

Rethinking Support for Adaptive Capacity to Climate Change

The Role of Development
Interventions

Findings from
Mozambique, Uganda
and Ethiopia

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and Lindsey Jones



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Cover photo: Ander Kello, Ethiopia. (Haramaya University, 2010)

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Abbreviations

ACCRA	Africa Climate Change Resilience Alliance
AMJ	April, May, June
asl	Above Sea Level
CBO	Community-Based Organisation
CDKN	Climate Development and Knowledge Network
DFID	Department for International Development (of the UK Government)
DJF	December, January, February
DRR	Disaster Risk Reduction
ENSO	El Niño Southern Oscillation
GCM	Global Climate Model
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IPCC	International Panel on Climate Change
ITCZ	Inter-Tropical Convergence Zone
JAS	July, August, September
LAC	Local Adaptive Capacity Framework
MDG	Millennium Development Goal
ODI	Overseas Development Institute
OND	October, November, December
PSNP	Productive Safety Net Programme
SRES	Special Report on Emissions Scenarios by the IPCC
VSLA	Village Saving and Lending Association

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Country reports

Uganda Jones L, F Ayorekire, M Barihaihi, A Kagoro and D Ruta, 2011. *Preparing for the Future in Uganda: Understanding the Influence of Development Interventions on Adaptive Capacity at the Local Level*. ODI/ACCRA.

Ethiopia Ludi E, Million Getnet, K Wilson, Kindie Tesfaye, Beneberu Shimelis, S Levine and L Jones, 2011. *Preparing for the Future? Understanding the Influence of Development Interventions on Adaptive Capacity at Local Level in Ethiopia*. ODI/ACCRA.

Mozambique Arnall A, 2011. *Preparing for the Future in Mozambique: Understanding the Influence of Development Interventions on Adaptive Capacity at the Local Level*. ACCRA.

Executive Summary

The Africa Climate Change Resilience Alliance (ACCRA) is an alliance of five development partners: Oxfam GB, the Overseas Development Institute, Save the Children, World Vision International and Care International. It was established in 2009 with the aim of understanding how development interventions can contribute to adaptive capacity at the community and household level, and to inform the design and implementation of development planning by governments and non-governmental development partners to support adaptive capacity for climate change and other development pressures. This paper is based on an analysis of three country studies conducted by national research teams in eight research sites in Ethiopia, Uganda and Mozambique for ACCRA. It describes the Local Adaptive Capacity (LAC) framework developed for this project, its application during the research, and the evidence found about the impact of development interventions on the adaptive capacity of people and communities.

Change is a constant in the lives of rural people in Africa. For most developing countries, climate change adds another layer of complexity to existing development challenges, such as high levels of poverty and inequality, rapid population growth, underdeveloped markets, poor infrastructure and service provision, and weak governance systems. Development interventions will need to help people and communities to adapt to the interaction of these new and old pressures. Since change is a constant, sustainable interventions can only be achieved if people can adapt them in the future to a changing context.

Adaptive capacity is understood as the ability of individuals and communities to anticipate, deal with and respond to change – both changing climate and development pressures – while maintaining (or improving) their wellbeing. Adaptive capacity refers to the *potential* of individuals and societies to respond to change, so it is not currently possible to measure it directly. ACCRA therefore focused on five dimensions that are considered to contribute to adaptive capacity: the asset base (including physical and non-physical assets), institutions and entitlements, knowledge and information, innovation, and flexible forward-looking decision-making and governance.

The rapid rise in warming of the Earth's surface over the last half-century is well accepted, and there is general scientific acknowledgement that this has been caused largely by human activity. Although there is rapidly increasing understanding of how the climate is likely to change at the global scale under various emissions scenarios, what is less well understood is the *exact magnitude* of future temperature and rainfall changes at the local level, and how these are influencing bio-physical systems. Global climate models are most commonly used to project broad trends in temperature and rainfall distribution and intensity. However, difficulties in downscaling these models to the spatial and temporal scales relevant to local decision-making persist. For this reason, scenario-based approaches that consider a range of possible climate, agricultural production and water futures are recommended. In the three ACCRA countries, observed and projected trends confirm that temperatures have risen and will continue to increase sharply. Trends in rainfall are not as well-aligned and are much more uncertain, but models suggest that annual rainfall in Ethiopia and Uganda will increase slightly in this century, with no substantial changes for Mozambique. All models suggest an increase in rainfall intensity over the same period.

In order to understand the impact of climate change at the local level, it is important to recognise the interactions between climate change and wider development pressures. People adapt to the impact of climate change on wider development processes, such as rising food prices, the spread of disease and illness, and competition over natural resources. The impacts of climate change will not be the same for all. Vulnerability to the impacts of climate change often comes from vulnerability in a general sense – from poverty and marginalisation. It makes little practical sense to talk about how people adapt to climate change in isolation, since adaptation is driven by a range of different pressures acting together. Supporting local adaptive capacity cannot therefore be seen in isolation as 'climate change programming'. It is an intrinsic part of all development interventions.

Although the range of interventions studied in the ACCRA fieldwork is varied, there are discernible common

features. Typically, interventions focused on technology dissemination, often including direct asset provision. Many respondents reported that interventions, which contributed to their household income, had made them more resilient to future shocks and stresses, but none of the interventions had explicitly set out to support adaptive capacity. Had assets been considered as part of wider adaptive capacity, different project decisions might have been made. Since people's assets and technologies will need to change with changing circumstances, projects could have helped establish permanent links between people and sources of a *range* of technologies.

Assets, such as irrigation infrastructure, only deliver benefits to people if there are **institutions** that ensure this. ACCRA research found that institutions are at the heart of the lack of sustainability of interventions. Some institutions were subject to elite capture and corruption. In other cases, new institutions were established but they did not survive because they were not socially rooted. Some interventions were introduced as new technical practices without considering the institutional arrangements required (e.g. introducing changes to natural resource management on common property). Few interventions had adequately considered the necessary institutional framework. These are well-rehearsed problems associated with interventions, not just those (mis)conceived as climate change.

People's **innovation** was rarely considered; interventions equated 'innovation' with the provision of standardised new technology, which recipients were supposed to simply adopt. In some villages, innovation was clearly constrained by a dominant culture which frowned upon doing things differently. This culture was not challenged by the introduction of an 'approved' innovation by external authorities or experts. Opportunities were being missed to find out where, how and by whom local innovation is happening, i.e. the forces that constrain people from innovating. These barriers included institutional issues such as culture, the ability to take financial risks, lack of confidence, and limited access to information and new ideas. Adaptive capacity could have been supported by identifying and analysing these factors and identifying measures to address them together with the people concerned.

Governments' and projects' treatment of **information** was largely confined to providing standardised technical packages deemed to be 'correct'. In fact, it is almost inevitable that information will not be appropriate to many people, and the sources of information will then tend to be considered unreliable. People's opportunities and constraints are diverse and farmers rarely, if ever, have the objectives deemed obvious by those providing the

information packages (e.g. maximising yield per hectare). Seeing information and knowledge as components of adaptive capacity would encourage actors to put more emphasis on giving people a wider range of information, appropriate to a much wider range of circumstances and future scenarios; giving people the tools to find information for themselves; and turning information into **knowledge** by supporting people's ability to use the information for decision-making.

ACCRA research found that, rather than **forward-looking decision-making**, policies and development interventions were often running risks of maladaptation, i.e. decision-making that leads to long-term increases in vulnerability, from two sources. Firstly, climate information was being misinterpreted and uncertainties not adequately communicated, leading to the potential for ill-informed planning; and secondly, interventions and policies were designed without considering available evidence, either from economic analysis or climate information sources, including longer-term climate projections. Interventions were based on a projectised approach, with 'participation' consisting mainly of asking 'communities' what they wanted. Policies were too often based on top-down planning which did not support local flexible decision-making and agency.

Summary conclusions

1. All development interventions need an agency lens, i.e. they need to be thought of not simply as delivering a given infrastructure or technology, but as vehicles for expanding people's range of choices. For any intervention to offer sustainable benefits, consideration is needed at all stages, from preliminary research to final evaluation, to the question of how different people will use the intervention under a range of possible climate futures. This is impossible without due attention to features which are largely neglected in development planning and interventions, namely power and institutions.
2. The five characteristics of adaptive capacity are not stand-alones, from which one or more can be selected for attention, they shape and depend on each other. Taking adaptive capacity on board does not mean adding five sets of each intervention for the five characteristics. It means understanding these dimensions of people's and communities' lives, and designing and implementing interventions in ways that enhance the way in which assets, institutions, innovation, knowledge flows and decision-making contribute to increased agency, and more informed decision-making for the long term.

3. Working to support agency requires participatory ways of thinking and acting. However, much of what is called ‘participation’ has failed to deliver the intended transformation in relations between development agents and the people they wish to work with. There are practical reasons for this, relating both to deeply entrenched attitudes and also to resources, including funds, time and skills. Getting participation right will require a major investment by many kinds of actors working together. The alternative, of ‘business as usual’, will ensure that investment in development continues to have the disappointing results that have been seen over the past decades, both for sustainable development in general, and for adaptive capacity for the new and pressing challenges of climate change.
4. Change at system level is required because the necessary changes to the practice of development which ACCRA has identified are not actionable by any single organisation or individual acting alone. The adaptation required by development actors is transformational, not incremental. Platforms will need to be strengthened and, where necessary, created at local, national and international level for negotiating these fundamental changes and paradigm shifts. Although the challenge is enormous, the increasing use of the language of ‘impact’ provides an opportunity to place at the centre of debate the necessary conditions for sustainable impact.

Although system-wide change is needed, there are some minimum steps that individual government departments or agencies can take at the level of interventions.

Recommendations

1. *No development without adaptive capacity*
Governments and development partners do not need to think of designing separate projects for building adaptive capacity, but should rather incorporate into the design of all development programmes a consideration of how people will be able to adapt in the future. Adaptive capacity should be considered in all assessments, planning processes, feasibility studies, agreements with donors, implementation, monitoring, reporting and evaluations.
2. *Flexibility and scenario planning*
All interventions should be designed and implemented based on future scenario planning which includes all the important likely changes – and their interactions – but also acknowledges uncertainties. Intervention design and development planning must build flexibility into programme design and management, and build support for adaptive capacity into planning objectives.
3. *Using autonomous innovation as an entry point for an adaptive capacity perspective*
Planning and intervention design should use people’s own ability and practice of experimentation and innovation as an entry point. This involves understanding how people are currently experimenting and innovating in response to different pressures, and understanding the constraints to innovation and the uptake of new ideas. This inevitably includes having an understanding of institutional factors, power relations, and other socio-cultural factors.
4. *Turning information into knowledge*
Information provision should not stop with giving people facts. All information providers should redefine their role as one of ‘knowledge providers’, whose objectives are more ‘informed decision-making’. Both they and others should support people to acquire the required skills and tools to analyse and use the information provided and, furthermore, to give them the ability to access independently further information from a variety of sources. Frequently, this will entail working with those generating and holding information to ensure that they are better connected to people.

Section 1 Introduction

Change is a constant in the lives of rural people in Africa. People have always had to cope with sudden shocks such as war, rain failures or food price spikes, and with longer-term stresses such as population increases, the degradation of natural resources and long-term decline in their terms of trade. These and many other changes will also be there in the future, but there is a more recent appreciation of change in the form of climate change. For most developing countries, climate change adds another layer of complexity to already existing development challenges, such as high levels of poverty and inequality, rapid population growth, underdeveloped markets, poor infrastructure and service provision, and weak governance systems (Smit et al., 2003).

Current climate models agree that there will be change, and that this change will vary greatly from place to place, but they disagree on the magnitude of that change, and they are also not able to tell us exactly what form that change will take at the local level (Royal Society, 2010). Climate change affects people directly (e.g. through changing rainfall patterns and increasing temperatures) and indirectly, by exacerbating other changes, including

yields, world and local prices for crops, migration patterns, possible tensions over dwindling natural resources and disease patterns. These other changes are constantly in flux, magnifying the uncertainty around the effects of climate change.

Responding to climate change and related uncertainty is a principal development challenge. The impacts of observed and projected changes on global and regional climate are likely to have significant implications for ecosystems and the livelihoods of the communities that depend on them (Tompkins and Adger, 2004). In light of this, it is vital that policy-makers and development planners understand how best to reduce vulnerability to climate change impacts, and ensure that communities have the capacity to adapt to changes over time.

1.1 Adaptation and adaptive capacity

Given its wide array of impacts on and interactions with wider development, climate change will inevitably have considerable implications for development interventions. Accordingly, there is a need to consider how such



Searching for water in Kotido, Uganda, during the dry season. (Photo: M. Barihaihi, 2010)

Type of Adaptation	Description
Autonomous Adaptation	Adaptation that occurs naturally by private actors without intervention of public agencies. Often, autonomous adaptation does not constitute a conscious response to climatic stimuli, but is triggered by ecological changes in natural systems and by market or welfare changes in human systems.
Planned Adaptation	Adaptation actions that are the result of deliberate policy decision or action on the part of public agencies.
Incremental Adaptation	Adaptation that results in small incremental changes, generally aimed at enabling a person or community to maintain its functional objectives under changing conditions.
Transformational Adaptation	Adaptation that results in a change in the individual or community's primary structure and function
Maladaptation	An adaptive response made without consideration for interdependent systems which may, inadvertently, increase risks to other systems that are sensitive to climate change.

Figure 1: Types of adaptation

This terminology reveals much about the preconceptions of those who shape both discourse and policy in this area. The definition of planned adaptation is from the World Bank and is commonly accepted. The autonomous adaptation definition is from UNFCCC and UNDP (2001). 'Planned adaptation' is what the state or 'development partners' do – as if people's own adaptation ('not a conscious response', 'triggered by stimuli') is not the result of their analysis and planning. Despite reservations, this paper prefers in general to use terminology that is already widely accepted, in order both to avoid confusion and to avoid the discussion being sidetracked away from important issues and into issues of terminology.

interventions help people and communities to adapt to new configurations of their natural, socio-economic and political environment, and the relations between them.

Adaptation within human systems can be broadly described as the *process* of adjustments to actual or expected climate and its effects, in order to moderate harm or exploit potential benefits (IPCC, 2011). Adaptation does not occur instantaneously; a person or community requires agency, ability and willingness to realise their adaptive capacity and adapt successfully (Adger et al., 2004). A suitable enabling environment is needed to ensure that individuals and societies are capable of making the changes necessary to respond to climate change and other changes. Adaptation manifests itself

in a number of forms, is undertaken by various agents, and occurs at multiple scales. Adaptation practices can be either anticipatory or reactive and, depending on the degree of spontaneity, can be autonomous or planned (Smith et al. 2010) – see Figure 1. Accordingly, there are distinctions between adaptation as a programmatic approach and adaptive actions and processes by households, communities or institutions themselves: the former is largely planned, seeking to facilitate sustainable and effective positive adaptation by the community as a whole and avoid maladaptation; the latter is generally associated with any such actions in anticipation of (or more commonly as a reaction to) shocks and stresses. Indeed, it should be noted that adaptive actions are not necessarily positive, and short-term gains or benefits taken to adapt to changing shocks and stresses can in some cases lead to increased vulnerability in the long term – known as maladaptation (ADB, 2009). One important role of development partners is therefore to help households and communities to assess and understand current strategies to see which ones might lead to sustainable adaptation, and which ones to maladaptation.

At the local level, adaptation is rarely in response to climatic stimuli alone. In many cases, a direct climatic event is less likely to trigger adaptive action than the economic and socio-political consequences of the climatic condition (Smit and Pilifosova, 2001). Thus, the consequences of a climate event are not direct functions of its physical characteristics. Rather, as Rayner and Malone (1998) contend, they are functions of 'the way in which a society has organised its relation to its resource base, its relations with other societies, and the relations among members'. This echoes discussions about 'natural' disasters, which are never simply natural hazards, but the product of the impact of a natural hazard on people whose vulnerability has been created by socio-cultural, economic and political conditions and power relations (Cannon and Müller-Mahn, 2010). Accordingly, in order to understand how societies can better cope with and adapt to climatic stressors and climatic change, the focus must be addressing the political, socio-cultural and economic factors that may promote or inhibit the capacity of individuals or groups to adapt (Smit and Pilifosova, 2001). Moreover, the majority of actions taken to adapt to changing climate and development pressures are reactive, usually occurring after a particular weather event (Adger et al., 2005). Far fewer have anticipated future changes and taken action to prepare for them. Increasing emphasis is needed to ensure that communities do not simply wait until the climate has changed and then adapt; rather, they need to be supported in developing their capacity

Box 1: Adaptive capacity

Communities are considered to have high adaptive capacity when they are able to anticipate, deal with, and respond to changing climate and development pressures, while maintaining (or even improving) their wellbeing.

It is not possible to directly measure adaptive capacity, as it refers to the 'potential' of individuals and societies to respond to change. In this research, ACCRA focused on dimensions that it considered to contribute to the adaptive capacity of a system in a particular context. These are the five characteristics that make up the Local Adaptive Capacity framework: the asset base, institutions and entitlements, knowledge and information, innovation and flexible forward-looking decision-making and governance.

Sources: Lim and Spanger-Sieffried, 2004; Smit and Wandel, 2006; Jones et al., 2010b.

and provided with the tools to evaluate options and make proactive decisions (Mani et al., 2008; Reisinger 2009)

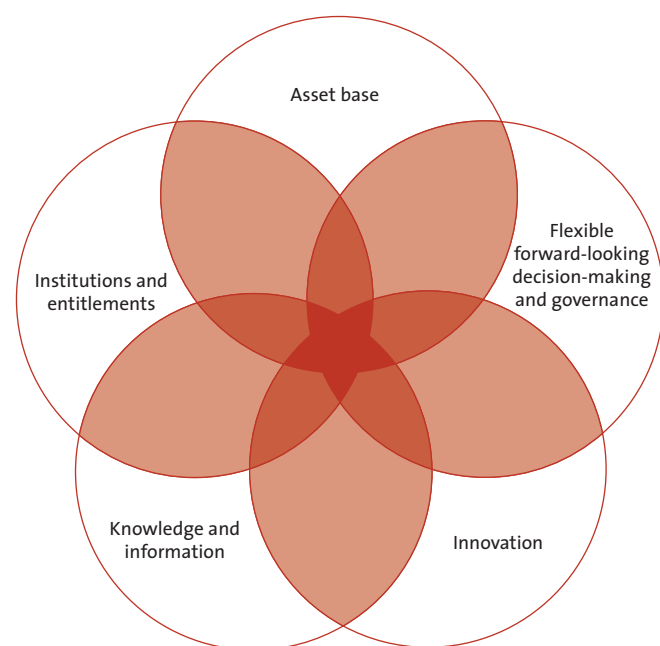
Nearly all societies and their activities are sensitive to the climate in one way or another, largely because where people live and how they generate their livelihood is influenced by their surrounding climate (Adger et al., 2003). Variability and uncertainty in the climate are inherent, and human societies have often had to deal with, and respond to, unforeseen variations in climate or weather extremes. However, the ways in which societies

have coped to date, and the range of these coping mechanisms, may not be sufficient to deal with the new challenges brought about by climate change (van Aalst et al., 2008). Societies most vulnerable will not only be those that experience the greatest impacts, but also those most sensitive and least able to adapt to the changing climate and development pressures. In order to successfully adapt to future climate variables, many communities in developing countries will have to modify their characteristics and potentially transform their structure and how they organise themselves.

1.1.1 Why a focus on adaptive capacity?

One of the biggest challenges within development programming is how to ensure that individuals and societies can adapt beyond the programme cycle of an intervention. This is key to climate change adaptation because there is no end-point to which people have to adapt; people need to acquire the capacity to adapt for generations to come. The challenge to development practice is how to meet immediate needs whilst also building this capacity to adapt in the future. A focus on resilience alone does not necessarily bring in this perspective; a specific focus on adaptive capacity is needed.

Adaptive capacity refers to the potential to adapt, as and when needed, and not necessarily the act of adapting or its outcome. Adaptive capacity is multi-dimensional and the elements that make up an individual's adaptive capacity are not entirely agreed. It essentially relates to



Adaptive capacity at the local level

<i>Characteristic</i>	<i>Feature that reflect a high adaptive capacity</i>
Asset base	Availability of key assets that allow the system to respond to evolving circumstances
Institutions and entitlements	Existence of an appropriate and evolving institutional environment that allows fair access and entitlement to key assets and capitals
Knowledge and information	The system has the ability to collect, analyse and disseminate knowledge and information in support of adaptation activities
Innovation	The system creates an enabling environment to foster innovation, experimentation and the ability to explore niche solutions in order to take advantage of new opportunities
Flexible forward-looking decision-making and governance	The system is able to anticipate, incorporate and respond to changes with regard to its governance structures and future planning

Figure 2: The ACCRA framework for thinking about Local Adaptive Capacity

whether people have the right tools and the necessary enabling environment to allow them to adapt successfully over the long term. It is also important to bear in mind that adaptive capacity is context-specific and varies from country to country, community to community, between social groups and individuals, and over time (Smit and Wandel, 2006).

ACCRA recognised that it is not possible to directly measure adaptive capacity, as it refers to the ‘potential’ of individuals and societies to respond to change; so instead the research sought to investigate dimensions that are considered to contribute to the adaptive capacity of a system in a particular context. These are the five characteristics that make up the Local Adaptive Capacity framework (see Figure 2) used in the ACCRA research to investigate the impact of development interventions on people’s and communities’ adaptive capacity.

1.2 The Africa Climate Change Resilience Alliance (ACCRA)

Building adaptive capacity is a requirement of climate change adaptation and development interventions, and as such there is a need to learn how to support it effectively. An alliance of five development partners – Oxfam GB,

the Overseas Development Institute, Save the Children, World Vision International and Care International – came together in the ACCRA consortium. The alliance’s aim was to understand how development interventions – whether in the form of DRR, social protection or livelihood programmes – are contributing to adaptive capacity at the community level, and to increase governments’ and development actors’ use of evidence in designing and implementing development interventions that increase the adaptive capacity of poor and vulnerable communities.

ACCRA’s four objectives are:

1. To understand how existing social protection, livelihoods and disaster risk reduction projects by ACCRA members build local adaptive capacity to climate change, and how these approaches can be strengthened.
2. To use the findings to influence donors, development partners and civil society to improve future planning and action.
3. To work together with local and national governments to build capacity to implement interventions that can build communities’ adaptive capacity.
4. To encourage learning across countries and disciplines.



Men in Meboi Community, Chibuto District, discussing a seasonal calendar with ACCRA researchers. (Photo: ACCRA Mozambique, 2010)



Community focus group discussions during data validation with government staff and researchers in Gulu, Uganda. (Photo: M. Barihaihi, 2011)

The LAC framework was the overarching conceptual framework for our work. It draws on extensive consultations with academics, policy-makers and practitioners, and is tested in pilot studies in each of the three countries. Most assessments of adaptive capacity at household or community level have focused on assets and capital as indicators (Dulal et al., 2010). While useful in helping us to understand what resources people have or need to adapt, these asset-oriented approaches tend to mask the role of processes and functions (Jones et al., 2010a and 2010b). Understanding adaptive capacity, therefore, requires that we also recognise the importance of intangible processes such as decision-making and governance, the fostering of innovation and experimentation, and the exploitation of new opportunities and the structure of institutions and entitlements. This means moving away from simply looking at what a system *has* that enables it to adapt, to recognising what a system *does* that enables it to adapt (WRI, 2009). Understanding what development activities are doing to support this capacity, and what can be done to further enhance it, will be crucial to strengthening adaptive capacity.¹

1.2.1 Research approach and methodology

Under ACCRA, research was conducted in three countries, Ethiopia, Mozambique and Uganda. In each country, two or three research sites were identified where one of the consortium members implements development

interventions. The different sites were chosen to represent different livelihoods, different agro-ecological characteristics, and different types of project intervention, including disaster risk reduction, social protection and livelihoods support programmes, in reaction to the different development challenges and climate hazards each site faces.

Following the development of the programme's conceptual framework and research guidance, the in-country research began with an inception workshop, bringing together experts from academia, government, civil society and NGOs to discuss the LAC framework and adapt it to the national context. This was followed by the development and testing of the research protocol; analysis of available secondary data; an intensive period of fieldwork in the research sites; data analysis and the production of site reports. These formed the basis for the country reports on which this final document builds (for Uganda see Jones et al., 2011; for Ethiopia see Ludi et al., 2011; for Mozambique see Arnall et al., 2011). Investigations were carried out by a team of national researchers supported by the national ACCRA coordinator, and with the support of the international ACCRA coordinator and the Overseas Development Institute (ODI).

¹ For more see the ACCRA background paper (Jones et al., 2010b), <http://www.odi.org.uk/resources/download/4790.pdf>.

1.2.2 ACCRA research sites in Uganda

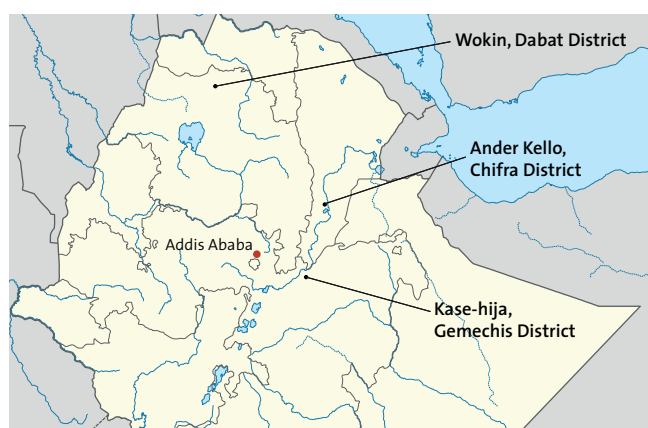


<u>Site</u>	Bundibugyo	Gulu	Kotido
<u>Geographical zone</u>	Highland & Lowland	Woodland	Semi-arid
<u>Principal climate hazard</u>	Floods	Poor rains, variable rainfall	Poor rains, variable rainfall
<u>Main livelihood source</u>	Rainfed agriculture for market; cash crops important in lowland areas	Rainfed agriculture for market	Pastoralism; subsistence rainfed agriculture
<u>Development interventions</u>	Rwenzori Livelihoods and Disaster Preparedness Support programme <ul style="list-style-type: none"> Empowerment of poor people to achieve sustainable livelihoods, influence those with power over them and ultimately improve their standard of living Support community priorities such as improving livelihood diversity, food security, agro-processing activities and DRR planning 	‘Roco Kwo’ programme <ul style="list-style-type: none"> Multi-sectoral initiative addressing sustainable livelihoods, peace-building, conflict resolution, gender equity, psychosocial support and gender-based violence Agricultural input provision Establishment of village savings and loan schemes 	North Karamoja Pastoral Development programme <ul style="list-style-type: none"> Support resilient pastoral livelihoods Working with local government to empower rural communities Supporting community-based groups



Women participating in a focus group discussion in Kotido, Uganda. (Photo: M. Barihaihi, 2010)

1.2.3 ACCRA research sites in Ethiopia



Site	Ander Kello	Kase-hija	Wokin
Region	Afar	Oromia	Amhara
Geographical zone	Lowland (dry <i>Kolla</i>)	Lowland (<i>Kolla</i>)	Highland (<i>Dega</i>)
Principal climate hazard	Cyclical drought	Drought, floods	Erratic rainfall, floods, hailstorms
Main source of livelihood	Pastoralism, increasing agro-pastoralism	Mixed crop cultivation, <i>Khat</i> important cash crop	Mixed crop cultivation, livestock, increasingly market-oriented
Key programme interventions	PILLAR – Preparedness Improves Livelihood Resilience <ul style="list-style-type: none"> • Improve drought preparedness through protecting and diversifying the livelihood assets of pastoralists in drought-prone areas 	HIBRET - Household Asset Building and Rural Empowerment for Transformation, including PSNP ² <ul style="list-style-type: none"> • Reduce food insecurity and increase community resilience by (i) protecting household assets and community resources; and (ii) increasing agricultural output through integrated natural resource management and strengthened civil society 	Agricultural Scale Up Programme <ul style="list-style-type: none"> • Policy influencing, enhancing market access and improving gender equity
Focus of intervention	Disaster Risk Reduction	Social protection and sustainable livelihoods	Sustainable livelihoods

Stone terraces in an enclosed area, Kase-hija research site, Ethiopia. (Photo: K. Wilson, 2010)



² The Productive Safety Net Programme (PSNP) provides a labour-based cash or food allowance (paid without a labour contribution for those who cannot give it) to a targeted number of households in a village/ community.

1.2.4 ACCRA research sites in Mozambique



Site	Chibuto	Caia
Region	South (Gaza Province) Limpopo River Basin	Centre (Sofala Province) Zambezi River Basin
Principal climate hazard	Drought	Floods
Main source of livelihood	Agriculture for subsistence crop production; cattle-rearing; migrant labour	Agriculture for subsistence crop production and cash income; cash crops; casual farm labour
Key programme interventions	Integrated rural development programme <ul style="list-style-type: none"> • Food and seed distribution • Micro-credit • Livelihood diversification 	Livelihood diversification <ul style="list-style-type: none"> • Formation of groups and associations

Promoting irrigated potato production in Caia District. (Photo: ACCRA Mozambique, 2010)



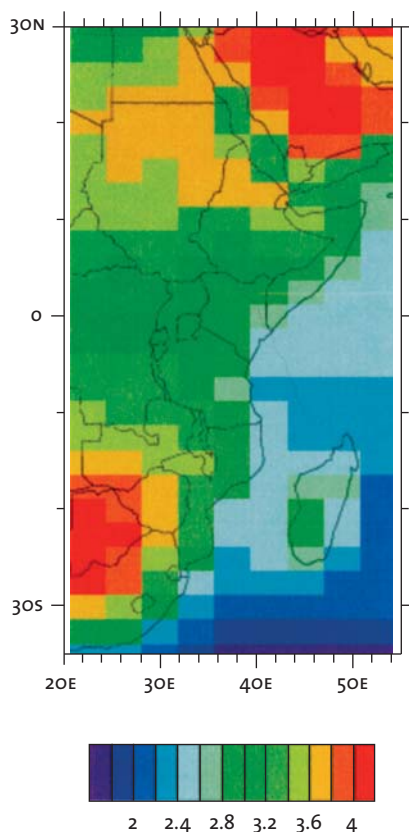
Section 2 Understanding Climate Change

Responding to climate change and related uncertainty is a principal development challenge. In recognising the need to adapt successfully in the long term, it is important to explore our understanding of climate change. This section gives a brief overview of available information for guiding policy decisions in countries like Ethiopia, Uganda and Mozambique. It outlines some of the uncertainties involved in predicting changes in future climates (what we do and do not know).

First, what we know. We know that there has been a rapid rise in warming of the Earth's surface over the last half-century, and that there is strong evidence that this warming has been caused largely by human activity,

through activities such as the burning of fossil fuels, and changes in land use (IPCC, 2007). We have a reasonably good understanding of how the climate is likely to change at the global level under various emissions scenarios (i.e. estimates of how the world is likely to look and act in the future). And we know that the risks associated with some of these changes are substantial and need acting upon (Royal Society, 2010).

Second, what we don't know. We don't know, with absolute certainty, what the *exact magnitude* of future temperature and rainfall changes will be, and how they will influence the biophysical environment at the regional and local level (such as rainfall patterns and water cycles,



Change in temperature °C

Box 2: An example of the type of climate data available for Sub-Saharan Africa and the difficulties in using it for policy-making

This is an ensemble of different global climate models showing projected changes in annual surface air temperature for the period of 2060–2089 relative to a baseline of 1970–1990 under an A2 scenario. Viewed as ‘business as usual’, this emissions scenario describes a heterogeneous and divided world. It maintains a focus on regional economic growth over local environmental sustainability and high population growth.

Variables for Ethiopia, Uganda and Mozambique are each clearly visible. Each box is roughly 250km², giving a single averaged value of temperature difference over the entire box.

This is not a true reflection of how temperatures will change at the local level, as temperatures will vary within each block. Availability and access to data from Regional Climate Models, which try to generate more localised climate information, is poor for much of Sub-Saharan Africa. Outputs like these make for difficult policy decisions, and the uncertainties involved with each of these models must be taken into account.

Source: CLIVAR VACS African Climate Atlas – WCRP CMIP3 Multi-Model Data Module, accessible at: <http://www.ouce.ox.ac.uk/~clivar/ClimateAtlas/ipcc.html>

the temperature of oceans and related influences on weather patterns). These are often the most relevant issues for effective decision-making.

To get an accurate understanding of climate change, it is important to look at a number of different sources of information. In doing so, researchers draw heavily on past data from observed recordings, as well as modelled projections to simulate future climates. In the context of ACCRA's three country sites, getting access to, and making sense of, available information is often challenging.

Despite recent efforts by governments to develop these systems, all three countries suffer from common problems, including a poor network of weather stations and large gaps in the records due to poor facilities and a lack of investment in infrastructure and personnel, as well as issues of conflict. In light of this, one of the primary tools we turn to is climate modelling.

A climate model is a system of different equations that simulate the interactions between the atmosphere, oceans and land. They are generally used to predict how



Small-scale irrigation is considered an important strategy to overcome rainfall variability in Kase-hija, Ethiopia. (Photo: K. Wilson, 2010)

Observed trends	Global Climate Model projected trends
<p>Ethiopia Mean annual temperature has increased by 1.3°C between 1960 and 2006. Daily temperature observations show significantly increasing trends in the frequency of hot days, and much larger increasing trends in the frequency of hot nights. The strong inter-annual and inter-decadal variability in Ethiopia's rainfall makes it difficult to identify long-term trends.</p> <p>There is not a statistically significant trend in observed mean rainfall in any season in Ethiopia between 1960 and 2006. There are insufficient daily rainfall records to identify trends in daily rainfall variability.</p>	<p>The mean annual temperature is projected to increase by 1.1 to 3.1°C by the 2060s, and 1.5 to 5.1°C by the 2090s. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot'.</p> <p>Projections from different models in the ensemble are broadly consistent in indicating increases in annual rainfall in Ethiopia, largely in the short rainy season (OND) in southern Ethiopia. Projections of change in the rainy seasons (AMJ and JAS), which affect the larger portions of Ethiopia, are more mixed, but tend towards slight increases in the south-west and decreases in the north-east. The models in the ensemble are broadly consistent in indicating increases in heavy rainfall events.</p>
<p>Uganda Mean annual temperature has increased by 1.3°C since 1960. Daily temperature observations show significantly increasing trends in the frequency of hot days, and much larger increasing trends in the frequency of hot nights.</p> <p>Across Uganda observations show statistically significant decreasing trends in annual rainfall. Trends in the extreme indices based on daily rainfall data are mixed. There is no significant trend in the proportion of rainfall occurring in heavy events.</p>	<p>The mean annual temperature is projected to increase by 1.0 to 3.1°C by the 2060s, and 1.4 to 4.9°C by the 2090s. All projections indicate increases in the frequency of days and nights that are considered 'hot'.</p> <p>Projections of mean rainfall are broadly consistent in indicating annual increases. The models consistently project overall increases in the proportion of rainfall that falls in heavy events.</p>
<p>Mozambique Mean annual temperature has increased by 0.6°C between 1960 and 2006. Daily temperature observations show significantly increasing trends in the frequency of 'hot' days and nights in all seasons.</p> <p>Mean annual rainfall over Mozambique has decreased at an average rate of 3.1% per decade between 1960 and 2006. Daily precipitation observations indicate that, despite observed decreases in total rainfall, the proportion of rainfall falling in heavy events has increased.</p>	<p>The mean annual temperature is projected to increase by 1.0 to 2.8°C by the 2060s, and 1.4 to 4.6°C by the 2090s. The projected rate of warming is more rapid in the interior regions of Mozambique than areas closer to the coast.</p> <p>Projections of mean rainfall do not indicate substantial annual changes. The range of projections from different models is large and straddles both negative and positive changes. Overall, the models consistently project increases in the proportion of rainfall that falls in heavy events</p>

Figure 3: Summary of general trends for Ethiopia, Uganda and Mozambique³

Source: McSweeney et al., 2008.

the climate might change in the future, based on different emissions scenarios. Climate models vary considerably in their complexity and accuracy. The more complex models seek to simulate the interactions between components of the climate system, representing parameters such as temperature, wind and humidity with latitude, longitude and altitude in the atmosphere as well as the oceans. The most commonly used models operate at a large scale (i.e. on a global to hundreds of kilometres scale) to give indications of broad changes in characteristics like average temperature and the intensity and distribution of rainfall (see Box 2). To help understand future climate change at a scale more useful to local decision-making, climate modellers turn to techniques known as 'downscaling'. These typically generate outputs at a much finer scale, ranging from 25–50km². The resources and techniques needed to carry out downscaling⁴ are however expensive and require significant resources, most of which are largely unavailable and inaccessible to much of Sub-Saharan Africa.

Climate models are not a magic bullet. They do not give an exact representation of future climates, and they carry a wide range of uncertainties. Nor do they all agree. In order to get a more reliable picture of future climate change, multiple models are run using the same emissions scenarios and averaged out to see where there is common agreement. Yet in certain places, a high degree of variation exists particularly at smaller scales. For example, 90% of global climate models cannot accurately replicate past or present climatic conditions observed across Sub-Saharan Africa (IPCC, 2007). These challenges make the task of decision-making for adaptation extremely difficult.

Despite these uncertainties, it is clear that the climate is changing and will continue to do so. Continued population growth and rapid economic development are likely to further increase greenhouse gas (GHG) emissions. Indeed, scenarios presented in the Intergovernmental Panel on Climate Change's Fourth Assessment Report (IPCC, AR4) are now widely viewed as conservative, with present GHG emissions higher than those projected by the worst-case

³ Climate variables are broad summaries of observed and projected outputs. For more detailed variables see McSweeney et al. (2010).

⁴ There are two main types of downscaling. Dynamic downscaling involves embedding a Regional Climate Model (RCM) within a GCM. This

process requires significant computing power. Empirical downscaling uses relationships between modelled data and recorded observational data to provide local detail. This is less computationally demanding, but requires an accurate and lengthy database of observational data.

IPCC scenario, and consistent with a rise in global average temperatures of 3–4°C and 3–5°C over Sub-Saharan Africa (Calow et al., 2011). Climate models can provide a useful indication of future trends. If their uncertainties are understood and interpreted correctly, climate models can be extremely useful tools for policy-making. They can inform us of broad trends across various scales – whether in relation to increasing average temperature and a growing number of ‘hot days’,⁵ sharp rises in rainfall intensity and heavy rainfall events – and can allow decision-makers to plan ahead and make informed decisions to support sustainable adaptation. With this in mind, confidence is high enough to inform and guide policy at regional, national and in some cases local scales.

With a good understanding of the knowns and unknowns of climate change, we turn our attention to

observed and projected trends for each of the three ACCRA countries. Figure 3 shows a high degree of variation between countries, both in terms of past and future climate. In all three, temperatures have been increasing sharply, and in all three this will continue. Trends in rainfall are not as well-aligned, with Ethiopia and Uganda showing slight increases in annual rainfall, and no substantial changes for Mozambique. Perhaps most importantly, all suggest an increase in rainfall intensity and the number of heavy rainfall events. Yet these projections mean very little unless they are translated into more local conditions, considered in light of wider development pressures and interactions, and set alongside the implications on sectors and livelihoods.

⁵ ‘Hot’ days (and ‘hot’ nights) are defined as the temperature currently exceeded on 10% of days or nights in that region and season.

Section 3 The Relationship Between Climate Change and Development

In order to understand how people are affected by climate change at the local level, it is important to recognise the interactions and overlaps between climate change and wider development pressures. In many senses, climate and development have a dual relationship. Climate change is a threat to sustainable development and the achievement of many key development targets, such as the Millennium Development Goals (MDGs) (Alexander et al., 2011). In addition, the impacts of climate change, felt at the local level, will often be mediated through interacting development pressures (O'Brien et al., 2004). Indeed, people seldom adapt to the direct impacts of climate change, whether in the form of gradual increases in average temperature, decreases in total annual precipitation, or greater seasonal variability. Rather, the impact of climate change is typically felt indirectly, for instance through rising food prices, the spread of disease and illness, and competition over natural resources and their management (Hertel and Rosch, 2010).

Moreover, **many of the 'natural' events typically associated with climate change have strong links to human processes** and the ways in which social systems interact with natural systems (Brooks, 2003). Floods and droughts illustrate this very well. Climate change is often associated with increases in rainfall variability, leading to a higher likelihood of flood and drought events in many areas. Climate change itself can be attributed to changes in rainfall intensity and patterns of distribution. However, the occurrence and extent of flood and drought events are often influenced by human activities – for example issues of natural resource and land use management such as deforestation, soil degradation and changes to water drainage – and other anthropogenic factors. This section discusses some of the climate and development challenges in the three ACCRA countries and how they interact. The risk of variable and decreasing crop yields in rural communities in all three countries, for example, is influenced both by increasingly variable rainfall patterns and by the ongoing degradation of natural resources, in part a result of population pressure and the lack of economic alternatives for large parts of the rural population.

Another way that development overlaps with climate change is through the distribution of impacts across different social groups. The impacts of climate change will not be evenly felt; some will be hit harder than others.

Vulnerability to the impacts of climate change will often be mediated through social and institutional factors.

Poverty, livelihood, age, gender, culture, ethnicity and clan will all have a significant bearing on levels of vulnerability, and on how different social groups are allowed or able to adapt (Adger et al., 2007). Not surprisingly, groups that are vulnerable to the impacts of climate change are often also considered vulnerable in a general sense (i.e. those unable to deal with the impacts of multiple shocks and stresses, whether climate- or development-related). In this regard, an understanding of people's ability to adapt to climate change also has to take into account their ability to deal with and respond to changing development pressures (Eriksen et al., 2005).



Infrastructure damaged by heavy rain makes marketing more difficult and expensive. Bundibugyo. (Photo: M. Barihaihi, 2010)

The **poorest and most marginalised groups within a society are often considered to be hardest hit** and least able to adapt to changing climate and development pressures, particularly those whose livelihoods are heavily dependent on natural resources. As a consequence, promoting sustainable development can play an important part in helping people adapt to the impacts of climate change. Returning to the MDGs, for example,



Livestock market in Chifra, Ethiopia. (Photo: Haramaya University, 2010)

efforts taken in ‘reducing poverty, providing general education and health services, improving living conditions in urban settlements, and providing access to financial markets and technologies, will all improve the livelihoods of vulnerable individuals, households and communities, and therefore increase their ability to adapt’ (Ayers and Huq, 2009). Recognising this complex relationship, in order for communities, governments and civil society actors to understand the impacts of climate change, they need not only projections of future climate over different time scales, but how various development scenarios are likely to play out over the short, medium and long term. Knowing how water storage capacity is likely to change and the impacts of soil degradation on crop yields, understanding rates of population growth and identifying changing patterns of migration and urbanisation, are each equally important as they are likely to be influenced, and play a mediating role, in delivering the impacts of climate change at the local level.

The impacts of climate change are widespread, but its consequences will fall disproportionately on developing countries, and typically will hit the poorest communities within them the hardest (Smith et al., 2003). Variability has long been a characteristic of the climates of Uganda, Mozambique and Ethiopia; dealing with it is part and parcel of rural livelihoods. Livelihoods are particularly

sensitive to fluctuations in seasonal rainfall. However, the capacity of individuals to respond to climate variability remains generally low across the three countries, particularly in rural contexts. Generally, these communities also face a host of wider pressures, some of which may be influenced by the impacts of climate change, e.g. the threat of displacement in conflict, increasing population pressure on land, unequal resource distribution and globalisation (O’Brien et al., 2004).

Therefore, in exploring the impacts of climate change in the three ACCRA countries, we have to also understand the general development context in each, and the specific factors that contribute to their vulnerability. Below we briefly describe the main development challenges facing Uganda, Ethiopia and Mozambique (for further details, refer to the individual country reports)

3.1 Developmental challenges in the study countries

3.1.1 Uganda

Uganda faces a host of developmental challenges. Although significant gains have been made in relation to economic growth and poverty reduction, particularly during the 1990s, significant barriers to progress remain.



Finding adequate pastures for cattle during the dry season is difficult in Kotido District. (Photo: M. Barihaihi, 2010)

As of 2006, 25% of Uganda's population lay below the national poverty line and the country is ranked 161 out of 187 countries on the Human Development Index (UNDP, 2011). Devereux et al. (2002) suggests that Uganda's current poverty situation is the outcome of both economic and historical factors, describing two principal barriers to supporting sustainable development at the national level. Firstly, the economic structure reflects a chronic failure to achieve productivity increases in the context of a growing population. Secondly, the numerous wars that the country has experienced (and to some extent continues to experience) have left a legacy that further impoverishes the country. High levels of poverty, internal conflict and poor access to basic services act as key drivers of vulnerability. Moreover, the general lack of human and technical skills to exploit available income-generating and livelihood opportunities is both a cause and symptom of Uganda's low social and economic status (Okidi and Mugambe, 2002).

The environment and development are closely linked. Access to land is the basis for rural livelihoods, but this is becoming increasingly constrained in the face of mounting population pressures. Uganda's population growth rate of 3.4% between 1991 and 2002 is higher than the average for Sub-Saharan Africa, and the population is expected to double between 2002 and 2025 (UBS, 2002). Agriculture forms the backbone of Uganda's economy, employing around 80% of the country's labour force, but productivity is low. Food-crop production accounts for at least 65% of agricultural GDP.

3.1.2 Ethiopia

Changing patterns and intensities of rainfall and increasing temperatures will have consequences for all Ethiopians, but especially for the more than 70 million

poor people whose survival depends on rainfed agriculture (farming and/or pastoralism). As of 2005, 39% of Ethiopia's population lay below the national poverty line (UNDP, 2011). Despite considerable improvements human development is still very low; Ethiopia is ranked 174 out of 187 countries on the Human Development Index (UNDP, 2011).

Reasons for Ethiopia's vulnerability are manifold. Its geographical location and topography entail high vulnerability to the impacts of climate change. The highlands, home to almost 90% of Ethiopians, are dominated by sedentary crop farming; many lowland areas are characterised by mobile pastoralism, with increasing numbers of agropastoralists in areas between the two (Yacob Arsano et al., 2004). Historically Ethiopia has been prone to extreme weather variability. Rainfall is highly erratic; most rain falls with high intensity and there is a high degree of variability in both when and where it falls. Since the early 1980s, the country has suffered seven major droughts – five of which have led to severe



Degradation of natural resources is widespread throughout Ethiopia and an important factor undermining livelihoods. (Photo: Haramaya University, 2010)

food insecurity – in addition to dozens of local droughts (World Bank, 2010). One of the reasons for this pronounced vulnerability is the extremely low level of water resources management, either in the form of watershed management or investment in water infrastructure (World Bank, 2006).

On an aggregate level, Ethiopia's economy will remain highly vulnerable to exogenous shocks, mainly because of its dependence on primary commodities and rainfed, small-scale and subsistence-oriented agriculture. Agriculture remains the largest source of growth, though mounting pressure on land puts considerable limits on productivity growth. As a result of population growth, the average size of landholdings has decreased by more than half since the 1960s.

3.1.3 Mozambique

Since the 1992 peace agreement brought 25 years of civil war to an end, macroeconomic reform, donor assistance and political stability in Mozambique have helped achieve rapid improvements in the country's rates of economic growth and poverty reduction. Despite this progress, however, Mozambique remains dependent on foreign assistance for much of its annual budget. The country is ranked 184 out of 187 countries on the Human Development Index and as of 2009, 55% of Mozambique's population lived below the national poverty line (UNDP, 2011).

Over 80% of Mozambique's population depend on small-scale, rainfed agriculture (ISDR, 2009). The best soils are located in the country's extensive network of low-lying floodplains (Brouwer and Nhassengo, 2006). Mozambique

is subject to frequent periods of drought, particularly in the south and centre. Cyclones regularly strike coastal districts in the summer months (October to March), bringing heavy rains, strong winds and storm surges. In 2000, widespread flooding in southern and central regions of the country resulted in 700 deaths, 491,000 people displaced and millions of dollars' worth of damage (World Bank, 2000). Subsequent efforts by the government and donors to establish early-warning systems in high-risk areas, particularly the Limpopo and Zambezi rivers, have reduced flood impacts considerably. However, a wide range of socioeconomic factors, including high levels of malnutrition and HIV infection, coupled with rudimentary social services, mean that Mozambique remains highly vulnerable to external shocks and stresses, with limited capacity to adapt to changes.



Access to services such as safe drinking water is a challenge in many rural parts of Mozambique. (Photo:ACCRA Mozambique, 2010)

Section 4 Findings from the Field on Adaptive Capacity*

4.1 Perceptions of climate change

In all countries, respondents in the research sites described distinct perceived changes in local weather phenomena. Patterns varied, but people generally pointed to alterations in seasonality (i.e. changes in the onset and duration of rainfall), as well as greater variability and uncertainty in rainfall patterns and increasing temperatures. Extreme events, such as hailstorms or extremely heavy rainfall leading to flooding, were also said to have increased in recent years. These changes were cited as having knock-on impacts on livelihoods through increasing animal and crop diseases, increasing occurrence of pests or invasive weeds, decreasing crop yields and pasture, shortage of water and increased human diseases.

Most respondents felt that the stresses on their livelihoods had increased, and that their ability to react and adjust had also changed, because of increasing population, less arable land per household, and increasing levels of resource degradation. People noted that weather-related stresses and shocks were mostly felt indirectly, in the form of decreasing crop yields, decreasing water availability and decreasing rangeland productivity, and hence fewer livestock.

The absence of good meteorological data means that it is hard to know how accurately people are describing changes in climate trends. Section 2 showed that there is good evidence to substantiate the perception that temperatures are now higher, but it is much harder to be clear about rainfall trends. Whilst ACCRA's own analysis of meteorological data showed some evidence to support community perceptions (for example declining rainfall during the short rainy season in Afar Region, Ethiopia, based on analysis of data from the Mille meteorological station), none of these trends was statistically significant. Many of the impacts which some attribute to climate or weather change can also be due to other development pressures, such as increasing pressure on land, environmental degradation and reduced mobility for pastoralists (see Section 3). Without good data, it is rarely easy to interpret what can be a mix of accurate reporting, subjective feeling, idealisation of the past and uncertainty as to the underlying causes of trends.

* For a more detailed presentation of the evidence on which this analysis is based, see the three ACCRA country reports, Jones et al., 2011; Ludi et al., 2011 and Arnall, 2011, for Uganda, Ethiopia and Mozambique, respectively.

Box 3: Climate change and children

In Ethiopia, children were asked how weather changes were affecting them. Apart from reflecting the concerns of their parents, they also mentioned specific impacts on their own lives. In the highland areas, children have to take livestock out grazing. They complained that heavy rainfall caused flooding and they were sometimes unable to cross the swollen rivers and streams to get back home. In pastoral areas, children reported that good grazing land was now much further away, forcing them to leave school to take animals in search of pasture.



Children, like the ones in Ander Kello, Ethiopia, face particular challenges regarding the weather. (Photo: E. Ludi, 2010)

4.2 Local adaptation

There is a general belief that the three countries studied in ACCRA have low adaptive capacity at national level. This is largely due to their general poverty and inequality, low capacity to invest in change, and weak state institutions and services. It is widely believed that this makes the three countries more vulnerable to climate change. There was often a tendency to assume that this translates into low adaptive capacity at local level. This cannot be assumed;

poor farming systems may be much more flexible than more industrialised ones, and social organisation may be more resilient in a less 'developed' setting. The research aims of ACCRA were to understand better how *local* adaptation takes place and, since it is not practically possible to measure adaptive capacity directly (see Section 1.1.2), to assess the impact of different development interventions on the various dimensions of local adaptive capacity.

The first aim proved difficult. Whereas planned adaptation is often based on written plans and proposals, local adaptation is hard to find. Most people are unaware how they adapt to changing circumstances or how they improve their work skills; an external researcher can only discover this by asking very specific questions, for which a large amount of prior understanding is necessary.⁶ Conclusions about the scale of local adaptive capacity cannot be drawn, therefore, from this research. More can be said with confidence about the ways in which people *consciously* try and adapt, since they do this at a level much more amenable to discourse.

In all sites in all three countries, people had made conscious decisions to adapt their lives. Economic changes included simple switches to more drought-tolerant crops, investment in irrigation, changes in herding patterns and greater investment in non-farm income.

Four important things stand out about autonomous adaptation in the research sites:

1. **Adaptation was rarely in response to changes in weather patterns alone**, but rather to economic pressures resulting from the interaction of different factors, sometimes including the weather. In fact, it is rarely possible to disentangle the multiple changes to which farmers are responding, and it makes little sense to do so. For example, more farmers were looking to irrigation as the reliability of livelihoods based on rainfed agriculture is seen to be poor. This may be expressed as 'climate change' (though it is inaccurate to say that this is more than weather variability), but it can also be seen as a reaction to smaller landholdings; less income from crops due to price changes; increasing expenses for other livelihood needs; reduced yields due to eroded soils; and crops withstanding dry spells less well due to the soil's reduced water holding capacity. Adaptation can also simply be a reaction to a newly accessible technology. It is impossible to quantify the 'number of changes' made due to each cause, but price changes or newly-available market opportunities (e.g. because of better accessibility or increasing urban demand) are probably at least as important, if not more so, than the weather in driving change. Price changes,

too, have complex causal chains. For example, there has been a significant increase in oil crop production in northern Uganda over the last few years, following a steep increase in the price of sesame. General observation supports the view that farmers considered prevailing market prices just as much as they considered weather patterns when switching varieties or crops. This does not imply that weather changes may not be important, only that, when different factors interact, it makes little sense to try to separate out the causes of farmers' adaptation.

2. **There are few examples of transformative changes in livelihood** driven by climate stresses. Most adaptation was incremental, involving changes made in order to permit people to continue in broadly the same livelihood (e.g. supplementary income from charcoal making or petty trade). In rural settings, economic livelihoods are very much bound up with people's social world, and radical change is difficult without moving location, particularly since there is little scope for economic diversification. Migration to towns is usually one of few options. This raises the question whether such adaptation is advantageous in the long run, or whether it is locking people further and further into a livelihood which may, in the long run, be unsustainable ('maladaptation'). This also applies to adaptation which is supported externally.⁷ Safety-net programmes, for example, have had some success in preventing households from falling into destitution, but much less success at helping households accumulate assets and escape poverty (Gilligan et al., 2008; Devereux and Guenthe, 2009). However, if the underlying problem of very small landholdings is not being solved adequately by safety nets and accompanying programmes, people's underlying vulnerability may remain the same. The difficulty is that, while locking people into unsustainable livelihoods may be called maladaptation, it is hard to see what options are available for supporting more radical transformative adaptation.

Sometimes a radical change is the only option for households. For example, in Ander Kello, Afar Region in Ethiopia, people's herd sizes had declined (for a variety of reasons, beyond the scope of this report to discuss) to the point where it was no longer worthwhile spending the time taking them grazing for long distances. As a result, more settled patterns of livestock-keeping were being taken up by people who had been semi-nomadic herders. However, this was described by respondents as adapting to 'failure' rather than an example of forward-thinking adaptation. This may also be an example of maladaptation, since lack of mobility is further undermining the resource base around the

⁶ Most people trying a new recipe will not succeed perfectly the first time. Although the results usually improve with time, few can explain what they have done differently.

⁷ Sometimes called 'planned adaptation', see Figure 1.



Supplementary income from charcoal making is a common strategy in difficult times. (Photo: M. Barihaihi, 2010)

newly established villages, on which the remaining livestock depends.

Whilst government officials described settling pastoral communities as a planned adaptation strategy which will enable them both to access basic services and use irrigation to pursue agriculture, ACCRA research findings highlighted that this risks maladaptation. Settlement could further undermine the resource base (water, grazing and agricultural land) around the newly-established villages. The social dimensions of successful adaptation may also be undermined because experience shows that transitions from communal to individual land-use systems risk creating inequality and conflict.

3. **Adaptation was reactive not proactive.** The research found no cases of farmers, communities or local leaders reporting making changes, technical or social, because of long- or even medium-term *predictions*, except by extrapolating past and existing trends (e.g. land pressure for grazing, price trends). This lack of forward-looking decision-making was so prevalent that it was taken for granted. This should not be the case. It has obvious implications for adaptive capacity and communities' ability to *prepare for* (as opposed to *react to*) change. The research was not able to identify why this was the case. Explanations may lie in any combination of insufficient knowledge about scenario

predictions (e.g. climate change, future price trends/ market conditions); lack of trust in the predictions; difficulty in analysing the local implications of predictions; lack of knowledge of alternatives; and lack of knowledge about how to implement alternatives. More worryingly, ACCRA has not found any reports of previous or existing attempts to investigate this crucial problem in relation to any of the three countries.

4. **Most examples of adaptation uncovered by the field research were technical.** It is impossible to know if this reflects the kinds of change taking place, or if it is simply because researchers found it much harder to get at adaptations in social organisation. There were some examples from Ethiopia. Changes in rules around land use were found in Kase-hija, where households without access to irrigable land can use others' land for cultivating sweet potato in the dry season, and landless people are being given the right to manage conserved communal land and benefit from grass sales. In Wokin, a growing group of landless people is starting to self-organise. They are saving money together and have begun to use their self-organisation to claim rights, putting pressure on the local authorities for changes in the rules on the use of communal land. Although this has not yet met with any success, their activism as a group is still a highly significant change.

4.3 Impact of development interventions on adaptive capacity

None of the development interventions studied had deliberately tried to build adaptive capacity; they were designed to improve livelihoods, to reduce risk/vulnerability or to act as safety nets. The research began from the assumption that any intervention would be likely to have unintended impacts, both positive and negative, on the various characteristics and ingredients of adaptive capacity. It was believed that there may be differences in the way in which different interventions (sustainable livelihoods, DRR and social protection) affected adaptive capacity, but in fact the evidence showed strong underlying similarities across the three countries, all research sites and all the implementing agencies present there, regardless of the explicit 'intervention type'.

The ACCRA fieldwork studied a range of interventions,⁸ including support to irrigation infrastructure, women's savings groups, agricultural extension, income diversification, grants, the provision of assets (e.g. improved seeds, credits, social infrastructure) and training. In Ethiopia, there was also a state social protection/safety net programme (the PSNP). Despite such diversity, common features can be discerned. Typically, interventions focused on the introduction of a specific technology or infrastructure. In most cases this was achieved through direct asset provision, with accompanying training specifically for that technology. The actual technologies introduced varied greatly, from 'improved' seed varieties broadly targeted at 'communities', to youth training programmes for livelihood diversification (e.g. Kotido, Uganda), which provided specific skills and start-up assets (e.g. driving lessons and motorbikes, training and equipment for barbers).

Programme design often followed a 'participatory' process with the community. This was typically based on village ('community') meetings, where people prioritised their immediate needs. Many interventions, even those where individuals were provided with assets, were delivered through groups formed by the project. Interventions were often based on the assumption that they would increase income by improving or diversifying assets, and this improved income stream would be part of a virtuous circle, thus ensuring sustainability. Many interventions also included organisational 'capacity building', e.g. training of malt barley producers in collective marketing (Ethiopia); support to village savings and loans groups (Uganda and Mozambique); establishing early warning committees and developing community emergency preparedness plans (Ethiopia). Most rural communities studied had not received isolated projects;

they received support from both government and non-governmental actors, including discrete 'projects' and state services (e.g. agricultural extension, safety nets). This research treats both as 'external interventions'.

The views of villagers tended to follow the logic of the intervention. Interventions, it was reported, had helped build resilience, because villagers now had more assets. In Ethiopia, respondents reported that the assets provided by the interventions had made it easier for them to deal with variability in the weather by helping them cover difficult periods with new income sources (e.g. honey). More assets often contribute to better livelihood outcomes, and diversified livelihoods contribute to increased resilience. Little evidence was found, though, that more assets in themselves contributed to better *adaptive capacity*.

There are several possible – and plausible – foundations for the link between increased assets and increased adaptive capacity. Adaptation may have an investment cost barrier, which more assets and higher income may remove. (This is certainly true at national level, e.g. investment in new green technologies, infrastructure construction, mass extension and training of citizens.) However, no projects had quantified an investment barrier to adaptation and designed an intervention to resolve it. This is unsurprising, since none of the interventions included improved adaptive capacity among their objectives.

Another possible causal pathway rests on the idea that poorer households have less adaptive capacity because they have to be much more risk-averse, since their margin of failure is so small. Higher income (in cash or food) could raise these risk horizons, opening up innovation space. Adaptive capacity would thus be improved through a link between assets (and livelihood outcomes, or income) and innovation. Although plausible, and although there is some evidence from other studies that the poor do indeed sacrifice longer-term benefit for short-term survival, this theory would be much more useful if there were concrete evidence about the income thresholds at which risk aversion began to reduce. Again, in the absence of any independent technique for quantifying adaptive capacity or risk aversion, the research could not find any evidence about this.

The better-off may also have more adaptive capacity because of the indirect consequences of improved income – e.g. more travel and exposure to ideas and information, better social status and a more influential voice in the community, and more self-confidence. The research found some anecdotal evidence of this, such as the ability to claim water rights in an irrigation system and exposure to new ideas through travel (see below). It was

⁸ Details of all the interventions in the various sites are in the country reports (Jones et al., 2011, Ludi et al., 2011, Arnall, 2011).



Community members in Ander Kello reported declining livestock numbers per household due to drought and rangeland degradation. (Photo: Haramaya University, 2010)

not possible to generalise about this effect or to quantify a threshold above which people ‘gain’ adaptive capacity in this way.

Since interventions did not consider adaptive capacity in their design, and since interventions rarely make their programme theory explicit, it is hard for research to find useful evidence to substantiate any links between assets and adaptive capacity. In fact, closer attention to the stories emanating from the field research gave reason to treat with some caution the idea that adaptive capacity had been built by giving people assets. A fairly typical intervention such as the provision of seeds, tools and technical information for a vegetable farming group⁹ rests on the assumption that the group can turn the hand-outs into a sustainable income stream, as mentioned above. But this assumption in turn rests on implicit assumptions that (a) the people the project wanted to help have the labour, literacy, land etc. to engage in this activity, (b) the group is able to continue to work harmoniously in future (that there is no elite capture, no corruption, etc.) and carry out all functions as envisaged, (c) the technical information and seeds provided are the right ones for the

specific land in that specific village and appropriate to the individual needs and constraints of each group member, and (d) that their appropriateness will remain despite changes in factors such as prices, demand, weather and climate, population pressure and land and water degradation.

In some cases there was clear evidence that one or more of these assumptions was not true. Some of the youth in Bundibugyo were given goats, but simply sold them the same day – they had no interest in the income-generating activity they were introduced to, only in the cash value of the assets handed out. Farmers sometimes regarded introduced technologies as inferior because they were not appropriate to their needs. This was the case, for example, with ‘improved’ groundnut varieties in Mozambique, which the state research and extension services, and the NGO, felt were superior to local varieties because they gave higher yields. Farmers prioritised risk avoidance over yield maximisation, and preferred their local varieties, which they felt were more drought-tolerant. Many respondents nonetheless reported that interventions such as the one cited above contributed to their household

⁹ Typical in the sense that it represents a transfer to specific individuals of a particularly technology deemed to be beneficial through asset provision (including training), provided through a newly-formed group.

income in the short term, and that this made them more resilient to future shocks and stresses, echoing the logic of the project implementers. However, few if any of the interventions researched by ACCRA explicitly set out to help households and communities respond to future change in development and climate pressures (adaptive capacity).

Having adaptive capacity as a deliberate objective would have had profound consequences for these interventions. For example, if it is recognised that the assets and technologies that people use will need to change with changing circumstances, instead of giving specific assets and technology, projects could put people in touch with sources of a range of technologies – and with sources of information to help them choose the most appropriate technology for their specific and changing circumstances. In other words, instead of handing out (for example) new seeds, projects could support linkages between farmers and seed suppliers and sources of new varieties – e.g. research stations, other farming communities – so that they can choose their own seeds in future. Similar arguments could be made about projects handing out other kinds of assets, for instance aimed at livelihoods diversification.

4.4 What makes assets ‘come alive’?

Assets, of course, do not exist in isolation. They can only deliver livelihoods through an institutional framework (DFID, 1999 is the clearest presentation of this¹⁰). Building irrigation infrastructure only delivers water to people if there are **institutions** that ensure this. This applies both to indigenous and externally supported interventions. In Ethiopia, for example, women in an irrigation scheme, developed by the community itself, complained to ACCRA

researchers that they did not receive their fair share of water, because they lacked both the money to pay the necessary bribes and the social status to claim their rights without bribes. The institutional dimension is at the heart of the unsustainability of interventions. First, as illustrated above, some institutions were subject to elite capture and corruption. Second, new institutions were established but they did not survive because they were not socially rooted. One example is savings groups, where the rules did not conform to existing norms about group membership, and created different power relations to those in existing local institutions. (It is unfortunate how often interventions create new institutions rather than supporting and working through existing ones that are socially and culturally accepted). Third, some interventions were introduced as new technical practices without considering the institutional arrangements required. Examples here would be the management of common natural resources, where a technically sound intervention in Ethiopia, seeking to spread the use of enclosures for communal hay production, died out because no institutions either existed or were put in place for managing them and taking decisions about the use and distribution of any benefits.

In many cases change will create both winners and losers, and it therefore depends on one’s perspective whether or not it is believed that positive change has been brought about, or whether maladaptation has brought more harm than good. Enclosures for hay in Ander Kello are still limited, and individuals are not (yet?) claiming exclusive rights to harvest the hay; in other pastoral areas of Ethiopia, however, the spread of private enclosures has led to increasing conflict among livestock keepers (Flintan, 2011). Another example is support for increased irrigated crop cultivation along riverbanks in Ander Kello (Ethiopia).

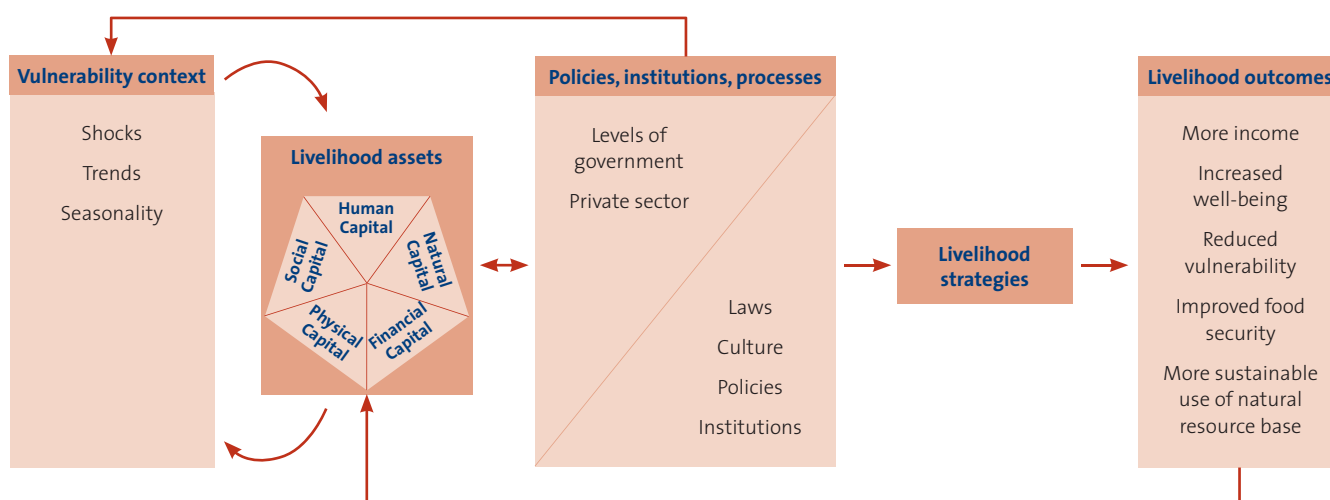


Figure 4: Sustainable livelihoods framework

Source: Adapted from DFID 1999

¹⁰ In a similar way, the LAC argues that assets alone cannot deliver adaptive capacity.



In Afar Region, Ethiopia, irrigated crop farming is becoming increasingly common. (Photo: E. Ludi, 2010)

There are clear benefits for those producing the crops, but others suffer, at least potentially. Cropping prevents livestock from easily accessing water from the river. So far, no new institutions or social organisations have been developed that could manage the competing interests of livestock keepers and crop farmers. In many countries, as farmers settle on what was previously grazing land, or livestock access routes to grazing and water, power rests with the farmers, who are able to co-opt the law and justice system to impose fines when livestock damage their crops. There are much wider questions about whether support for pastoralism is prolonging people in unviable livelihoods or whether, by contrast, it is support to sedentarise pastoralists and turn them into crop farmers that will prove to be maladaptation. Settled farming in pastoral areas takes place on land that was previously used for communal grazing, so adaptation is taking place around institutional changes (land rights) that determine the assets that people can use for their livelihoods. A final judgement will only be possible with hindsight and, since there will always be winners and losers, it will still be subjective, to the extent that it will balance the gains of some against the losses for other.

There are particular dangers that a policy of sedentarisation of pastoralists risks maladaptation because it does not appear to be adequately based on an analysis of the available evidence. The current famine in Somalia has severely affected settled farmers, but mobile pastoralists are much less affected.¹¹ This suggests that pastoralists may have better resilience and better adaptive capacity, which is being negated by increasing restrictions on their mobile livelihood strategies.

4.5 Innovation and change

Examples of **innovation** were found in all sites, though to different degrees and with greater or lesser success. Whether or not a culture supports innovation can also be seen as an institutional question. In practice, ACCRA research found that interventions rarely considered innovation; when it was considered, it was assumed that forming groups to reduce risk would be sufficient to make it happen. In some villages, innovation was clearly constrained by a dominant culture that frowned on doing things differently, e.g. in some villages in Ethiopia there was strong opposition to individuals changing sowing

¹¹ Under-five malnutrition rates among pastoralists are around half those of riverine famers. See www.FSNAU.org.

Box 4: Stories of innovation in Ethiopia

Why are some innovations copied and others not? Two contrasting examples.

Wokin in Ethiopia suffers from heavy soils that are difficult to plough and are prone to water-logging, which damages crop growth. The response of the agricultural extension system was to promote broad-bed makers, which create deeper furrows and a raised bed to allow better drainage. Uptake, however, was limited because they were too heavy for the locally available oxen. One farmer modified them by using wood to reduce the amount of metal needed, making a lighter tool. Other farmers are now coming to him for advice and are copying his innovation.

One man from Ander Kello received military training in an area of Ethiopia known for its agro-forestry systems. When he returned home he established an orchard with fruit trees, vegetables and beehives surrounded by eucalyptus trees. The income from the fruit, honey and timber has paid for all his children to go to school and for better medical care for his family. However, he says that, when he started, people considered him crazy, and even now there is little interest in copying his ideas.

It is not obvious that one innovation was more successful or appropriate than the other, or that one involved greater investment. Perhaps the first

innovation allowed people to practice their existing strategies more successfully whilst the second involved a greater psychological change. If extension services and development projects invested more in understanding how to ease constraints to the spread of good ideas, great strides may be possible in advancing adaptive capacity – and grass-roots economic development.



The compound of an innovative farmer in Ander Kello, Ethiopia. (Photo: K. Wilson, 2010)

dates in the face of changing weather patterns. A culture that disapproves of individual innovation and adaptation is not challenged by the introduction of an ‘approved’ innovation by external authorities; indeed, this can be seen as supporting such a culture. Opportunities are being missed to find out where, how and by whom local innovation is happening and the forces that constrain people from innovating, and seeing how these could be addressed and innovation supported. Those implementing projects and the ACCRA researchers all confused the provision of a new technology (an ‘innovation’) with support for innovation as part of adaptive capacity. Indeed, the dominant culture demanding conformity to top-down norms applies as much to many NGOs and government departments as it does to rural communities.

Innovation is not only constrained by institutional issues such as culture. Other barriers include the ability to run financial risks, lack of confidence and limited information, and access to new ideas. All of these factors could be analysed by development actors with the people concerned if these actors were thinking in terms of adaptive capacity. Supporting farmers’ innovation was a subject of study some years ago (e.g. Røling and

Wagemakers, 1998; Levine 1996). It subsequently went out of fashion, but has returned to some extent in the context of local adaptation (e.g. www.prolinnova.net).

4.6 Knowledge and information

Adaptive capacity needs knowledge and information, to know what to adapt to, to have more options and to be able to make informed choices. Many kinds of knowledge and information are needed, both by farmers and by the development planners and actors who shape their economic world and work with them. The research found areas for improvement in the knowledge networks and information flows in each of the three countries studied.

Knowledge for planners. It is certainly true that planners urgently need better information, for instance on the likely impacts of climate change in different areas. This should not detract from the importance of the findings, and that decision-makers are not currently making good use of what information is already available. This applies both to large-scale policy decisions (e.g. settlement of pastoralists, resettlement from flood-prone areas) and to the design

of specific interventions. This was clearly seen in Kase Hija, where farmers had noted that seasonal change was making traditional (late maturing) sorghum more difficult to grow, and wanted short-maturing maize. An NGO distributed maize seeds, but the varieties were long-maturing and less tolerant to water stress than traditional crops. Information about growing conditions was easily available and could have informed a decision about the most suitable range of varieties to introduce into the area – but it was not used.

Knowledge for farmers. At first sight, a great deal of information was being passed on to farmers in the research sites, from agricultural extension and animal health information, project packages of technologies, weather forecasts, price information, food security and early warning information, and a whole host of other recommendations and guidance from the government, the media and non-government sources (although information about climate change was very limited). However, if an adaptive capacity lens is used to analyse the provision of information and knowledge, a very different picture emerges. Adaptive capacity rests on people's

ability to make informed choices. Information for adaptive capacity is thus tested against criteria that measure the extent to which it supports agency and allows people to make their own, better (i.e. more informed) choices. On such criteria, the provision of information in all research sites was generally poor.

Information:

- was prescriptive;
- precluded choices;
- was unreliable;
- was limited to a narrow range of issues;
- excluded uncertainty;
- was not forward looking, and
- lacked medium- and long-term analysis.

In addition, there was very weak investment in giving people the analytical tools to use information.

Prescriptive, precluded choices and unreliable Governments' and projects' treatment of information was largely confined to providing technical packages. There are similar assumptions underlying this approach to those underpinning the provision of set technical packages



Bringing together farmers and researchers to discuss solutions would allow people to make informed choice.
(Photo: M. Barihaihi, 2010)

around assets. A similar assumption exists that technical information is both 'correct' and appropriate. For agricultural technologies, this is defined by whether or not they maximise yield for a standard set of circumstances. However, it is almost inevitable that the information will often not be appropriate to many people, and that the sources of information will then tend to be considered unreliable, for two reasons: the situation of people is highly diverse, and there is a significant misunderstanding among information providers of the objectives of those whom they are advising. This is seen most clearly in the case of new agricultural technologies. These are almost always judged by how well they maximise yields per unit area. However, no farmers seek to maximise yield per unit area. Farmers aim to maximise their net cash and food *income* (not yield), per unit of whichever factor is in most limited supply. This unit is usually time, not land – and often time in a particular month of the growing season. Much of the failure of 'development' efforts can be explained by the lack of fit between farmers who are trying in dynamic ways to adapt and 'squeeze' a livelihood out of their limited assets (including time), and states and NGOs, which seek to instruct them with 'correct' information that is defined by quite different criteria, which are static and standardised.

Weather forecast information, seasonal and short-term, is provided by state meteorological services, but is rarely used or considered reliable by villagers. Long-range weather forecasts are inherently uncertain, but when this uncertainty is not well presented, farmers can quickly become disillusioned with 'wrong' predictions. A major problem with short-term forecasts is that they are generalised for large geographical areas and so do not prove accurate or useful at local level – where it is needed. Specific short-term warnings for cyclones or for floods from the River Zambezi in Mozambique are an exception and are widely acted upon.

Information is often not being used to help farmers make choices (i.e. build their 'agency'), but to dictate set choices for them. If information and knowledge were being used to support adaptive capacity, far more emphasis would be given to providing people with a much wider range of information, appropriate to a much wider range of circumstances, to help them to make more informed choices. Indeed, attention would be given not just to providing information but also to improving information flows, supporting people's ability to find and access information from a variety of sources.

Narrow range of issues; excluded uncertainty; not forward looking Information is needed to deal with the process of change as well as to inform decisions about adapting

to future circumstances. This requires information on a wide range of topics, whereas farmers were only being given very narrow, technical information. Farmers had inadequate information about likely future conditions (climate, prices, economics, demographics, markets) and their likely impact on livelihoods, and changing risks and opportunities. It is unreasonable to expect any kind of official agency to supply all this information from all the perspectives needed, so a range of independent information providers (i.e. both information producers/analysts and sources of dissemination/media) is almost certainly required. Forward-looking information was lacking for both shorter- and longer-term futures. There was also inadequate recognition of the fact that all predictions are inherently uncertain. On one level this creates a lack of trust in predictions, as discussed above. In one case ACCRA gave long-term climate projections to District officials in Uganda, to see how it would influence District planning. Meteorological officials reviewed these and found that the original information had been poorly interpreted and had led to potentially harmful planning because of a serious misunderstanding of uncertainty in the predictions. The District Officials had not been equipped with the knowledge and skills needed to interpret and use climate information.

Adaptive capacity forces us to see information not as a set of facts, but as an input into decision-making and choice. This puts less emphasis on simply making facts available, and instead pays attention to how information is turned into knowledge, i.e. how people's ability to use the information for decision-making is supported. This is particularly difficult when predictions are uncertain.

4.6.1 Turning information into knowledge

Turning information (facts) into knowledge (people's level of understanding) requires that people have the tools to use the information: to analyse it, to use it to answer their own questions and to have the ability then to act upon it. ACCRA research found little investment in turning information into knowledge, either for communities or for local authorities. It was not possible to research the reasons for this exhaustively, but some threads were apparent; these are offered here as a basis for further analysis rather than as a definitive diagnosis of the problem in all of the research sites.

- People who have the information do not themselves always realise its implications for different rural population groups.
- A huge investment of human resources is needed to analyse adequately the implications of any individual

predicted change, e.g. of rainfall or temperature. This needs doing area by area. It is a task that has never been done, because it is simply too big and the necessary personnel with the capacity to do it are in short supply.

- Turning information into knowledge is necessary, but there is no system to do this. Each individual person or agency has only a responsibility to inform, not to give people analytical tools. Information providers are evaluated on the extent to which they provide information, not the extent to which they catalyse change.
- Disseminating analytical ability is labour-intensive, needs long-term horizons, and is very expensive. It is much simpler and cheaper to disseminate knowledge on radio, and this will therefore be preferred where this still counts towards the promised outputs and measurable deliverables.
- In some cases, it seems that knowledge is seen as power, in that people want to control the distribution of information. A monopoly on information brings power, because, as discussed above, information is so often prescriptive and directive – a way of guiding people's choices, not of liberating them to choose.
- Attitudes among educated 'elites' are commonly highly patronising of rural people. Farmers are not credited with the intelligence to make rational choices, and so supporting their 'agency' is seen as leading them to make 'wrong' choices. For example, one government official at the ACCRA regional workshop insisted that, if the state gave farmers both long-term predictions and seasonal forecasts, this would only confuse them. He argued that only Central and local government officials should be given the longer-term scenarios, and they would pass on specific recommendations to farmers for each season. Clearly, this common attitude is the antithesis of support for adaptive capacity.

4.7 Forward-looking decision-making?

ACCRA research found risks from two sources of maladaptation, i.e. decision-making that leads to long-term increases in vulnerability. The misinterpretation of climate information and specifically of the degree of uncertainty leading to the potential for ill-informed planning has already been discussed. However, a more important reason is that most interventions are made without any consideration of evidence about longer-term climatic changes or any forward-looking economic analysis.

The response of the government of Mozambique to repeated floods in the Zambezi River valley has been to relocate farmers to higher ground. Research showed that

farmers close to the river, who are able to farm vegetables in the dry season and to fish, are much more resilient to a range of economic shocks and stresses than those who live on slightly higher ground (FEWS, 2008). The livelihoods of those in the river valley were even resilient to floods, and although they sometimes received food aid following floods, the evidence showed that they could cope quite well without it. It is, of course, hardly surprising that people's livelihoods had been adapted to dealing with a regular hazard, with which farmers had made a conscious and rational choice to live. There was a need to understand the details of livelihoods in the river valley and on higher ground, including consideration of a wide range of factors – e.g. weather, soils, economic opportunities, risk and risk management, etc. – before imposing choices such as relocation on populations. This was not done. Unsurprisingly, many of those resettled were looking to return.¹²

An example of the need for forward-looking analysis relates to the rapid creation of irrigation schemes for crop farming in semi-arid areas. It is impossible to know whether these interventions represent adaptation to the impacts of climate change or maladaptation, without much more information about the future scale of irrigation and about the long-term availability of water, the feasibility of irrigation from an economic and institutional perspective, and the wider environmental, social and economic impacts. The ACCRA research did not find that this information was being sought, or these wider questions discussed.

This latter example highlights the need not only to have and use information, but for decision-making to be forward-looking. Given that we know that the future is uncertain, both in terms of future climates and development, rigid centralised planning runs high risks of either failing to respond to changing circumstances, or even leading to maladaptation. ACCRA research suggests that there were two problems with decision-making and planning. First, planning is not incorporating available climate knowledge or considering other developments such as world food prices and demographic changes, but is primarily reactive and focused on addressing immediate needs. In part, this stems from current modalities of 'participation' (asking 'communities' what they want), and from short-term funding modalities and from a projectised approach to development working from plans, but in the absence of coherent long-term strategies. Second, there is still a reliance on top-down planning which does not support local flexible decision-making and agency.

The ACCRA field research and analysis was intended as a first field test of the LAC framework. Conclusions can

¹² Resettlement policies are rarely without controversy over land rights.



Discussing implications of evidence is a key component of forward-looking decision-making and key to avoid maladaptation. (Photo: M. Barihaihi, 2010)

be drawn in two areas. First, as a way of guiding research, the LAC framework presented some difficulties. These are discussed in Section 5. The evidence which was gathered suggested that the analytical framework was capable of providing new insights into understanding adaptive capacity. The earlier presentations of the framework (Jones et al., 2010a, 2010b), though, did not, perhaps, sufficiently emphasise the interactions between the

five characteristics of adaptive capacity. Second, the evidence presented above suggests the need to see these five characteristics as being different perspectives of the same reality, rather than as five independent qualities that can be added, with adaptive capacity as the sum of them all. The way in which 'agency' emerges at the intersection of the five characteristics is discussed further in Section 6.

Section 5 Lessons for Research from Using the LAC Framework

There were considerable difficulties in finding good evidence about the contribution that development interventions had made to local adaptive capacity. These difficulties are in fact an important echo of the central finding of the research programme: adaptive capacity is being missed by development actors because they do not 'see it'. The research process showed that 'seeing' the characteristics of adaptive capacity involves changing the way in which many have become accustomed to thinking about development. This was as true for those involved in the research, as for programme designers and implementers.

The lesson is important. The LAC framework was specifically designed to take a closer look at aspects of development interventions (and of adaptive capacity) that are often missed: the dynamic aspects of institutions, innovation and decision-making processes. The conceptual framework was turned into a research framework that was supposed to guide the research into examining these areas. However, initial field reports clearly showed that these were the very areas that were being under-researched, both in evidence gathering and in initial analysis. Typical site reports after the first phase of field work were following the same biases inherent in the programmes which they were examining, e.g. identifying institutions as 'organisations' or formal authorities (local administrative structures, CBOs).

The difficulties in researching abstract and unfamiliar concepts were magnified because the research often passed through two stages of translation (from English to the national language in which the national researchers worked, e.g. Amharic or Portuguese, and then into local languages). Certain biases and preconceptions could easily give translations of sophisticated terminology that lost the most important ingredient of its meaning. 'Institutions', for example, was translated as 'organisations' because of a failure to fully appreciate the difference. Similarly, climate and weather became confused, 'issues' was translated as 'problems' (reflecting a standard NGO bias in community meetings) and 'adaptive capacity' became 'resilience'.

One of the most crucial deviations in terminology, whether because of translation or because of

preconceptions and bias, was equating new technologies introduced by external agencies ('innovations' in the plural) with 'innovation', the abstract quality that is at the centre of adaptive capacity. Innovation as a key component of adaptive capacity is about how people find, create, share and adapt new ideas and new ways of doing things. This could involve changes in technology (e.g. new plant varieties), new forms of social organisation and new ways of engaging with markets. Discussions at the ACCRA regional conference gave several examples of grass-roots innovation, and participants also suggested reasons why these were frequently overlooked by outsiders. Much of the explanation lies in preconceptions about what 'local people' (where 'local' means rural, less well-off, less well-educated) are capable of. One participant, in stressing the importance of local innovation, explained that small-scale farmers do not have the resources to develop their innovations, and so they remain crude. It is up to 'us' to take these innovations and develop them so that they can be useful. This comment makes clear a common attitude to what count as innovations, what 'sophistication' implies, what counts as useful – and above all, the conflation of giving people new technology with supporting their ability to create, test, develop and adapt ideas for themselves. Many of the same attitudes are behind difficulties in researching the other 'softer' aspects of the characteristics of adaptive capacity in the LAC framework. All depend on suspending preconceptions of the complexity and sophistication of 'their' lives as compared to 'ours', and appreciating the centrality of the agency of individuals within any community or society.

It would be wrong, we believe, simply to conclude that the LAC framework is 'too complicated'; it is a simple framework that necessitates dealing with concepts which are difficult to research. Since the research has given an insight into adaptive capacity, the concepts have to be retained, even if they are less familiar for researchers and practitioners alike.

The importance of taking on board the difficulties of researching these areas cannot be over-estimated. One common approach to programme design is to use 'participatory techniques'. These are underpinned by an unstated assumption that, if field workers who are



Researcher discussing with an elderly farmer in Kotido, Uganda. (Photo: M. Barihaihi, 2010)

untrained in sociology, anthropology, ethnography or some similar field of study are given a simple framework and the 'right' questions (often through a use of set PRA exercises), then the development actor can gain an understanding of the relevant features of the lives of the people it wants to help. This assumption has long been

critiqued.¹³ ACCRA research found very strong evidence that far more guidance and support is needed even for experienced researchers in order for them to understand some of the most important dimensions of sustainability. Simply giving over a checklist cannot be sufficient. Much greater investment is needed into establishing a shared analysis. This investment must be both between the research organisers/development planners and the field researchers, and between the research team and the communities being researched. The resource implications, both financially and time-wise, cannot be avoided or reduced. We have argued that the key to the impact and sustainability of all interventions lies in understanding the institutional set-up and power relations involved; this can only be done by supporting and developing agency, innovation and forward-looking decision-making. If this is true, then it is clearly wrong to make any attempt to design an intervention that is not based on understanding how decision-making currently takes place, and what the constraints are to local innovation. Achieving this understanding is a significant, and under-appreciated, challenge.

¹³ See for example Richards (1995) and Stadler (1995).

Section 6 Conclusions

6.1 The importance of supporting people's own agency

People's agency is their ability to develop and successfully execute their own plans. The development interventions studied by ACCRA in the three countries had helped to strengthen assets and, in some situations, institutions, but they had not incorporated a broader view of the need to support the adaptive capacity of local people and communities. Development partners had not taken into consideration how to support people's own agency and their ability to make informed choices and to design and implement their own 'projects'. Agency, empowerment or some similar term is sometimes mentioned in development interventions, but in practice it was found that interventions rarely led to greater agency. In certain instances, interventions have even reinforced a lack of agency by maintaining dependence on outside assistance or by reinforcing subservience to authority and 'experts', rather than supporting people's independent access to the assets, skills and knowledge that they need to shape their own future.

Without agency there is no adaptive capacity, and without adaptive capacity there is no sustainability or ongoing development. Development means helping people cope with a future of change – and uncertain change at that. This cannot be achieved by central planning alone, partly because no-one knows the exact way in which climate will change locally, and because in any case all the impacts of climate change on people's lives are influenced and felt through a host of other changes. In such a world, project interventions which focus on delivering specific interventions to create fixed outcomes are of limited value. Sustainable development can only be achieved by giving people the ability to adapt to future change, weather-related or otherwise, autonomously. This does not contradict the need for forward-looking decision-making – but it does suggest that forward looking must include flexibility and choices.

6.2 Interconnectedness of the five dimensions of adaptive capacity

Livelihood strategies and their outcomes do not depend only on the assets people have, but also on the institutional environment which governs people's entitlements to assets, and how people may or may not put these assets to use. The institutional environment influences decision-making at all levels, including whether and how people innovate and how they access information and translate it into knowledge. Many interventions are based on the idea that some form of collective action, achieved through group formation, will bring development advantages for the group members. There are underlying institutional dimensions to how people act collectively, to solve current problems and to plan for the future. It is thus not simply that adaptive capacity is shaped by the five characteristics of the LAC framework – assets, institutions and entitlements, information and knowledge, innovation, and forward-looking governance and decision-making. Each of the characteristics is defined and shaped by each of the others. Programming and planning therefore need to take account of *all* the characteristics and their interactions, rather than seeking to address one in isolation (usually assets).

During the ACCRA research, agencies often argued that they cannot be expected to 'deal with everything' in what are sometimes relatively small and time-bound projects. They prefer to make a discrete contribution, and if adaptive capacity is to be put on their agenda, this would be achieved by addressing one or other of its five characteristics. This, though, reflects the kind of linear thinking (where inputs lead to certain outputs bringing predetermined outcomes) that the adaptive capacity lens seeks to challenge. It is to profoundly misunderstand adaptive capacity and its characteristics. It is also to misunderstand the solution. Adaptive capacity should not be supported by more activities added on to the existing ways of working, but by *doing things differently*. All the characteristics of adaptive capacity will always be relevant to every project, however small. It is necessary to understand them all, and to find ways of implementing

any project in ways that take account of them all. Agencies do not have any choice about which characteristics of adaptive capacity are important; the only choice they have is whether or not to be aware to them.

6.3 Rethinking participation

Taking on board agency will require *major paradigm shifts* in how local people are perceived and treated. Development actors will have to learn to trust people in new ways, to see their role as supporting people's own life 'projects' and to stop trying to determine how they should use the assets, information and opportunities they have. Although talk about the need for 'bottom-up' rather than 'top-down' decision-making is hardly new in any way, the evidence is clear: it has yet to be taken seriously, despite the ubiquitous rhetoric of 'participation'.

One reason is that a paradigm shift is needed in the way in which participation itself is seen. Modalities of participation have become the vehicle through which support to agency and adaptive capacity has become blocked. The research found that interventions were rarely forward-looking, yet the excuse for this is that

communities prioritise current needs over solving possible future problems. Is it possible to be both participatory and to address uncertain future stresses and shocks?

Currently, participation in programme design typically involves one (rarely two) community meetings in a few villages to hear the 'community's priorities'. A number of implicit assumptions are being made about social organisation. Although it is widely recognised that there are power imbalances within villages, it is still assumed that these can be taken care of quite simply within a day, for example by having a separate discussion group for women. It is assumed that people will talk about their real concerns, rather than ask for one or more items from the very restricted list of interventions which they know that government offices and NGOs can offer. It is assumed that people can easily identify and articulate their priorities and challenges in a first meeting with strangers. It is assumed that meaningful social research can be conducted by taking intelligent and reasonably well-educated staff and giving them a set of exercises to follow.

Understanding the different constraints facing different people in a village requires much deeper understanding, and this can only take place over a much longer



Local women, researchers and government staff are involved in a participatory hazard ranking exercise in Kase-hija, Ethiopia. (Photo: K. Wilson, 2010)

timeframe. It is necessary to understand the different power structures in the village and beyond, and what room for manoeuvre they leave different villagers. (Change will always lead to winners and losers. Interventions to empower marginalised and powerless groups will often challenge local power relations; status quos do not exist by chance, but are the product of power relations.) It is necessary to understand the role and functioning of local institutions, which local people themselves may not find easy to articulate. It is necessary too to understand how external actors are perceived, and the ways in which external interventions are contested and used. This has implications for the skill set and for the resources required. The benefits that ‘participation’ has so far brought to development efforts have been hugely disappointing. This research concludes clearly that this is because of the kind of participation being practised. There are huge potential benefits in an approach to participation that is based on a fundamental rethink of the relationship between the ‘community’ and the external development actor.

6.4 The need to reform ‘the system’

It is clear from the above that this is not within the control of any individual organisation or government office. Just as the constraints facing villagers often lie outside the village, so too planners and development actors are often constrained by institutional factors in governmental planning systems and in the international aid system. Development resources are scarce, and it is hard for them to commit to paying highly skilled staff without the promise of a certain level of ‘deliverables’ within a given time period. How government spending and aid money are rationed and managed to maximise impact contributes to overly-rapid needs assessments rather than research, and overly-short time frames for interventions and pre-set development plans or projects with fixed outcomes, rather than the flexible provision of skills and assets which people can use to produce the outcomes that they themselves choose.

Fundamental paradigm shifts are needed in how organisations work with each other – local government with central government and financing departments, NGOs and UN agencies with donors, etc. Although the problem is well known, no way has been found to solve it that can be replicated on any scale. This research suggests that, unless efforts are made to fundamentally rethink development planning, there is little chance of ever achieving sustainability with the money spent, or ever creating societies that will be capable of adapting to climate change. Such changes may make it harder to manage accountability for outputs, but without it, impact

will remain elusive. The system, though, has consistently favoured accountability on financial procedures and on delivering outputs, not on impact.

6.5 Strengthening adaptive capacity at local and national level

Much of the vulnerability at local level is caused by distant structures and processes. Without addressing the stressors that emanate from higher levels, efforts to enhance the adaptive capacity of households and communities may fail. The ACCRA research was limited to realities at local level (roughly, from village to District). Though little can thus be said about challenges at the wider level, it would nonetheless be wrong not to signal their importance.

6.6 Integrating climate change into development policy

Evidence from the field research has shown that:

- a) the impacts of climate change cannot be separated from other development pressures;
- b) people do not adapt separately to pressures from climate change; if they adapt, it is to the pressure they face, whatever its mixture of causes; and
- c) adaptive capacity is an ability to deal with change, whether from climate or other development pressures. The elements that give people adaptive capacity are the same, whatever the cause of the change to which they have to respond to.¹⁴

This provides support from grass-roots realities for the argument expressed in Klein et al., 2007, that in the context of climate change, climate risks must be addressed not as a separate initiative but as part and parcel of ongoing development policy across all sectors. It was put more bluntly by Prof. N. Stern (Stern, 2009):

“Adaptation is essentially development in a more hostile climate. It is pointless, and indeed even diversionary or disruptive, to attempt a rigid and comprehensive separation of elements of investments in physical or human capital which are marked for ‘development’ or ‘adaptation’.”

The challenge, though, is how to organise ourselves to do this.

It is an accepted principle that developed countries, which are largely responsible for greenhouse gas emissions leading to climate change, should help finance additional costs that are being faced by developing countries in order to deal with the impacts of this climate change. The Cancun Agreement¹⁵ re-stated the financial

¹⁴ Of course, the relative importance of the different elements of adaptive capacity, as described in the LAC framework, will vary according to the challenge: longer term pressures may need more emphasis on different components of adaptive capacity from a response to short-term shocks.

¹⁵ The agreement made in December 2010 at the 16th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC).

pledge first made in the 2009 Copenhagen Accord that developed countries would work to a goal of jointly mobilising US\$100 billion per year by 2020 of new and additional finance to address the needs of developing countries to deal with climate change (Brown et al., 2010).

It is vital that the principle that this is *additional* money is maintained, and that this pledge is not used to address shortfalls in other development finance. It is also essential to maintain the principle that these funds are for addressing problems posed by climate change, and are not used to continue with business-as-usual in development assistance. However, in other contexts it has been seen that separate funding channels can result in parallel sets of interventions. If there were to be

parallel sets of activities at the local level for supporting adaptation on the one hand, and ‘doing development’ on the other, it could risk failure in both objectives – in tackling poverty and in making people in developing countries less vulnerable to the impacts of climate change. The challenge, therefore, to be faced is this: how to ensure clear accountability in commitments to funding climate change adaptation, and at the same time ensure that support for adaptive capacity to change (including to climate change) is properly integrated into development assistance planning and practice. It was, though, beyond the scope of ACCRA to research or to recommend a way forward.



Diversifying livelihoods is supported as an adaptive strategy – potato marketing in Caia District, Mozambique. (Photo: ACCRA Mozambique, 2010)

Section 7 Summary Conclusions and Recommendations

Summary conclusions

1. All development interventions need an agency lens, i.e. they need to be thought of not simply as delivering a given infrastructure or technology, but as vehicles for expanding people's range of choices. For any intervention to offer sustainable benefits, consideration is needed at all stages, from preliminary research to final evaluation, to the question of how different people will use the intervention under a range of possible climate futures. This is impossible without due attention to features which are largely neglected in development planning and interventions, namely power and institutions.
2. The five characteristics of adaptive capacity are not stand-alones, from which one or more can be selected for attention, they shape and depend on each other. Taking adaptive capacity on board does not mean adding five sets of each intervention for the five characteristics. It means understanding these dimensions of people's and communities' lives, and designing and implementing interventions in ways that enhance the way in which assets, institutions, innovation, knowledge flows and decision-making contribute to increased agency, and more informed decision-making for the long term.
3. Working to support agency requires participatory ways of thinking and acting. However, much of what is called 'participation' has failed to deliver the intended transformation in relations between development agents and the people they wish to work with. There are practical reasons for this, relating both to deeply entrenched attitudes and also to resources, including funds, time and skills. Getting participation right will require a major investment by many kinds of actor working together. The alternative, of 'business as usual', will ensure that investment in development continues to have the disappointing results that have been seen over the past decades, both for sustainable development in general, and for adaptive capacity for the new and pressing challenges of climate change.
4. Change at system level is required because the necessary changes to the practice of development

which ACCRA has identified are not actionable by any single organisation or individual acting alone. The adaptation required by development actors is transformational, not incremental. Platforms will need to be strengthened and, where necessary, created at local, national and international level for negotiating these fundamental changes and paradigm shifts. Although the challenge is enormous, the increasing use of the language of 'impact' provides an opportunity to place at the centre of debate the necessary conditions for sustainable impact.

Although system-wide change is needed, there are some minimum steps that individual government departments or agencies can take at the level of interventions.

Recommendations

1. *No development without adaptive capacity*
Agencies (Governments and development partners) do not need to think of designing separate projects for building adaptive capacity. They should rather incorporate into the design of all development programmes a consideration of how people will be able to adapt in the future. Future uncertainty includes both climate and other changes, which should not be separated. Incorporating adaptive capacity means making it an integral part of all assessments, planning processes, feasibility studies, agreements with donors, implementation, monitoring, reporting and evaluations.
2. *Flexibility and scenario planning*
All interventions should be designed and implemented for the future, and not just the present. This makes scenario planning an essential part of all development planning and intervention design. Such scenario planning must cover more than one possible scenario and include all the important major changes which are likely – and their interactions. Intervention design and development planning must be for an uncertain future. This means building flexibility into programme design and management; and also, building support for flexibility (i.e. adaptive capacity) into planning

objectives. This is currently beyond the capacity of most, if not all, development actors. The recommendation is thus: a) to start immediately making what progress is possible, and b) to invest more in the analytical capacity of those responsible for planning, intervention design and approval, and management.

3. *Using autonomous innovation as an entry point for an adaptive capacity perspective*

People's own ability and practice of experimentation and innovation is one of the key manifestations of their agency. Planning and intervention design should use such autonomous innovation as an entry point. This involves a) understanding how people are currently experimenting and innovating and b) understanding the constraints to innovation and the uptake of new ideas. This inevitably includes having an understanding of institutional factors, power relations and other socio-cultural factors. It must look at both local constraints to accessing information and knowledge, and constraints that exist outside the local context. Intervention design should then support people to challenge and overcome the constraints, both local and external.

4. *Turning information into knowledge*

Information provision should not stop with giving people facts. Information only becomes knowledge when people can understand and use it. All information providers should redefine their role as one of

'knowledge providers', whose objectives are 'more informed decision-making'. Both they and others should support people to acquire the required skills and tools to analyse and use the information provided, and, furthermore, to give them the ability to access independently further information from a variety of sources. The control of information access is not always in the hands of rural people themselves. Frequently, it will also be necessary to work with those generating and holding information to ensure that they are better connected to people.

ACCRA's analysis is that fundamental paradigm changes are needed in how development takes place. These paradigm shifts are needed within all development actors, and, most crucially, in how they work together. The four recommendations above can be acted upon by individual actors or even by individual projects and can be successful within the constraints of their operating environment. The analysis in this paper, though, clearly leads to the conclusion that meaningful progress towards building adaptive capacity can only occur if these individual recommendations are not treated simply as a checklist for action, but lead to a transformative change in the way in which development and climate change adaptation are conceived, designed and delivered.

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