what has been referred to as 'Mode 1': a science governed by academic interests of a specific community (theory building) to 'Mode 2': characterised by an increase in transdisciplinary, collaborative and co-produced research, which not only works across academic disciplines, but also works with other stakeholders (Ernø-Kjølhede & Hansson, 2011). Whilst action research (Mode 2) can have direct and measurable societal impact, Mode 1 can still have indirect societal impact by informing empirical research and contributing to the knowledge base. Research becomes relevant when it responds to locally identified issues, allowing stakeholders to work together to co-define the problem, and co-design the solutions. Transdisciplinarity and the 'productive interactions' (Wolf et al., 2013) between stakeholders during the entire research process work as the driving force behind ensuring that adaptation AR has a positive societal impact.

While the outcomes of transdisciplinary AR should also be measurable, this is complicated by adaptation, which does not have a common reference metric to measure success. Adaptation outcomes can be quantifiable, such as determining how many kilometres of a river have been rehabilitated to improve urban flood resilience, but it can be more challenging to measure less quantifiable outcomes, such as whether a project has supported capacity building. Despite these challenges, seeking to make the outcomes of adaptation AR measurable is important because this enables the monitoring of success and challenges. While measuring adaptation outcomes and societal impact will always be subjective, based on how 'successes' and 'impact' are defined and by whom, establishing intentions to track and monitor allows for lessons to be learned and shared.

The quality of research is not only visible in research outcomes but should also be reflected throughout research processes. When societal impact is centred as the prime aim of research, it ensures that adaptation AR has value and supports the continued uptake of knowledge and solutions for those most vulnerable to climate change. For this section, we have looked for evidence that related to the measuring of impact and uptake of research results and findings.

ADAPTATION OUTCOMES CAN BE QUANTIFIABLE, SUCH AS DETERMINING HOW MANY KILOMETRES OF A RIVER HAVE BEEN REHABILITATED TO IMPROVE URBAN FLOOD RESILIENCE, BUT IT CAN BE MORE CHALLENGING TO MEASURE LESS QUANTIFIABLE OUTCOMES, SUCH AS WHETHER A PROJECT HAS SUPPORTED CAPACITY BUILDING.

4.1 Research approach

In relation to the **measurement of impact**, we looked for evidence relating to the following criteria:

- *How were impact and success measured?*
- *Which indicators have been applied to measure impact?*
- *What are the intermediate and final outcomes reported?*
- *Have challenges and successes been mentioned in achieving impact?*
- *What are the benefits of the project on the ground?*

In relation to the **uptake of results and findings**, we looked for evidence relating to the following:

- *Have research results been transformed into/used in non-academic outputs?*
- *Has a significant share of the budget been assigned for this phase (research uptake) of the project?*
- *What percentage of budget was allocated for research uptake?*

CGIAR Research Program

4.2 Findings

Within this evidence review, we have come across different types of societal impacts, achieved through the reviewed projects. These impacts manifest in different social, cultural, environmental, or economic benefits, often overlapping. Moreover, the range of benefits spans across different sectors, such as public health and sanitation, agriculture or climate information services.

Positive societal (socio-economic and environmental) impacts, particular to rural areas include:

- Involvement of communities in rural areas towards agroforestry measures, whereby local knowledge is blended with scientific know-how and modern technology to create drought-resistant plant species, and 'land health' is measured to develop sustainable land management plans and practices.
- Interestingly, EbA is helping to achieve climate and sustainable development goals, in the rural and forested landscapes of India and Guatemala.
- Forest conservation projects are found across the different formats of long-term, donor-funded projects, such as the TAL project in Nepal, and through community-led forest monitoring initiatives in Chintantla, Mexico.

Positive societal (socio-economic and environmental) impacts, particular to urban areas include:

- Co-developed climate information and early warning systems in Dar es Salaam, Tanzania and Nairobi, Kenya towards flood risk management in informal urban settlements.
- Slum development projects that are often enabled through multi-partner consortia, such as the Muungano Alliance in Mukuuru, or the MHT in India, with empowered communities working alongside research and scientific partners, and participating in decision-making and solution design. Such projects integrate the multiple ways in which the climate crisis overlaps and intersects with public health risks, sanitation needs, food security and nutritional needs of residents.
- Ecosystem-based adaptation in coastal regions of Vietnam, through mangrove planting and restoration and uplifting the socio-economic situation of women, who rely upon natural resources. Examples of EbA are also found in South Africa, in the eThekwini Municipality, through river rehabilitation projects and community reforestation initiatives.
- Increased sanitation and protection of public health through the Faecal Sludge Field Laboratory in the aftermath of disasters – be they natural, such as the earthquake in Haiti in 2010, or political crises, such as the mass migration of the Rohingya from Myanmar to Bangladesh and West Bengal.

Jervis Sundays

Detailed descriptions

In Purushwadi, in the Ahmednagar District of Maharashtra, India, WOTR implemented a watershed development approach that started with a five-year community-based natural resource management (CBNRM) project in 2002. This approach was studied by the Climate-SDG Integration Project, whose core objective was to develop roadmaps for scaling EbA in India and Guatemala. Key project activities included research on the effectiveness of EbA (effects of EbA on ecosystem health, livelihoods and adaptive capacities) and its enabling conditions. Through case study analysis, it was observed and recorded that the watershed development approach was gradually extended to include biodiversity conservation, climate-resilient agricultural practices and community-managed ecotourism (Stiem-Bhatia et al., 2021). The research also revealed that myriad (socio-economic and ecological) benefits are gained through the introduction of EbA measures, such as increases in agriculture-based employment, food and nutritional security, the promotion of indigenous vegetables, and a reduction in out-migration. A significant expansion of indigenous tree species and conversion of degraded land into productive agricultural land are among the ecological benefits, with direct, positive social impacts from projects such as the watershed development approach implemented in Purushwadi. However, village-level committees in India that were set up specifically to manage EbA-related activities were unable to sustain their activities once external funding of EbA-related projects ended. Such fine-grained understanding of initiatives that had been implemented for at least five years provided insights into what it takes to build an enabling environment for implementing and scaling up EbA. The insights and findings aim to inform sub-national-, national- and international-level governance processes related to climate adaptation.

The DARAJA project, implemented in Dar es Salaam and Nairobi, focuses on bridging the disconnect between the producers and users of information for climate adaptation. Vulnerable communities are at the centre of developing and participating in the design of weather information services, as the primary users of this information. A key tenet of the success of DARAJA is ensuring the development of climate information that is locally relevant, readable and usable through accuracy to a particular area, rather than a nationwide forecast. The brokering and designing of weather and climate services with urban stakeholders helped to improve the access and use of weather and climate information, in turn enabling the incorporation of such information in planning for and reducing the losses and damage from extreme weather events and related disasters, such as extreme rainfall and floods.

In South Africa, the eThekwini Municipality (also known as the City of Durban), supported by the C40 City Finance Facility (CFF), is developing a business case for a Transformative River Management Programme (TRMP). The TRMP aims to adapt the 7 400 km of streams and rivers in the city to the flooding, drought and higher temperatures that can be expected from climate change. The TRMP is nested in the Durban Climate Change Strategy and its Climate Action Plan as a C40 city. It builds on the city's considerable experience with EbA and its commitment to increase the resilience of eThekwini Municipality's most vulnerable communities (C40 Cities Finance Facility, n.d.). The TRMP builds on a range of transformative river management projects in Durban and KwaZulu-Natal, which include three different and contrasting projects: (i) the city-led, seven-year Sihlanzimvelo Project, (ii) the community-led Aller River Pilot Project, and (iii) the Green Corridors special purpose vehicle, supported by the city.

PARTNERSHIPS WITH DIFFERENT STAKEHOLDERS AND BETWEEN DIFFERENT ACTORS BROUGHT ADDITIONAL COMPLEXITY. HOWEVER, THEY ALSO CREATED AN ENABLING ENVIRONMENT FOR GREATER CREATIVITY AND FLEXIBILITY, AS DIFFERENT PARTNERS LEARN FROM ONE ANOTHER AND END UP CONTRIBUTING TO MULTIPLE PROJECTS.

(C40 Cities Finance Facility, 2019, p.40)

Partnerships with different stakeholders and between different actors brought additional complexity. However, they also created an enabling environment for greater creativity and flexibility, as different partners learn from one another and end up contributing to multiple projects (C40 Cities Finance Facility, 2019, p.40). The TRMP involves utilising community co-operatives for stream management and, in so doing, builds enterprises and creates jobs: a good example of what is called the 'Green New Deal' or transformative adaptation. This model will be expanded to a broad range of river conditions, ecological infrastructures, land ownership and land-use conditions to anchor the green economy and to develop the social and economic capital of the city. This will provide a scalable and replicable model for how cities across the world can manage and maintain their waterways while maximising socio-economic benefits. By providing for ecosystem-related job and asset creation for local communities, it aims to change community lives and urban spaces, and to reconnect people and communities with water.

The TRMP aims to develop the social and economic capital of cities and to change the way cities perceive rivers and streams, by treating water as a socio-economic asset. Societal impact is determined to a large extent by how projects are motivated, planned and structured. The pilot projects upon which the TRMP is built were based upon the understanding that rivers are complex systems, each with their own local geographical, political, socio-economic and governance structures. This understanding was carried through into the development of the Ecological Infrastructure and Socio-Ecological Toolkit (C40 Cities Finance Facility, 2020).

Hannah McNeish/UN Environment

Also in KwaZulu-Natal, a large-scale community reforestation initiative was undertaken at the Buffelsdraai regional landfill site. Initiated in 2008, it offered a triple-win opportunity for addressing biodiversity loss, carbon sequestration and the enhancement of ecosystem services through land restoration (Roberts et al., 2012). Within a decade, a biodiverse forest was established, through trees provided by adjacent rural communities, trained by a local NGO (Douwes et al., 2016). Initially funded by the Danish International Development Agency (DANIDA), the Buffelsdraai Landfill Site Community Reforestation project was later funded by the eThekwini Municipality. A research partnership established with the University of KwaZulu-Natal, known as the Durban Research Action Partnership, has helped to deliver a range of research outputs, which have in turn informed the restoration initiative, by understanding the effectiveness of different approaches (Roberts et al., 2012). However, as noted by researchers of this project, rapid transformation of the surrounding areas, through the expansion of informal settlements, rekindles issues such as land invasions, sand-mining, hunting and plant collection, often at odds with the protective and restorative objectives of the reforestation project.

5

Research that builds capacity and empowers actors for the long term

Building capacities that go beyond technical or financial support is central to achieving social transformation. Due to the nature of climate change, there are high levels of uncertainty, and contexts change rapidly, making it necessary to build capacities to adapt to future events. Research should therefore not only produce and mobilise knowledge, but it should also improve the capability of local institutions, organisations and researchers to respond to climate risks long after the research project has ended.

In (participatory) action research, the collaboration and co-creation of different stakeholders in planning and implementation is a crucial element (see sections 2 and 3). When it comes to capacity development, the following questions arise: Whose capacities are developed? And whose knowledge and capacities are considered important and relevant? It is particularly important in PAR to learn and try to overcome the duality and (traditional) roles of the researcher transferring knowledge and capacities to the 'recipient'. PAR is driven by the demands and needs of local stakeholders and vulnerable communities, supporting them in finding their own solutions and empowering them, by providing tools and methods, to find future solutions independently (see section 2). Integrating different forms of knowledge – for example, experiential, tacit or indigenous knowledge – influences the process and roles in the research setting.

Seeing capacity as a longer-term process and capacity not as an *activity* (like training or workshops), but as an *outcome* (like abilities or the skill to adapt and transform), it is important to consider capacity development after the project has ended (Rokitzki & Hofemeier, 2021). As it can take many years for results and change to emerge in communities, organisations or policies, key impacts tend to materialise often after a (research) project has ended. Creating ownership, funding mechanisms or a network of partners is therefore crucial for a sustainable impact of activities. In particular, for partners who are not permanently based in a region, it is important to think about the 'legacy' of the project; that is, partners who will remain and maintain the know-how after the project has ended, such as local universities or organisations (Rokitzki & Hofemeier, 2021). To emphasise long-term impact, research results should be integrated in plans and strategies on climate change or disaster risk management.

RESEARCH OUTPUTS SHOULD BE EASILY COMMUNICATED TO RELEVANT LOCAL ACTORS OR RESIDENTS AND APPLIED TO LOCAL CONTEXTS, BEING ACCESSIBLE FOR A WIDE AUDIENCE.

Strengthening the ownership of involved stakeholders, either on local or national level, can enhance the self-mobilisation of communities in the longer term and help to avoid a primary external steering. Research outputs should be easily communicated to relevant local actors or residents and applied to local contexts, being accessible for a wide audience. This implies that produced outputs or climate services need to be available in local languages, shared via the different media used by the local population, or translated into different formats, such as games or emergency alerts. Additionally, different outputs (such as tools or products) should be embedded within long-term capacity development and engagement activities to empower actors with actionable knowledge and the ability to drive action (ARA, 2021b).

5.1 Research approach

Questions related to the **impact on capacity levels beyond the research project end-date** are the following:

- *Did knowledge produced during the project feed into local and regional plans for climate change or disaster risk management?*
- *Was climate information produced by local actors incorporated into the design of early warning systems?*
- *Did capacitated scholars and actors become members of local or regional planning groups for climate change/disaster risk management?*
- *Have specific methods/approaches been applied to build capacity over the long term?*
- *Have other outputs (for example, new techniques or products) that will have a positive effect in the long term been produced or introduced?*

Ashden/Ashden

Another crucial aspect to capacity development describes the **wide availability of information, tools and knowledge products**. This entails aspects of whether material and documents were easily accessible (for example, not behind a paywall, in the correct format and shared in different media) as well as in local languages. Questions relate to the following:

- *Were information and knowledge products embedded within engagement activities, such as webinars, presentations, discussions and local platforms?*
- *Were tools and knowledge products designed in local languages, or interfaced with local languages, for ease of access?*
- *Were tools and knowledge products shared and uploaded in different (local) portals and media used by stakeholders?*
- *Were tools and knowledge products assessed at regular intervals and redesigned by user demands, beyond the project date?*

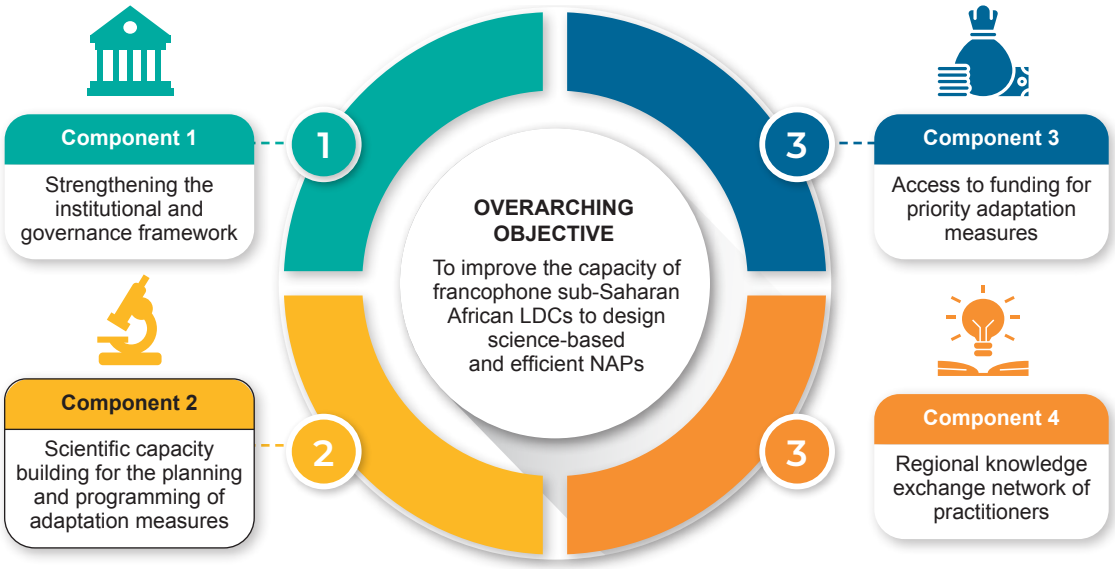
5.2 Findings

The leadership of local communities or the local municipality can enhance long-term engagement, going beyond a project cycle. In the case of the Rosario Urban Agriculture Programme in Argentina, the local municipality has fostered sustainable urban food production by starting the urban agriculture programme (Programa de Agricultura Urbana – PAU) in 2002 for making the city more resilient to climate impacts and to increase food security of poor urban families. The commitment by the city to make its resources available (for example, using public vacant land for food production or using its own funding) has secured the continuation of activities. Research components of the programme, such as analysing the potential of vacant land for agricultural production, have directly influenced the planning and implementation of the programme. The project has affected several city-wide decisions and strategies related to flood prevention as well as the city's strategic plan. The municipality equipped local residents with tools and knowledge on agroecological production, so that they could cultivate previously unused land independently.

The integration of research outcomes in national policies, strategies and action plans can therefore foster long-term impact. This was seen in the TAL programme in Nepal, and the High Impact Weather Lake System (HIGHWAY) project in East Africa, where a regional early warning system (EWS) was integrated into strategies and plans on a regional, national and local scale. This led to an increase in the use of weather information to improve resilience and reduce the loss of life and damage to property on and around Lake Victoria (Savage & Watkiss, 2020). Additionally, ownership and leadership are crucial elements when it comes to the sustainability and duration of activities. The Chinantla Forest Monitoring project in Oaxaca, Mexico only operates when local communities have asked for their support, guaranteeing interest and commitment by local residents. Working with local champions and training them in the necessary skills for conducting forest monitoring on their own creates ownership and buy-in, which increases the chances that activities are taken forward after the project has ended.

The PAS-PNA project supports the francophone sub-Saharan least developed countries (LDCs) in their National Adaptation Plan (NAP) process. It was implemented in Senegal, Benin and Burkina Faso and then in another 12 sub-Saharan African LDCs between 2016 and 2019.

FIGURE 6: Different components of the PAS-PNA project



Source: Climate Analytics (2019)

The main objectives of the project are to strengthen the national science–policy interfaces and to increase the capacity and efficiency of science-based NAP formulation. Therefore, the project accompanies government and scientific actors in the formulation, implementation, monitoring and evaluation of the NAP process, and engages with wider stakeholders from civil society and the private sector (Climate Analytics, 2019). One of the components (component 2, see figure 9) focuses on increasing national scientific capacity for the identification, planning and implementation of adaptation options and measures. To do this, Climate Analytics accompanies climate service providers (CSPs) such as national universities, research institutes and government agencies in conducting vulnerability studies and identifying adaptation priorities. The science-based documents are submitted to policymakers with the aim of increasing science-based policy formulation (Climate Analytics, 2019). The collaboration with national CSPs and the strong interlinkage between research and policy foster long-term outcomes.

Another crucial factor in guaranteeing long-term impact is the provision of funding and the ongoing financing of activities. A very successful example is PhytoTrade Africa, the southern African natural products trade association, which is a regional trade association, with small-scale enterprises in eight countries in southern Africa. Its primary objective is to supplement the income of poor rural communities, particularly those living in marginal dryland areas, through the commercialisation of a range of natural products, derived from sustainably managed, indigenous floristic resources. It has a sustained commitment to biodiversity conservation and economic prosperity by strengthening bio-trade in southern Africa (FFEM, n.d.; IFAD, 2014). The aim is to create social and economic value through the sustainable use and conservation of southern African plant biodiversity (PhytoTrade Africa, n.d.). Founded in 2001, it has evolved into a self-funded organisation.

When it comes to the wider use and application of developed tools and resources, the Flood Resilience Portal, managed by the Zurich Flood Resilience Alliance, provides practitioners who live and work in flood-affected communities with easy access to the resources they need to build resilience to floods (Practical Action, 2021). The Alliance has developed the Flood Resilience Measurement for Communities (FRMC) tool, in co-development with research institutions and practitioners. Besides providing a variety of types of resources related to flood resilience, the Alliance has (regional) knowledge platforms in local languages – for example, the Bangladesh Flood Resilience Portal, with many resources in Bangla (https://floodresilience.net.bd/) and one for West Africa in French (https://resilience-inondations.net/).

The DARAJA project addresses vulnerability to extreme weather events in informal settlements by co-designing climate information services and forecast products and creating new communication channels to enable improved decision-making and improve resilience. The new services and forecasts are more accessible through the use of popular channels such as SMS or radio to convey information in a simplified language (KDI, 2020). The results of questionnaire revealed that information shared through DARAJA pilot projects in Nairobi and Dar-es-Salaam was 'very well' understood by local residents, mostly due to the language that was used, how the advice was provided and the fact that the technical terms of the forecast were explained. Almost all respondents in Nairobi (98 per cent) and Dar-el-Salaam (92 per cent) stated that they use the information provided to take preparatory action (in comparison to three-quarters in the baseline). The most common actions that were undertaken as a result of access to the forecast were decisions on what type of clothing to wear, whether it was necessary to clean household drains, make repairs to the house or move belongings to a safe space (Resurgence, 2020).

UK Department for International Development

6

Research processes address structural inequities that lead to increased vulnerability and reduced adaptive capacity of those at risk

This section focuses on the question: how can research address the root causes of risk? Risk is a nebulous term, but in terms of climate change and adaptation, it is associated with the likelihood of exposure to a hazard that can cause harm. It is widely accepted that there are certain groups in society who are more at risk from the impacts of climate change for several interrelated reasons, including geographical location, aspects of identity and socio-economic status. Alongside risk is the notion of vulnerability. While the definition of vulnerability is highly contentious, most adaptation scholars agree that vulnerability is socially and politically generated (Neef et al., 2018). The root causes of vulnerability are often gender-based, economic and political, preventing vulnerable groups from being able to shape how they live. Climate change and adaptation solutions have differentiated impacts, which is reflected in the differentiation of vulnerability across society. The understanding of vulnerability to climate change has grown significantly to encompass its differentiated nature, as well as the intersectionality of multiple vulnerabilities experienced by particular social groups (CCAFS, 2021).

Adaptation action research brings into focus women, youth, children, disabled and displaced people, Indigenous Peoples and marginalised ethnic groups as key groups who are vulnerable to the impacts of climate change. The structural inequalities preventing these vulnerable groups from accessing, participating and leading adaptation AR are historical, layered and not easily dismantled. However, for adaptation AR to support these vulnerable groups, the structural inequalities and barriers holding them back must be overcome. AR is a valuable platform from which to develop and implement inclusive and collaborative processes that not only enable greater access for these groups, but also support them to meaningfully participate in shaping adaptation action.

GENDER-DIFFERENTIATED IMPACTS OF CLIMATE CHANGE ARE WIDELY CITED, WITH WOMEN (AND YOUTH) UNDERSTOOD TO HAVE MULTIPLE COMPOUNDING VULNERABILITIES OFTEN AS A RESULT OF THEIR SOCIO-CULTURAL ENVIRONMENTS.

(CCAFS, 2021)

Gender-differentiated impacts of climate change are widely cited, with women (and youth) understood to have multiple compounding vulnerabilities often as a result of their socio-cultural environments (CCAFS, 2021). The literature acknowledges that some relationships between researchers and vulnerable stakeholders have been exploitative or exacerbated vulnerabilities (Eriksen et al., 2021). Therefore, it is important that efforts are made to consider differentiated vulnerabilities and to firmly establish partnerships built on trust and mutual respect. Within adaptation literature, references are made to recognising the value of localised experiential knowledge (Altieri & Nicholls, 2017); accounting for the unequal power relations between vulnerable communities and other stakeholders throughout the research process (Altieri & Nicholls, 2017); not predetermining adaptation needs but integrating a plurality of voices into the co-design and co-implementation of actions (Altieri & Nicholls, 2017); and finally, acknowledging that the impacts of climate change are entangled with other social, economic and environmental issues, and effective adaptation action should reflect this (Bezner Kerr et al., 2018). It is important that adaptation AR moves beyond being sensitised to the struggles of vulnerable groups, and towards providing supporting apparatus that enables meaningful and empowering involvement.

Addressing structural inequalities within the research process, while challenging, is crucial to ensuring that adaptation AR can be made more inclusive and just, and that adaptation solutions are more equitable and sustainable. This section highlights the importance of the partnership between researchers and stakeholders, particularly the relationship with vulnerable and marginalised communities. The following sections analyse how projects sought to include these vulnerable and marginalised voices, as well as exploring how these perspectives were incorporated into various stages of the research process.

Martin Wright/Ashden

6.1 Research approach

In this section, we have paid attention to finding evidence in relation to the following criteria:

- *Integration of root causes of vulnerability, into the process*
- *Have vulnerable groups and community members' voices and knowledge of the local context been incorporated into the project?*
- *What were the tools or methods employed for incorporating community voices?*
- *Have specific methods/approaches been applied to integrate vulnerable groups and voices, as well as making them more visible?*
- *Conceptualisation of vulnerability:*
  - *Was an excessive focus on exposure or hazard avoided?*
  - *Was there a sufficient focus on adaptive capacity/vulnerability as opposed to exposure?*
  - *Can the project be situated on the left-hand side of the adaptation continuum?*
- *Equitable partnership between researchers and stakeholders (in particular marginalised and vulnerable groups)*
- *Meaningful participation from vulnerable and marginalised groups.*


Georgina Smith/CIAT

6.2 Findings

The main finding when reviewing the AR projects in light of the above questions was that implementing teams needed to *intentionally* incorporate root causes of vulnerability into the process of problem identification and solution design; incorporate the voices of community members and local contexts; and ensure equitable partnerships between researchers and stakeholders (especially marginalised and vulnerable groups). This is not an automatic outcome unless it is built into the design of the project and is ensured through a deep understanding of vulnerability, socially differentiated adaptive capacities and sensitivity to climate exposure and risk.

A gender lens is incorporated into the AR process of various projects by following slightly different approaches:

- In Chad, women interviewed as part of the research become key informants about structural inequalities they faced.
- Consultative Group on International Agricultural Research (CGIAR) scientists utilise analytical and consultative methods to build evidence towards a deeper understanding of gender-specific vulnerabilities in the agricultural sector of Ghana.
- In Vietnam, the ResilNam project is run by women-led CSOs to achieve flood resilience, incorporating their particular social circumstances and supported by researchers and donor organisations.

Andrew Wu/World Resources Institute

Detailed findings

Concern Worldwide and its partners are running the BRICS project, as part of the larger BRACED programme, to build community resilience amongst 280 000 people in the face of the effects of regular droughts in West Darfur, Sudan and Eastern Chad. A key focus area is to address gender imbalances through cultural sensitivity and to enhance women's participation in decision-making processes by applying a gender-transformation approach. Researchers on the project discovered that the biggest worry for interviewed women was not drought or failed crops, but violence against them. Researchers incorporated these risks into their definition of resilience, involved Chad's Minister of Women and shared findings in a ministerial workshop. An important recognition is to not typecast women as mere victims of climate change and disasters. The project and processes acknowledge the structural inequalities that prevent women's active participation in climate adaptation, undermining their capacities to anticipate, absorb and adapt to climate extremes. In places where gender-based violence is prevalent and is a social norm, resilience programmes will need to adopt a human rights-based approach: arguably, simply being sensitised to gender issues and inequalities is not enough. When activities aim to tackle harmful norms, there is at least some potential for transformation.

CGIAR is catalysing transformation to create better food systems, which will require an infusion of new knowledge, tools, policies and business models. The global challenges associated with the world's food system require building a new relationship between food, landscapes and people, supported by science (https://www.cgiar.org/research/). The fifteen CGIAR Research Centres are independent, non-profit research organisations, involving more than 8 000 scientists and researchers, technicians and staff. CGIAR is working towards a better future for the world's poor, often in vulnerable circumstances that are socio-economically entrenched. The concept of climate-smart agriculture (CSA) emerged as a solution to transform and reorient agricultural systems to

support food security under the new realities of climate change (FAO, 2013). There is also wide recognition and international consensus that the design and implementation of climate change responses must consider gender-specific differences in the capacity to respond to climate change (FAO & World Bank, 2017). The interlink between gender, climate change and CSA is at the heart of recent development research programmes. Gender inclusion is at the core of all CGIAR's Climate Change, Agriculture and Food Security (CCAFS) Flagship plans for 2021. However, according to a recent report covering the gender profile of CSA in Ghana, there is limited information on gender-sensitive CSA practices, the extent of their adoption and their role in gender empowerment. Therefore, research is needed to inform the integration of gender-responsive action into agriculture and CSA development plans, policies, investment programmes and strategies, particularly in developing countries where the vulnerability to climate extremes is highest (CCAFS, 2021). Based on preliminary analysis of baseline data, and wide stakeholder consultation, the report stresses the need to establish gender-sensitive vulnerability indices for each agroecological zone in Ghana and then to use them in policy decisions and to garner support for CSA investments.

The ResilNam urban project (ecology- and gender-based flood resilience building programme in Thua Thien Hue, Central Vietnam) responded to flooding in urban areas, through ecosystem-based disaster risk reduction approaches. Such approaches included wetland restoration, unblocking old drainage systems and the dredging of canals to improve flood regulation capacity and enhance recreational functioning (Vidal Merino et al., 2021). Although women were assessed as being highly vulnerable to climate disasters, through research and gathering local insights, they were also found to play an important role in valuing and conserving nature. Working with local and regional authorities and stakeholders from civil society, the project seeks to overcome structural differences that make women especially vulnerable to floods. Recipient of the 2021 Risk Award of the Munich Re Foundation, a related initiative called Strong Roots, Strong Women empowers women for community and coastal ecosystem resilience in Central Vietnam (My, 2021). The research component of this project, involving researchers from University of Potsdam, produces outputs such as journal articles, capturing research that feeds back to the practice of disaster risk reduction in urban areas from flooding, and policy briefs towards greater awareness of flood risk and vulnerability among policymakers and informing a greater role for women in building flood resilience.

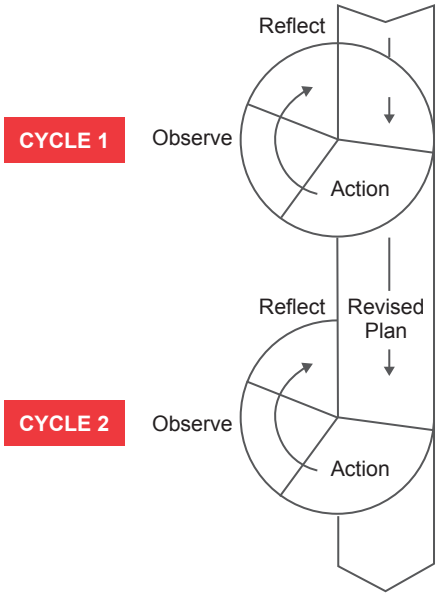
James Anderson/WRI

7

Learning-while-doing enables adaptation action to be evidence-based and increasingly effective

An important aspect of AR is the cyclical nature of the research process. A very simple model is the one developed by Stephen Kemmis and Robin McTaggart (1988), where each cycle has four steps: planning, taking action, observing and reflecting, before again, planning the next cycle (Huntjens et al., 2015; O'Brien, 2001; Waterman et al., 2001). Theory and practice are therefore closely interlinked, constantly informing the process in the two directions. The cycles of action and reflection help to make change processes more robust and effective by enabling continuous adjustment of action (German et al., 2012). Both qualitative and quantitative methods can be used for the evaluation. Again, the close interlinkage between researcher and practitioner enables a close collaboration within the different steps of the cycle. It can therefore be said that while AR projects might have a specific starting point, they do not have a defined end date (Mertler, 2019). For example, when cooperating with national universities or research institutions in a particular country, monitoring and evaluation activities can be taken over by generations of students long after the project has ended (see also section 6). This enables long-term improvements for the next phase of implementation and even further into the future.

FIGURE 7: The cyclical action research model



Source: based on Kemmis and McTaggart (1988)

7.1 Research approach

Questions related to the **integration of research findings into ongoing implementation efforts** were defined as follows:

- *Have tracking, learning and sharing processes been in place at different scales (biweekly check-ins, quarterly reports and annual get-togethers, connected to a MEL or project management framework)?*
- *How often were tracking, learning and sharing processes undertaken?*
- *Has flexible and adaptive management been in place through open communication?*
- *Was at least one member from each organisation part of the planning and management through open communication (for example, online tools such as chats, channels and so on)?*
- *Have there been feedback loops between research and action components (regular structure for discussions, interactions and information sharing, which is also flexible as the project evolves)?*
- *What mechanisms were in place for feedbacks between research and action components?*

Questions related to the **building of an evidence base**:

- *Is there an evidence base of the ongoing research through journals, process reflections, and so on?*
- *Is there an evidence base on related and emerging research (external to the project) reflecting 'learning from what others are doing'?*
- *Is there a parallel base on related, emerging research, produced by the project team?*
- *Are there regular reviews, analysis and assessments of topical and region-specific knowledge (incorporating both project-related and wider knowledge) reflecting 'learning from what no one is doing, yet!'*
- *Were regular review, analysis and knowledge gathering on related topics undertaken?*

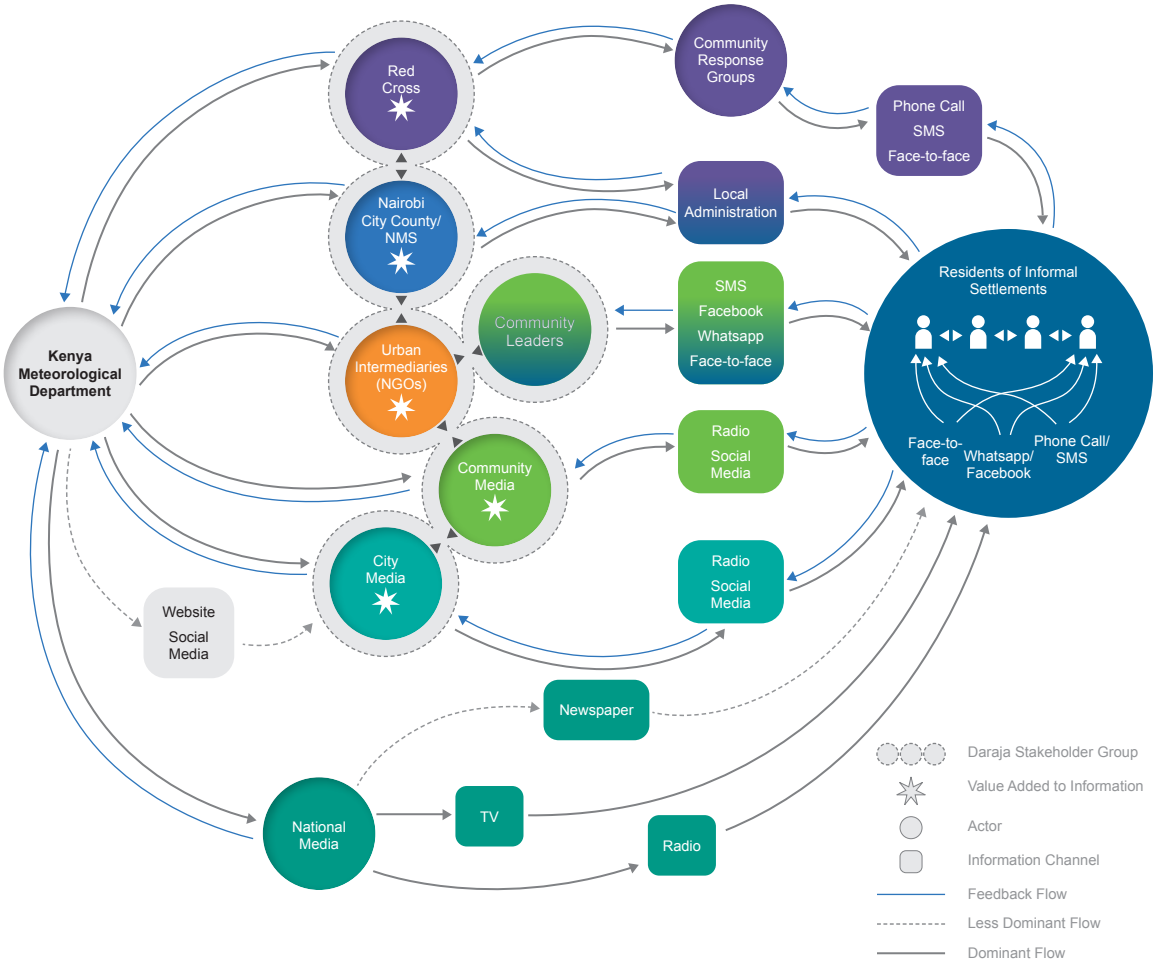
Questions related to **responses to highly uncertain situations through evolving knowledge** (and a need to act quickly and at scale):

- *Was there a collective awareness of sources of uncertainty and room for their incorporation into project design?*
- *Was the project plan designed with flexibility and devolution of decision-making?*
- *Do decision-making protocols enable quick, efficient decisions, made at the appropriate scale?*
- *Are there reflections on decision-making?*
- *Was/is dynamism in response to highly uncertain situations rewarded/acknowledged?*
- *Qualitative – how was collective decision-making effectively achieved?*

7.2 Findings

The application of research outcomes in practice can be influenced by external variables and may vary from theoretical considerations. Therefore, designing and implementing pilot projects that leave room for improvement and feedback is vital to enhance theoretical frameworks and solutions on the ground. The DARAJA project has implemented two pilot projects – in Nairobi and Dar es Salaam – implementing a new, inclusive and dynamic weather and early warning information system. The model foresees feedback loops between the Meteorological Department, stakeholder groups and the end-user to improve the channels and climate information provided (see figure 8). By providing regular feedback in this phase of implementation, possible improvements and lessons learned are assessed and adjustments are made to the pilot services (Met Office, n.d.; Resurgence, 2021).

FIGURE 8: Nairobi's new inclusive and dynamic weather and early warning information map pioneered under DARAJA



Source: Resurgence (2021)

The MRED Programme is subdivided into different phases, entering its third phase in 2020. Launched in 2013, the programme began with laying the foundation for MRED's integrated model, building private sector and government partnerships in Nepal, Timor-Leste and Indonesia.

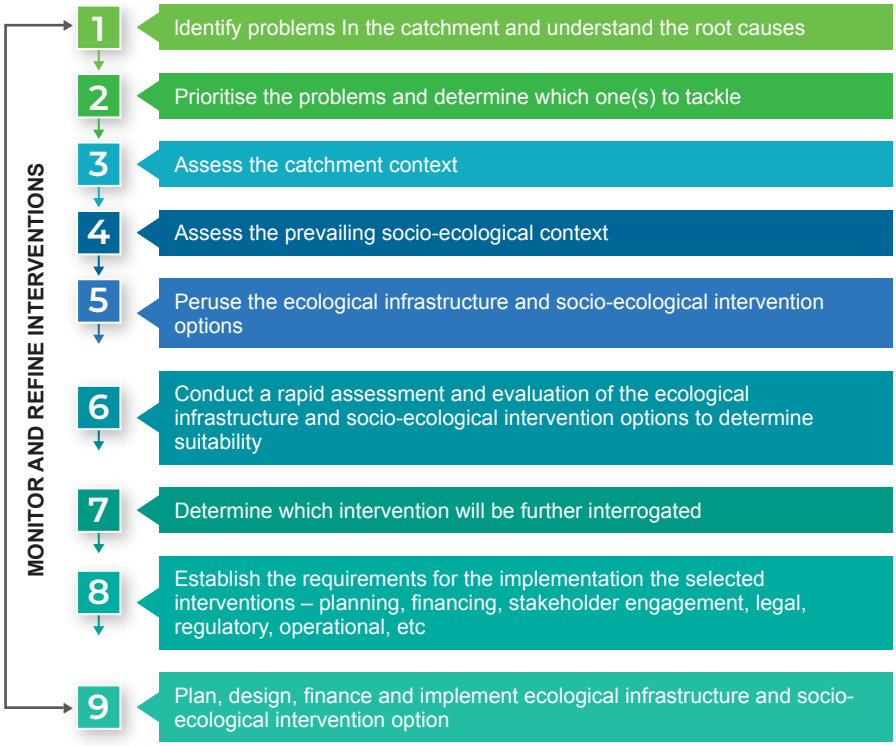
These partnerships continued into phase II of the programme and played an important role in the design and implementation of some of the activities. Based on several assessments during that phase (for example, gender assessments, post-flood and post-windstorm studies), the activities and measures in MRED communities have shown positive impact (Craft et al., 2020).

Learning by doing is a key component of the BRACED BRICS project and the intention is that projects adapt activities and interventions as they discover what works and what does not. For example, community nurseries were set up as pilots, to make tree-planting materials more accessible to smallholder farmers and to train them in tree propagation and management methods (Tsobeng & Degrande, 2017). Different approaches were tried as pilots in villages in eastern Chad, including introducing new varieties of tree species that thrive in dry conditions and grafting to create new independent and resilient plants.

LEARNING BY DOING IS A KEY COMPONENT OF THE BRACED BRICS PROJECT AND THE INTENTION IS THAT PROJECTS ADAPT ACTIVITIES AND INTERVENTIONS AS THEY DISCOVER WHAT WORKS AND WHAT DOES NOT.

As mentioned in the previous section on the Transformative River Management Programme, the Ecological Infrastructure and Socio-Ecological Toolkit is guided by seven principles, one of them being the ability to be responsive and flexible. For an intervention to be sustainable requires flexibility and adaptive management as well as the monitoring and refinement of measures (C40 Cities Finance Facility, 2020, p.40). The planning and implementation of different interventions can be seen as a circle (see figure 8).

FIGURE 9: Transformative adaptation of rivers in an urban context: Ecological Infrastructure and Socio-Ecological Toolkit – Recommended steps



Source: C40 Cities Finance Facility (2020)

8

Conclusion

The evidence review has selected and analysed twenty projects and initiatives, presenting a snapshot of iconic examples of adaptation action research. The projects that were scrutinised have a predominant and primary focus on research outcomes, while others are action projects that have a complementary or aligned research component. Pre-dating the formal development of the six Adaptation Research for Impact Principles, these projects have provided evidence of adaptation AR in practice while offering preliminary insights into how the principles emerge and interact in particular contexts. This work can inform what the ARA is advocating for – adaptation AR that is led by the Global South, collaborative and co-developed, while also helping to further fine-tune the understanding and the operationalisation of the Adaptation Research for Impact Principles. Contributing to the ongoing conversation on adaptation AR, this review can add value by sharing insights and highlighting good practices from iconic examples, which can support evidence-based adaptation actions.

This initial process of scanning adaptation projects from across the Global South, that employed good practices of AR has revealed several key insights:

- The projects show a **great variety of adaptation solutions**, such as planning and management activities, policy design or capacity development and how research outcomes can inform the design and implementation of those in different ways.
- The projects sit along a **continuum**, where some meet the criteria for several of the six ARA principles simultaneously, while others are less aligned with the principles. These projects tend to feature more often than others, across the different chapters of this study.
- Even though the number and selection of projects only displays a limited spotlight in the vast areas of adaptation AR projects, **climate information services** and **early warning systems** had a high occurrence among both rural and urban projects.
- Some projects utilised a **multi-sectoral approach**. For example, BRACED (and its component project BRICS) focuses on agriculture and food security, public health and hygiene, and gender sensitivity in practice, in addition to early warning systems. Similarly, the Kibera Urban Flood Resilience project concerns itself with several gaps in the informal settlements of Nairobi, such as economic opportunities, attention to early childhood development and community empowerment, in addition to physical and natural solutions for flood risk mitigation. A multi-sectoral approach is able to address the multi-layered and intersecting vulnerabilities faced by communities, and to build upon synergies.

- While some projects have been initiated from the bottom up and attracted **donor funding** and multiple institutional partners during their tenure, such as the Mukuru Special Planning Area (SPA) process by the Muungano Alliance in Mukuru, others have had to stop, or reduce their activities, when external funding is no longer available or is reduced. This is true of the Terai Arc Landscape programme in Nepal and the Climate-SDG Integration project in Maharashtra, India. At the opposite end of the spectrum is an initiative project such as PhytoTrade, which is financially self-sufficient in its operations and delivers on several of the criteria simultaneously.
- Projects that applied **participatory approaches** and aimed for a close collaboration of researcher and the most vulnerable, by putting their needs and voices at the centre, often fulfilled multiple principles. This can be seen in the MHT's project on Women's Action towards Climate Resilience for Urban Poor in South Asia in Ahmedabad.
- Projects and initiatives that were rated exemplary in fulfilling one of the principles almost always incorporated similar values into their project design or research process **right from the beginning**. The intentional integration of criteria at the beginning of the programme design is therefore crucial to the success of the intended outcomes.
- When the principles are put into practice, there are often **overlaps and strong synergies** between them, showing how the application of one (or more) principles often leads to the facilitation of another principle.


Ryan Brown/UN Women

8.1 Operationalising the Adaptation Research for Impact Principles

Along with the consultation of academic and grey literature, we present good practices for operationalising and applying the Adaptation Research for Impact Principles. Such practices include the following:

(1) Related to principle 1

Placing people or beneficiaries at the core of the project ensures that research is demand-driven and solutions-oriented. Operating only on demand of communities, as in the case of the Chinantla Forest Monitoring project, ensures that activities address the needs of the beneficiaries and creates ownership and leadership, increasing the likelihood that activities are taken forward independently after the project cycle has ended. Collaborating with local partners such CSOs that have been rooted in the community for many years, as in the case of the MHT, allows for problem identification based on the communities' needs. Only if activities are tailored to the needs of local actors and communities, can real solutions be designed, applied and sustained over time.

(2) Related to principle 2

Finding innovative and democratic ways for incorporating the voice and views of local communities, throughout the research process, including in the problem identification phase, enables their participation in the research process as equal partners. The Urban Flood Resilience project by the Kounkuey Design Initiative in Kibera, the Mukuru Special Planning Area (SPA) process by the Muungano Alliance in Mukuru and the MHT's work in India are examples of co-producing research with stakeholders, and thereby incorporating elements of transdisciplinarity. Additionally, involving local CSOs in meaningful and co-creative ways helps researchers to learn from those who are closest to the lived experience of climate change and vulnerability.

Michael Eko/Climate Visuals Countdown

3 Related to principle 3

Research becomes relevant when it responds to locally identified issues, allowing stakeholders to co-define the problem – and the solution. This principle relates to the accountability, relevance and rigour of research produced, so as to have not only a scientific impact, but also societal impact. Based on the typology provided by Belcher and Halliwell (2021) on elements of research impact, AR can generate measurable outcomes and/or realised benefits (societal outcomes), in addition to knowledge outputs. Knowledge partnerships between different actors (such as community co-operatives for stream management) in the Transformative River Management Projects brought additional complexity, and yet also released creativity and flexibility, towards strengthening local enterprises and creating jobs (realised economic benefits) and waterways management (realised environmental benefit). The societal impact envisioned through the Climate-SDG Integration Project is to inform climate adaptation policy by generating and disseminating insights about enabling conditions for scaling EbA in India and Guatemala. While the policy outcome may not have been realised yet and may be difficult to attribute directly to this project alone, the network formation among consortium partners is an outcome that yields change in knowledge, attitudes, skills, relationships and behaviours among involved actors and supports the strengthening of this adaptation actor community, towards the of scaling of EbA. The Buffelsdraai Landfill Site Community Reforestation Project offered a triple-win opportunity for addressing biodiversity loss, carbon sequestration and enhancement of ecosystem services through land restoration. Within a decade, a biodiverse forest was established, through trees provided by adjacent rural communities, trained by a local NGO.

4 Related to principle 4

To ensure long-term impact, capacities of stakeholders should be built sustainably while findings and lessons are shared and disseminated. For example, the PAS-PNA project strengthens the national science–policy interface, working collaboratively with scientific institutions, national universities and government agencies to integrate informed research data into policy planning. Also, the Climate-SDG Integration Project produced case studies of EbA in India and Guatemala to inform policy processes, while the Terai Arc Landscape project informs national planning policies to ensure long-term activities. The leadership of local communities or municipalities can enhance long-term engagement, going beyond a project cycle, as in the case of the Rosario Urban Agriculture Programme in Argentina. Application-oriented toolkits and toolkits in local languages are key outputs of the Transformative River Management Programme in Durban, the Flood Resilience Portal, managed by the Zurich Flood Resilience Alliance and the Faecal Sludge Field Laboratory.

5 Related to principle 5

Within adaptation research, different drivers of vulnerability should be considered, as vulnerable people are located within a complex system where different sources of risk interplay. The Mukuru Special Planning Area (SPA) process by the Muungano Alliance in Mukuru, the Urban Flood Resilience project in Kibera and the Climate-SDG Integration project in India integrate the multiple ways in which the climate crisis overlaps and intersects with public health risks, sanitation needs, food security and nutritional needs of communities. Additionally, being inclusive of vulnerable and marginalised voices and incorporating their perspectives into the research process can go some way to addressing root causes of vulnerability. Such vulnerability can be gender-based, economic and political, with particular social groups facing an intersectionality of multiple vulnerabilities, preventing them from meaningful participation towards shaping adaptation action. Good practices for AR in the context of this principle aim to shift attitudes, relationships and behaviours, as well as knowledge production processes, to directly address structural inequalities that prevent the involvement of marginalised groups in meaningful ways. For example, the CCAFS has put gender

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inclusion at the core of all CCAFS Flagship plans for 2021, while means for implementation are still improving to foster gender-responsive action. Furthermore, a gender-transformative approach in the BRICS project enabled the participation of women stakeholders as key informants in the research process, and the ResilNam project works with multiple stakeholders to overcome structural differences that entrench women's vulnerability to floods and their impacts.

6 Related to principle 6

A rigorous MEL process is a key component in AR, making sure that actions are evidence-based. Feedback loops by stakeholders and practitioners enables constant improvement of activities while also informing the theoretical development of frameworks for uptake and upscaling. For instance, evaluation of projects at intermediate phases can inform and improve ongoing project processes, while impact assessments and feasibility studies can feed into new programme design. In the BRICS project, researchers build on learning from decades of development practice, while collaborating with local organisations. The project seeks to make adaptation outcomes measurable and aims for projects to have ambitions for societal impact, while remaining flexible towards learning feedbacks from stakeholders, implementers and partners. Projects such as DARAJA incorporated regular feedback in their pilot phases, while the MRED programme was able to measure positive impacts on their communities, through various activities and measures during the second phase of the project.

The theory of change for research impact (see section 1.3) can guide further analysis and operationalisation of the principles by placing them in the wider research framework and exploring linkages between them. It can help to embed the project in the wider system, by keeping in mind influences that go beyond the sphere of control, focusing the planning and implementation on long-term impacts.

For adaptation researchers this review should provide key references for learning how to design and conduct exemplary AR, while being guided by the key principles, and ways for engaging with adaptation action projects. **For adaptation funders**, the review puts forth the wide array of action research initiatives, which are innovating, piloting and implementing new ways of bridging the research-to-practice dichotomy, and how funding could assist in scaling and unlocking long-term co-creation of adaptation with affected communities. **For adaptation practitioners**, the review hopefully provides examples of how adaptation projects in the action domain could benefit from the involvement of the research community for collaborative knowledge production, informing future adaptation project design and implementation, and generating evidence to uphold or change processes. **For the broader adaptation community**, this review is a call for greater collaboration towards generating evidence that supports the wider application and validation of the Adaptation Research for Impact Principles.

8.2 Recommendations

This is a preliminary exercise that has greatly enriched our understanding of the projects and initiatives that were reviewed. We found that there is a large diversity in the scale, size and scope of projects and long-term initiatives that may be considered representative of good practices in AR. We find that there is great potential in gathering finer detail, in collaboration with involved researchers and involved practitioners to deepen our analysis and offer more nuanced insights into AR in practice – in other words, tracking, learning and sharing from AR to inform future programme development, underpinning processes and funding mechanisms. Principles have been proposed alongside an evidence review in *Scaling Impact* by the International Development Research Centre (McLean & Gargani, 2019), as a method for guiding analysis, case studies and further embedding of the principles themselves.

As a result, we recommend the following next steps:

- Consolidating the outcomes from the evidence review with practitioners, in order to understand and learn from the finer details on how project outcomes were achieved, the challenges encountered and how they were overcome.
- Further discussion on terms such as action research, research for impact, and research into use, in order to establish a common understanding towards increased collaboration between different communities.
- Working with partners whose projects are part of this review to exchange ideas and learn more about the further development and implementation of the principles.
- Taking this review as a starting point to further operationalise the principles in exchange with researchers and practitioners, including agreed definitions of key terminology and development of indicators.
- Working with funders on issues of how the principles can be enhanced by conducive funding practices and modalities.
- A more rigorous analysis with a greater sample size and exhaustive research framework is needed to further fine-tune the principles and derive reliable, valid and objective outcomes.
- Conducting further analysis to examine to what degree the principles are applicable and valid for different types of adaptation AR.
- Link the collaboration with practitioners and researchers to inform other work streams in the ARA, such as the co-creation space and the tracking, learning and sharing work stream.

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Annex 1 List of projects and key information

NO.	PROJECT NAME	FOCAL ORGANISATION	DURATION	FUNDER	LOCATION
1	Terai Arc Landscape Programme: Successfully conserving critical corridors and bottlenecks using community-based adaptation	Ministry of Forests and Soil Conservation, Nepal and WWF Nepal	Second phase: 2015–2025	Various sources (e.g., USAID, SNV Netherlands Development Organisation, DFID)	Terai region, Nepal
2	Mukuru Special Planning Area (SPA)	Muungano Alliance	2017 – ongoing	Cities Alliance	Nairobi, Kenya
3	DARAJA	Resurgence	2018–2020	Initially: FCDO, WISER	Nairobi, Kenya Dar es Salaam, Tanzania
4	Women's Action towards Climate Resilience for Urban Poor in South Asia	Mahila Housing SEWA Trust	2016–2018	Global Resilience Partnership	Ahmedabad, India
5	Managing Risk through Economic Development Phase-II (MRED-II)	Mercy Corps	2016–2020	Margaret A. Cargill Philanthropies	Timor Leste Nepal
6	Community Empowerment and Resilience in Chinantla: Building capacity for locally led forest monitoring	Ecologic Development Fund	Ongoing	Ecologic Development Fund	Chinantla, Mexico
7	Buffelsdraai Landfill Site Community Reforestation Project	eThekwini Municipality	2008 – ongoing	eThekwini Municipality	Durban, South Africa
8	Sustainable Food Production for a Resilient Rosario	Rosario Municipality	2002 – ongoing	Rosario Municipality	Rosario, Argentina
9	Central KwaZulu-Natal Climate Change Compact (Compact KZN)	Urban LEDS	2014 – ongoing	Various municipalities	KwaZulu-Natal Province, South Africa
10	CFF Transformative River Management Programme	eThekwini Municipality	First project started in 2010 – ongoing	Several	Durban, South Africa
11	ResilNam – Coastal: Ecology and gender-based flood-resilience building	University of Potsdam, Germany	2017–2018	Global Resilience Partnership & Water Window	Thua Thien Hue Province, Vietnam
12	High Impact Weather Lake System (HIGHWAY) Project	World Meteorological Organisation	Ongoing	WISER(FCDO)	Lake Victoria region (Uganda, Rwanda, Tanzania, Kenya)
13	BRICS: Improving community resilience through climate-smart agriculture, health and early warning systems	Concern Worldwide, UK	2015–2018	BRACED (FCDO)	Sudan & Chad
14	PAS-PNA: Science-based National Adaptation Planning in sub-Saharan Africa	GIZ, Climate Analytics	2016–2019	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)	Senegal, Burkina Faso & Benin
15	PhytoTrade Africa	PhytoTrade Africa	2001 – ongoing	Various (e.g. FFEM, AFD, IFAD)	Southern Africa
16	CGIAR Research Programme on Climate Change, Agriculture and Food Security (CCAFS)	CCAFS	Ongoing	CGIAR Trust Fund donors, bilateral funding agreements	Several
17	Faecal Sludge Field Laboratory	IFRC	2015 – ongoing	Humanitarian Innovation Fund, Swiss Agency for Development and Cooperation, Swedish Red Cross	Malawi and elsewhere
18	Zurich Flood Resilience Measurement for Communities	Zurich Flood Resilience Alliance	2013–2018 phase I, 2018 – ongoing phase II	Zurich Foundation	Multiple
19	Building Urban Flood Resilience	Kounkuey Design Initiative (KDI)	2015–2016	Swiss Re Foundation	Kibera (Nairobi), Kenya
20	Climate-SDG Integration Project: Supporting the implementation of the Paris Agreement and the 2030 Agenda through EbA	WOTR, TMG Research gGmbh	2018–2021	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)	Guatemala & Maharashtra, India

Annex 2 Definition of indicators and guiding questions

1	2	3	4	5	7
ARA PRINCIPLE	NO.	CRITERIA	DEFINITION (where necessary)	INDICATAOR (including threshold)	KEY QUESTIONS FOR CONTENT ANALYSIS
P1	1.1	**Demand-driven/ needs-driven**		**1.1a** Research design, questions and objectives have been endorsed by local stakeholders/ beneficiaries **1.1b** Stakeholders/ beneficiaries were consulted early in the process	How were local organisations engaged? **a)** direct partners (paid by funder) **b)** indirect/subcontracted partners (paid by funded agency) **c)** informants through interviews/workshops
	1.2	**Solution-orientation**		**1.2a** Concrete outputs that go beyond written research outputs/ knowledge-generation were defined ahead of the research	Can be process-related What were the concrete outputs that were defined in the proposal? **a)** academic publications **b)** +policy briefs **c)** +blogs, infobriefs, infographs – accessible **d)** toolkits for implementation **e)** innovative solutions with a physical manifestation – infrastructure, buildings – in allied sectors (agriculture, health, etc.)
	1.3	**Positive livelihood impact for people at risk**	Established indicators – socio-economic development indicators (e.g., income-related)	**1.3a** Established developmental output indicators have changed/are likely to change positively for a significant number of beneficiaries **1.3b** Relevant policies and strategies have changed/are likely to change positively **1.3c** Relevant enabling environments (legal frameworks, institutional procedures, etc.) have changed/are likely to change positively	**1.3a** Were developmental output indicators proposed and reported upon? What were they? **1.3b** Were specific policies and strategies targeted for change? Which ones? **1.3c** Which aspects of enabling environments were mentioned for positive impact?

1	2	3	4	5	7
ARA PRINCIPLE	NO.	CRITERIA	DEFINITION (where necessary)	INDICATAOR (including threshold)	KEY QUESTIONS FOR CONTENT ANALYSIS
P2	2.1	**Transdisciplinarity**		**2.1a** Research team consist of more than five people	What was the composition of the research team?
				2.1b Researchers have background (university degrees) covering at least three distinctively different disciplines	What were the researchers' disciplinary backgrounds?
				2.1c Has the research team has been trained in transdisciplinary research methods/ processes?	
	2.2	**Co-production**	Principles of co-production	**2.2a** Has the research design process involved a diverse group of actors? Have minorities been involved?	Was co-production a stated aim of the project? Did it involve minorities?
			Diverse group of actors = representatives of …	**2.2b** Has a specific facilitation method (enhancing co-production) been applied?	What was the specific facilitation method applied?
	2.3	**Inclusiveness of research design/ implementation process**		**2.3a** Have inclusive (non-hierarchical) forms of decision-making about the research design been applied?	How was the research-design process undertaken? Could it be understood as non-hierarchical?
P3	3.1	**Societal impact**		See 1.3	Potential overlap with 1.3 or distinction from 1.3 needs to be made
	3.2	**Uptake of research results/findings**		**3.2a** Have research results been transformed into/ used in non-academic outputs?	Which non-academic outputs were planned and delivered (see comments for 1.2 above)
				3.2b Has a significant share of the budget been assigned for this phase (research uptake) of the project)?	What percentage of budget was allocated for research uptake?
	3.3	**Integration of multiple knowledge types**		**3.3a** If not ensured through physical representation (see indicator 2.2a): has anecdotal evidence/ grey literature been considered in the process?	How was anecdotal/grey literature incorporated into research findings and during implementation?

1	2	3	4	5	7
ARA PRINCIPLE	NO.	CRITERIA	DEFINITION (where necessary)	INDICATAOR (including threshold)	KEY QUESTIONS FOR CONTENT ANALYSIS
P4	4.1	**Impact on capacity levels beyond the research project end-date**	Were local institutions, organisations, actors or researchers responding to climate change beyond the project?	**4.1a** Did knowledge produced during the project feed into local and regional plans for climate change or disaster risk management? **4.1b** Was climate information produced by local actors incorporated into the design of early warning systems? **4.1c** Did capacitated scholars, actors become members of local or regional planning groups for climate change/ disaster risk management?	
	4.2	**Wide availability of information, tools and knowledge products**	Tools and knowledge products are easily accessible for input from users	**4.2a** Information and knowledge products are embedded in engagement activities, such as webinars, presentations and discussion/ focus groups, local platforms **4.2b** Tools and knowledge products are designed in local languages, or interface with local languages, for ease of access **4.2c** Tools and knowledge products are assessed at regular intervals & redesigned by user demands, beyond the project date	
P5	5.1	**Integration of root causes of vulnerability**	Building research on knowledge and understanding of the local context and its realities & challenges	**5.1a** Vulnerable groups and community members' voices and knowledge of the local context are incorporated into the project **5.1b** What were the tools or methods employed for incorporating community voices?	Do researchers take into account that root causes of vulnerability are often complex, entrenched and intertwined with social structures that are deeply embedded and hard to shift? Are social-science tools such as oral histories and ethnographies utilised? Are particular facilitation tools utilised that enhance co-production?

1	2	3	4	5	7
ARA PRINCIPLE	NO.	CRITERIA	DEFINITION (where necessary)	INDICATAOR (including threshold)	KEY QUESTIONS FOR CONTENT ANALYSIS
P5	5.2	**Equitable partnership between researchers and stakeholders (in particular marginalised and vulnerable groups)**			Overlap with 2.2
	5.3	**Meaningful participation from vulnerable and marginalised groups**			Overlap with 2.3
P6	6.1	**Integration of research findings into ongoing implementation efforts**		**6.1a** Tracking, learning and sharing processes in place at different scales (biweekly check-ins, quarterly reports and annual meetings, connected to a MEL or project management framework)	How often were tracking, learning and sharing processes undertaken?
				6.1b Flexible and adaptive management in place through open communication	Was at least one member from each org. part of a co-ordination hub managed through an online communication system via chats/ channels?
				6.1c Feedback loops between research and action components (regular structure for discussion, interaction and information sharing that is also flexible as the project evolves)	What mechanisms were in place for feedbacks between research and action components?
	6.2	**Building of an evidence base**		**6.2a** Building of an evidence base on ongoing research (project-related) through journals, process reflections	Is there an evidence base of the ongoing research?
				6.2b Building of an evidence base on related and emerging research (external to the project) reflecting 'learning from what others are doing'	Is there a parallel base on related, emerging research, produced by the project team?

1	2	3	4	5	7
ARA PRINCIPLE	NO.	CRITERIA	DEFINITION (where necessary)	INDICATAOR (including threshold)	KEY QUESTIONS FOR CONTENT ANALYSIS
P6	6.2	**Building of an evidence base**		**6.2c** Regular review, analysis and assessment of topical and region-specific knowledge (incorporating both project-related and wider knowledge) reflecting 'learning from what no one is doing, yet!'	Were regular review, analysis and knowledge gathering on related topics undertaken?
	6.3	**Response to highly uncertain situations through evolving knowledge (and a need to act quickly and at scale)**	Uncertainly can be experienced at different temporal scales, framed by environmental or socio-political contexts; cross-regional factors with direct/indirect impacts on project-level, local aspects	**6.3a** Collective awareness on sources of uncertainty and room for their incorporation into project design	Was the project plan designed with flexibility and devolution of decision-making?
				6.3b Do decision-making protocols enable quick, efficient decisions, made at the appropriate scale?	Are there reflections on decision-making?
				6.3c Was/is dynamism in response to highly uncertain situations rewarded/ acknowledged?	
				6.3d Qualitative – how was collective decision-making effectively achieved?	

ARA Evidence Review 2

GOOD PRACTICES FOR ADAPTATION ACTION RESEARCH

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