ACCRA
AFRICA CLIMATE CHANGE RESILIENCE ALLIANCE

Preparing for the future in Uganda: Understanding the influence of development interventions on adaptive capacity at the local level

Africa Climate Change Resilience Alliance (ACCRA) Uganda Synthesis Report

Lindsey Jones, Overseas Development Institute, London, UK
Frederik Ayorekire, Gender and Development Initiatives, Kampala, Uganda
Margaret Barihaihi, World Vision, Kampala, Uganda
Anthony Kagoro, World Vision, Kampala, Uganda
Doreen Ruta, Gender and Development Initiatives, Kampala, Uganda

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Executive Summary

Uganda faces the challenge of responding to rapidly changing climate and development pressures. At the local level, many communities do not have the tools, resources or capacity to adapt alone, and will require assistance and support from government and other development actors. Though most development interventions do not seek directly to address issues of climate change, the impacts of project support are likely to influence the ability of people and communities to respond and adapt to changing climate and development pressures. Yet, few development actors have considered how their interventions are influencing communities' adaptive capacity, and what can be done to further enhance it.

Research by the Africa Climate Change Resilience Alliance (ACCRA) seeks to explore how existing Disaster Risk Reduction (DRR), Social Protection and Sustainable Livelihood interventions impact on adaptive capacity at the local level in Uganda. It does so through use of the Local Adaptive Capacity (LAC) framework, which depicts adaptive capacity as being composed of five inter-related characteristics: the asset base; knowledge and information; institutions and entitlement; innovation; and flexible, forward-looking decision-making. Primary and secondary data have been gathered from three research sites in Bundibugyo, Kotido and Gulu districts. This report is a synthesis of the key findings. It aims to inform and influence the work of development partners – government, NGO or civil society – in supporting those communities that are most vulnerable and least able to adapt to a changing climate.

ACCRA's research finds that governments and development partners are impacting, and in some cases contributing positively to the characteristics of adaptive capacity. Using the LAC framework, ACCRA's findings document how development interventions are making strong contributions towards strengthening 'the asset base' and supporting 'institutions and entitlements'. However, significant potential exists for development interventions to maximise their contributions through small changes to programmatic and operational activities. In particular, there is a need for development partners and government to focus on supporting the characteristics of 'innovation', 'knowledge and information', and 'flexible, forward-looking governance'.

Key findings and recommendations:

1. Understanding of adaptive capacity, and the processes that contribute to it, is weak and requires further research. The concept of adaptive capacity is complex, and the determinants, functions and indicators that reflect it at local level are not universally agreed. Findings from this report are meant to reflect ACCRA's interpretation of adaptive capacity, as depicted through the LAC framework, and have to be considered in light of limitations in the scale, application and methodology used through the research process. More research is needed to validate the findings across a wider scale and to generate a more applicable interpretation of the characteristics of adaptive capacity, particularly for different contexts – such as the differences between rural and urban settings.

2. People and communities are already responding and taking actions to adapt to changes in climate and development pressures. However, the majority of actions taken to adapt are reactive and focus on the short term. Fewer adaptation actions can be considered as successful and sustainable in the longer term. Similarly, development partners and government largely base intervention support on current and immediate needs, with future changes in climate and development pressures over the short, medium and long-term not considered within programme design.

3. Development interventions need to do more to support the agency of community beneficiaries. Adaptive capacity is, in large part, synonymous with an individual or community's agency; i.e., their ability to act independently and to make their own choices. The interventions that have had the most pronounced effect on enhancing adaptive capacity are those that have supported the processes needed to enable individual agency and capacity development. Many of these process elements relate to support for the characteristics of innovation, knowledge and information, institutions and entitlements, and flexible forward-looking governance.

4. Development partners need to better understand the context and to address the root causes of the underlying social, political and institutional processes within which their interventions operate. Findings from ACCRA's research suggest that development interventions that seek to address restrictive institutions and cultural barriers are some of the most effective in supporting adaptive capacity and promoting individual agency, particularly for marginalised groups.

5. Greater focus on coordination and building the capacity of local governance and decision-making bodies is needed. Government and development partners can do more to incorporate issues of climate variability and change into both current and future planning and implementation. Efforts to coordinate community, district and national activities toward addressing climate change issues are largely lacking across Uganda. District-level actors are seldom aware of national policies and commitments, and actions are not coordinated to integrate National Adaptation Programme of Action (NAPA), National Disaster Preparedness and Management Policy (NDPMP) and National Development Plan (NDP) objectives within district-level planning. The top-down and conditional nature of funding from central government leaves district government with few options for addressing local needs outside centrally designated priorities.

6. Development partners must, as a group, ensure that their support to communities helps to address and strengthen all the characteristics of adaptive capacity. Better communication and coordination is needed between different actors across difference scales, from the national to the local. The LAC framework may be a useful starting point in understanding where the focus should be, and how development interventions can be tailored accordingly.

Section 1: Exploring the characteristics of adaptive capacity

Exploring the characteristics of adaptive capacity

Responding to climate change is a principal development challenge (Boyd et al., 2009). 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 who depend on them (Tompkins and Adger, 2004). For Africa – and Uganda in particular – these impacts need to be considered in the context of wider development pressures, such as widespread poverty and inequality, marginalisation, rapid population growth, and the management of scarce natural resources, among others. Each overlaps with, and is likely to be exacerbated by, a changing climate. In light of this, it is vital that policy-makers and development planners understand how best to reduce vulnerability to climate change impacts, and to ensure that communities have the capacity to adapt to changes over time.

This paper syntheses key findings from the Africa Climate Change Resilience Alliance's (ACCRA) research in Uganda. Section 1 explores key concepts and provides background to ACCRA. It goes on to explain the research methodology and introduces the project's analytical tool, the Local Adaptive Capacity (LAC) framework. Section 2 highlights key climate and development challenges for Uganda, as well as describing some of the main development interventions at each of three research sites. Section 3 draws on research findings to explore how communities are responding to change and how development interventions are impacting on the characteristics of adaptive capacity. Finally, section 4 provides an insight into what ACCRA's research means for development practice.

1.1 Why focus on adaptive capacity?

ACCRA has evolved considerably since its inception in 2009 in response to a call from the UK government (DFID) to generate evidence of how Disaster Risk Reduction (DRR), Social Protection and Livelihoods approaches build resilience to climate change. Why then is ACCRA now focusing on adaptive capacity?

Discussions within the ACCRA consortium, with the DFID-funded Strengthening Climate Resilience consortium and experts in DDR, Livelihoods, Social Protection and Climate Change Adaptation approaches associated with the study led to two clear challenges. First, that a narrow focus on humanitarian interventions and a narrow definition of resilience – the ability to 'bounce back' after a shock – doesn't deliver what is required by communities faced with climate change.

There are many other development challenges and uncertainties beyond those that are weather-related: both communities and systems need to learn how to adapt to these uncertainties and changes. However, the term 'resilience' is hotly debated and many people have taken to using a broader definition, with widely differing interpretations of what it means. Secondly, 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 crucial to climate change adaptation because there is no end-point to adapt to: people need to acquire the capacity to adapt for generations to come. The challenge to development practice is how to meet immediate needs while also building the capacity to adapt in the future. The ACCRA consortium decided, in agreement with DFID, to reflect this need for long-term flexibility and focus instead on the capacity to adapt. ACCRA's research focused on providing insights into the requirements that allow people and communities to build their own 'adaptive capacity' with a view to supporting this additional challenge to development practice.

ACCRA's research focused on providing insights into the requirements that allow people and communities to build their own 'adaptive capacity' with a view to supporting this additional challenge to development practice. 'Adaptive capacity' refers to the potential of individuals and societies to respond to change; as such, it is not possible directly to measure adaptive capacity. Instead, ACCRA's research investigated the characteristics 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 LAC framework (see Section 1.3 for a detailed description) that was used to frame ACCRA's research. We investigated the impact of development interventions (DRR,

Social Protection, and Livelihoods) on people's and communities' adaptive capacity in order to: understand how different programming approaches either build or undermine adaptive capacity; understand how programmes that do not specifically target the impacts of climate variability and change can still improve people's capacity to adapt in the future; and learn how to improve interventions in all programme approaches towards building adaptive capacity. The conclusions are intended to support governments' and development actors' design and implementation of both humanitarian and development interventions, and policies that increase poor and vulnerable communities' resilience and wider adaptive capacity.

1.2 Understanding adaptive capacity and the adaptation process

Nearly all societies and their activities are sensitive to the climate in one way or another. This is largely because where people live and how they generate their livelihood and wealth are influenced by their surrounding climate (Adger et al., 2003). Variability and uncertainty in the climate is inherent, and human societies have often had to deal with, and respond to, unforeseen variation 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 those most sensitive and least able to adapt to changing climate and development pressures. For many communities in developing countries, already challenged in dealing with current climate conditions, responding to future climate variables will require them to modify their characteristics, and potentially transform their structure and how they organise themselves in order to successfully adapt. Importantly, communities face the challenge not only of responding to changes in climate, but of changing development pressures too, such as shifting patterns of internal/external migration, changing economic models and rapid population growth.

Communities that are able to anticipate, deal with and respond quickly to climate change are considered to have high 'adaptive capacity' (Smit and Wandel, 2006). Broadly speaking, adaptive capacity relates to the capacity of a person or community to respond and adapt to the likely impact of changing shocks and stresses (Lim and Spanger-Siegfried 2004). More specifically, in the context of climate change, it denotes the ability of a system to adjust, modify or change its characteristics or actions to moderate potential damage, take advantage of opportunities or cope with the consequences of a changing climate (IPCC, 2007; Brooks, 2003).

Crucially, 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 whether people have the right tools and the necessary enabling environment to allow them to adapt successfully over the long term. Also important to bear in mind is 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). It is the combination of development choices, adaptation actions and local capacities that allows for effective action at the local level (Kuriakose et al., 2009).

The concept of adaptation is relatively easy to describe in principle, but hard to depict in practice and in detail. In the context of this study, adaptation refers to the process by which communities reduce the adverse effects of shocks and stresses, including climate change, on their livelihoods and well-being, and take advantage of new opportunities provided by a changing environment (TERI, 2007). More specifically, it can be described as 'adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderate harm or exploit beneficial opportunities' (IPCC, 2001b, p.72). 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).

Adaptation terminology in this report
This report has looked at the changes that people have made to what they do or how they do it, without distinction between the stimuli or process for the change, and without reference to whether or not the change has been successful. Therefore the terms, 'adapt', 'adapting' and 'adaptation' have been used throughout the report in this way. It is important to highlight that this is distinct from the goal of climate change adaptation, which is that people are better adapted to a changed or changing climate. Climate change adaptation in practice refers to actions that people and institutions make in anticipation of, or in response to, a changing climate, and refers only to those changes that are successful, appropriate and sustainable. Changes that are not successful, appropriate and sustainable in the light of climate change are considered 'maladaptation' (see Figure 2).

Figure1: Adaptation terminology in this report

Actions taken to adapt to climate variability and change can take many forms. In this report we describe a number of different types of adaptation at the local level (see Figure 2). With this in mind, adaptation can occur as a result of deliberate planning, known as 'planned adaptation', or from spontaneous action as a result of changing shocks and trends, known as 'autonomous adaptation'. In terms of the degree of change, adaptation can occur as small, 'incremental' changes in livelihoods and practices, or more 'transformational' actions, requiring fundamental shifts in a system's functions and objectives (Smith et al., 2010). Important to note is that not all actions taken to adapt will be successful (see Figure 1). In some cases adaptation actions can increase an individual's vulnerability in the longer term, resulting in maladaptation (see Figure 2). Though the various types of adaptation are blurred and actions may constitute more than one type of adaptation, having a thorough understanding of these different types is useful in helping us to characterise how people respond to change, as well as to better explore the barriers to successful and sustainable adaptation.

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 result of a 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 2: Different types of adaptation at the local level

1.3 The Africa Climate Change Resilience Alliance (ACCRA)

Because building adaptive capacity is a conscious requirement of adaptation, we 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 UK, and CARE, the ACCRA consortium aims to understand how development interventions are contributing to adaptive capacity at the community level. It conducts research in three countries: Ethiopia, Mozambique and Uganda. ACCRA seeks to explore how development interventions – whether in the form of DRR, Social Protection or Livelihoods programmes – are influencing adaptive capacity at the local level, and what more can be done to best support it.

ACCRA has four key objectives:

a) To understand how existing DRR, Social Protection and Livelihoods projects by ACCRA members build adaptive capacity to climate change in beneficiaries, and how these approaches can be strengthened.

b) To use the findings to influence donors, development partners and civil society to improve future planning/action.

c) To work with local and national governments to enhance the capacity to implement interventions that can build communities' adaptive capacity.

d) To encourage learning across countries and disciplines.

Grounding these objectives is done through the use of the LAC framework[1]. The LAC framework 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 have focused on assets and capital as indicators (Dulal et al., 2010). While useful in helping us to understand what resources people need to adapt, these asset-oriented approaches tend to mask the role of processes and functions (Jones et al., 2010). Understanding adaptive capacity, therefore, requires that we also recognise the importance of various intangible processes, such as decision-making and governance, the fostering of innovation and experimentation and exploiting new opportunities, and the structure of institutions and entitlements, for example. 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.

The LAC framework incorporates intangible and dynamic dimensions of adaptive capacity, as well as more tangible capital and resource-based components, into an analysis of adaptive capacity at the local level. ACCRA's research recognises that it is not feasible to measure the 'potential' of people and societies directly. Instead, the LAC proposes that the capacity to adapt at the community level will be broadly similar in all groups, and separated into five distinct, yet inter-related, characteristics: the asset base; institutions and entitlements; knowledge and information; innovation; and flexible, forward-looking decision-making (see Figure 3 and Figure 4).

The underlying assumption behind the framework is that positive impacts on each of these characteristics should enhance the system's adaptive capacity (Jones et al., 2010). Research was conducted in the three countries to assess each of the five characteristics. Three sites were selected, drilling down into a range of livelihoods, vulnerabilities and capacities across each country. Results were then synthesised to draw common lessons and learning, in order to inform development practice. Key findings from research activities across the three Ugandan sites – Bundibugyo, Kotido and Gulu – are analysed in the following sections.

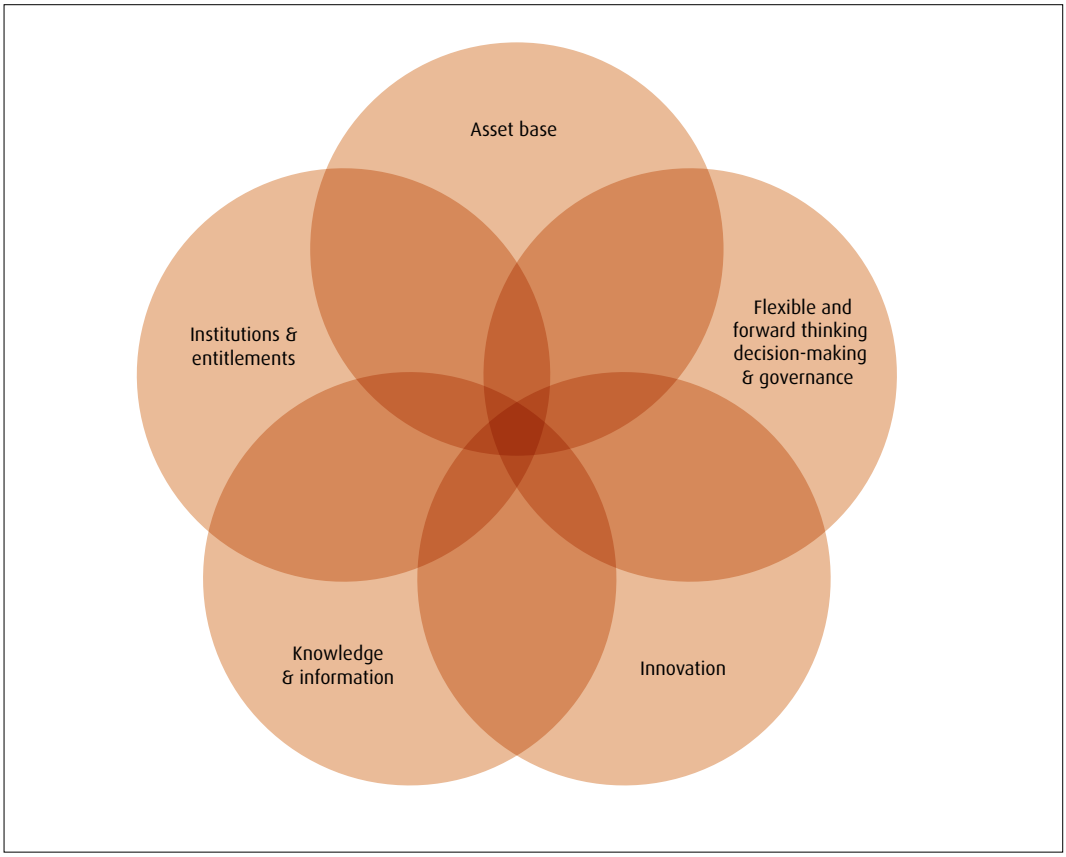

Figure 3: Relationship between characteristics of adaptive capacity at the local level

Adaptive capacity at the local level	
Characteristic	**Features that reflect a high adaptive capacity**
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 regards to its governance structures and future planning

Figure 4: LAC's characteristics and features

1.4 Scope of ACCRA's research in Uganda

ACCRA's research work in Uganda aims to explore how selected DRR, Social Protection and Sustainable Livelihoods interventions are influencing adaptive capacity at the community level. It does not identify and measure all the impacts on people's capacity to adapt. Rather, the research seeks to highlight some of the key elements where development interventions may be contributing to – or limiting – adaptive capacity. It is worth noting that building adaptive capacity was not the intention of any of the selected interventions; indeed it was not considered at all in their analysis or design. Rather, the research sets out to identify what small changes might be made to current and future operations that would maximise their contributions to supporting adaptive capacity.

Following the development of the programme's framework and research guidance, the in-country research began with a national consultation workshop, bringing together experts from academia, government, civil society and NGOs. The workshops sought to test the LAC framework's characteristics and to adapt them to the context of Uganda. This was followed by a series of three pilot studies in each of the study locations. The information gathered was synthesised and fed back into the development of the final research protocol.

National consultation workshop on the LAC framework in May 2010 at Grand Imperial in Kampala

1.5 Research approach

Data for the research was collected from primary and secondary sources.

Primary data collection was split into two components. The first involved a series of key-informant interviews with relevant authorities in the project areas at community and district levels (including staff of government and consortium agencies, NGOs, project beneficiaries, non-beneficiaries, representatives of community groups and the private sector). A second stage consisted of focus group discussions with community members and intervention beneficiaries. Participatory techniques and tools were used, including seasonal calendars, wealth-ranking, timelines, community maps, institutional analysis and hazard maps.

Participants were split into a number of groups according to set criteria, with representation from women, youth and elder groups. The selection of respondents was preceded by a wealth-ranking exercise of households with the guidance of local elders and community leaders. Wealth-ranking identified the existing social economic livelihood groups in the study site, so that each of them was represented in the different focus groups and interviews.

Secondary data came from project documents (reports and plans) and policy documents of government and other development agencies, research reports and other relevant studies conducted in the area. Where available, meteorological data from the National Meteorological Department was analysed to assess local climate conditions.

Adopted Field Strategy

1. Local facilitators were used for assisting in research and interpreting in interviews
2. Researchers were introduced to community and local leaders by consortium member operating in the area
3. Lists of contact people were secured from consortium member prior to field work
4. Compilation of relevant secondary information and meteorological data analysis was done before field work
5. First phase of field work was carried out between September 2010 and January 2011
6. Collected information was reviewed and preliminary analysis made to guide subsequent data collection
7. Research findings were validated with the participation of district and ministry representatives in May 2011
8. Second phase of research conducted between March 2011 and April 2011 to fill gaps and capture information that is sensitive to seasonality
9. Data analysed and site reports produced
10. Site reports analysed and this synthesis report produced

Figure 5: Adopted field strategy

Female youth focus discussions in Kotido – Nasapir Village

District data validation workshop at Kotido district headquaters

Section 2: Understanding Uganda's context

Understanding Uganda's context

In striving to meet its goals for sustainable development, Uganda faces a host of challenges. Though significant gains have been made in recent years in relation to economic growth and poverty reduction, particularly during the 1990s, significant barriers to progress remain (UNDP, 2005). Devereau 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, leaving a number of problems and challenges. Among others, high levels of poverty, internal conflict and poor access to basic health care and education act as key drivers of vulnerability across much of Uganda. 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).

In the context of Uganda, environment and development are closely linked. Access to land is the basis for rural livelihoods, but this access 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.

2.1 Understanding Uganda's climate

Variability has long been a characteristic of Uganda's climate, and dealing with it is part and parcel of rural livelihoods. However, the capacity of individuals to respond to climate variability remains generally low, particularly in rural contexts. Livelihoods are particularly sensitive to fluctuations in seasonal rainfall. The effects of premature, delayed, prolonged or failed rains are especially pronounced in the semi-arid north-east.

Uganda's tropical climate is moderated by its high altitude, ranging from 600m to 5,100m above sea level. The country's rainfall regime is bi-modal, with 'short' rains in October to December and 'long' rains from March to May. Temperatures vary little, both throughout the year and across the country, with average temperatures ranging from 20°C in the coolest regions of the south-west to 25°C in northern parts. Distribution of rainfall varies considerably. Areas of low annual rainfall (500–1,000mm) run from the Karamoja region in the north-east to Ankole in the south-west. A second elongated area of low rainfall occurs along the Western rift valley, running through Lake Albert. There is relatively high rainfall (1,400mm) in the central and western parts of the Lake Victoria basin and the highland regions of Mount Elgon and the Rwenzori Mountains (START, 2006). Uganda's climate can be further categorised into highland, savannah and semi-arid regions, each supporting a diverse array of tailored livelihoods. The timing and seasonality of rainfall is influenced by atmospheric systems such as the Inter-Tropical Convergence Zone (ITCZ), monsoons and the El Niño/La Niña-Southern Oscillation events (ENSO). Fluctuations in these systems can lead to significant variability, with changes in the onset of large-scale precipitation leading to droughts and floods (ibid.). Changes in the way land is used and managed locally, such as forest coverage and degradation, can have significant impacts on the surrounding micro-climate (Afrane et al., 2006).

Observation and analysis of available metrological data point to various emerging trends in Uganda's climate. Since 1960, mean countrywide annual temperatures have risen by 1.3°C, a rate higher than global and regional averages (McSweeney et al. 2007). The number of average hot days and hot nights has increased, and rainfall across the country has decreased significantly over the same time period[2]. Rainfall across the country shows a significant decreasing trend in annual and seasonal rainfall over the same time period. Interpreting meteorological data is, however, difficult as Uganda has a poor network of weather stations and large gaps in the records due to poor facilities, lack of investment in infrastructure and personnel, and local conflict. Despite these difficulties, climate models can provide a useful indication

of future trends. These models inherently carry a level of uncertainty, exacerbated by existing data gaps, and are more robust for certain factors – such as temperature – and more uncertain for others – such as patterns of precipitation (Bates et al., 2008). Despite these uncertainties, confidence in various climate models is high enough to inform policy, and their robustness will improve with further investment in information collection and analysis.

Available outputs from General Circulation Models (GCMs) also point to significant changing trends, both across the region and at the national level. Aggregate multi-model simulations[3] for the period 2080-2090 predict a rise in annual average temperature of 3.2°C over East Africa (IPCC 2007). Contrary to the observed metrological record – showing significant falls in annual rainfall – projections for Uganda are broadly consistent in indicating increases in annual rainfall ranging from +7 to +11 percent by 2090 (see Figure 6). The models also point to overall increases in the proportion of heavy rainfall events, ranging from a zero to 15% increase over the same time period (McSweeney et al., 2007). Simulations of how climate change is likely to affect El Niño and La Niña events show wide disagreement (IPCC, 2007).

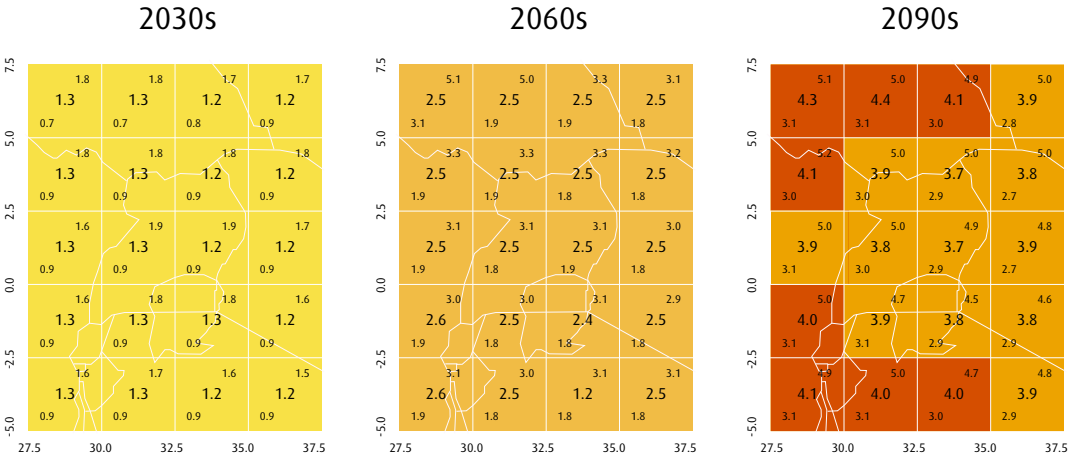

Figure 6: Projections of increases in mean temperature across Uganda for 2030, 2060 and 2090

Spatial patterns of projected change in mean annual and seasonal temperature for 10-year periods in the future under the SRES A2 scenario. All values are anomalies relative to the mean climate of 1970-1999. In each grid box, the central value gives the ensemble median and the values in the upper and lower corners give the ensemble maximum and minimum. Source: McSweeney et al. (2007)

Summarised outputs of GCM model projections of future climate for Uganda[4].	
Temperature	**Precipitation**
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[5].	Projections of mean rainfall are broadly consistent in indicating increases in annual rainfall. The ensemble range spans changes of -8 to +46 percent by the 2090s, with ensemble median changes of +7 to +11 percent.
All projections indicate increases in the frequency of days and nights that are considered 'hot' in current climate. Annually, projections indicate that 'hot' days will occur on 15-43 percent of days by the 2060s, and 18-73 percent of days by the 2090s.	Projected increases in rainfall are largest in the short-rain season, OND (-8 to +35 percent).
All projections indicate decreases in the frequency of days and nights that are considered 'cold' in the current climate. These events are expected to become exceedingly rare, and do not occur at all by the 2090s in any projections under the highest emissions scenarios (A2 and A1B).	The models consistently project overall increases in the proportion of rainfall that falls in heavy events. The increases range from 0 to 15 percent in annual rainfall by the 2090s and affect the whole country throughout the year.
	The models consistently project increases in 1 and 5-day rainfall maxima by the 2090s of up to 27mm in 1-day events, and up to 37mm in 5-day events. The largest increases are seen in the rainy seasons, MAM and OND.

Figure 7: Summarised outputs of GCM model projections of future climate for Uganda[4]. Source: (McSweeney et al. 2007)

2.2 Exploring climate variability and change in Gulu, Bundibugyo and Kotido

While the general picture for the next 50-80 years of climate change is becoming increasingly clear at regional and national levels, location-specific information is more limited and uncertain at the local level where people make key decisions about their lives and livelihoods. Accurate long-term meteorological data is lacking in each of ACCRA's research sites – Bundibugyo, Kotido and Gulu. Even where formal weather stations exist, large gaps in data are common. For example, since the Bundibugyo site has no station, the research team gathered information from the adjacent district in Kasese, some 50km away and subject to an entirely different geography and climate. Data from Kasese cannot be interpreted as directly reflecting the climate of Bundibugyo. As such, though analysis of the station's data shows an apparent increasing trend in average temperatures, its limitations have to be recognised.

Given the poor availability of meteorology data, climate models can provide an insight into past and future trends. Using a Regional Climate Model (RCM)[6], data was accessed for each of the site locations (see Figure 8 for summarised variables).

Summary of RCM data for each of the three ACCRA sites[7]	
Bundibugyo (all variables are for the period 1972–2015)	• Significant increase in minimum temperatures • Decreasing trend in the number of cool days • Slight decrease in the number of consecutive dry days • No significant trend in consecutive wet days, total of very wet days intensity and heavy precipitation days
Gulu (all variables are for the period 1970–2050)	• Increasing trend in average temperatures • Slight increasing trend in consecutive dry days • Slight decreasing trend in consecutive wet days • No significant trend in total precipitation
Kotido (all variables are for the period 1967–2050)	• Increasing trend in warm nights • Decreasing trend in cool days • No significant changes in consecutive wet days and consecutive dry days. • Decreasing trend in levels of total annual precipitation, and intensity and heavy precipitation days • Slight decrease in the number of very wet days

Figure 8: Summary of RCM data for each of the three ACCRA sites

While all three of ACCRA's research sites are characterised by different geographical zones and climates, from the temperate highlands of Bundibugyo to the semi-arid savannah of Kotido (see Figure 10), each focus group and interview session described distinct perceived changes in the local climate. Patterns of change vary, but people from all three sites 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. Respondents noted that these changes have considerable implications for their livelihoods.

The experiences of respondents reflect perceptions of changing climatic variables, and cannot be considered empirical in documenting actual changes in climate. When analysing longer-term trends within communities, more recent events tend to overshadow distant ones, and this needs to be considered when trying to extrapolate and identify trends (Reid et al., 2010). However, similar studies have found a close correlation between meteorological data and farmers' seasonal calendars and trends (Gill, 1991). With this in mind, tools used to infer perceived changes in local climate can provide a useful reference in documenting seasonal change. However, in this case, the research team found that communities' perceptions, weather-station data and RCM data do not always agree. Indeed, in a number of instances the trends pointed in opposing directions. As a result, information of any climate trends has to openly express uncertainties and take into consideration the source of all points of information.

2.3 Background to ACCRA study sites

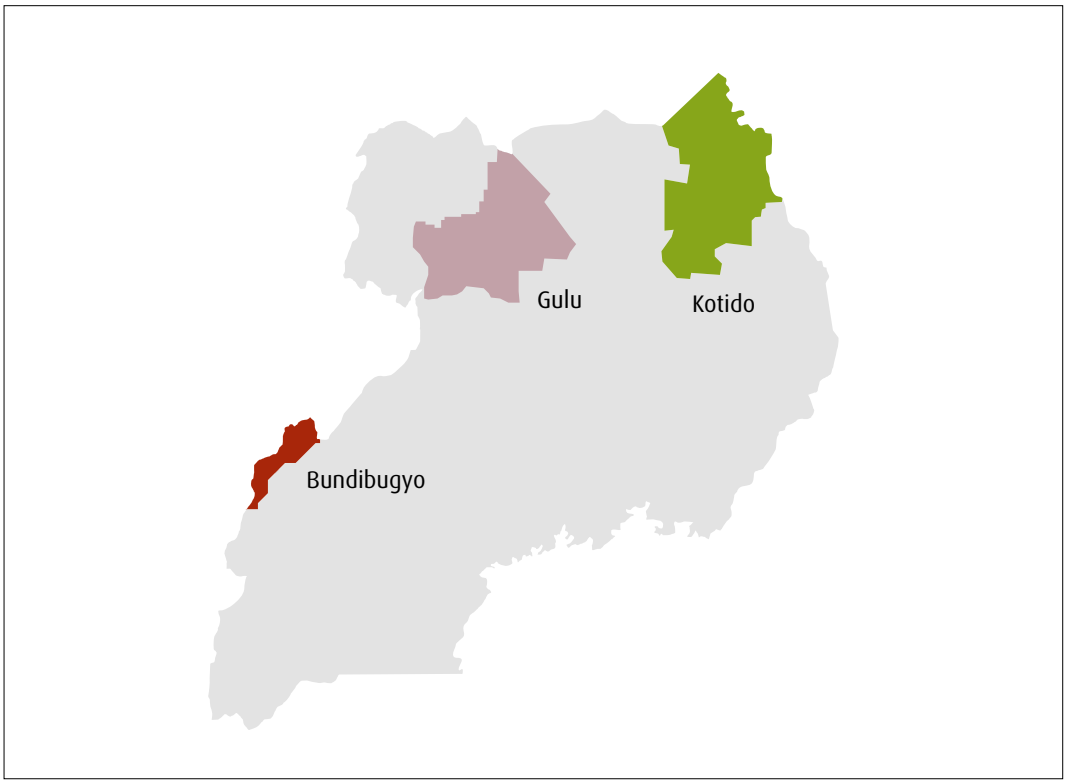

Figure 9: District map of Uganda showing ACCRA's three sites

The three sites used in the ACCRA research were selected to represent a diverse set of livelihoods, geographical zones and threats posed by climate variability and change (see Figure 10).

Site	Region	Geographical zone	Principal climate hazard	Main source of livelihood
Bundibugyo	West	Highland & lowland	Flood	Rainfed agriculture for market
Gulu	North	Woodland	Poor rains (variable rainfall)	Rainfed agriculture for maket
Kotido	North-east	Semi-arid	Poor rains (variable rainfall)	Pastoralism/ subsistence rainfed agriculture

Figure 10: Summarised characteristics of each research site

2.3.1 Bundibugyo

Bundibugyo district is situated in the far west of Uganda, on the border with the Democratic Republic of Congo. It is one of the most deprived districts of Uganda, suffering from levels of poverty almost twice the national average (60%, compared to 31% nationally). High levels of illiteracy, child mortality and population growth mean that the district struggles to achieve even the most basic development goals. Conflict has also been a notable factor in increasing levels of vulnerability. Conflict between government and Allied Democratic Forces (ADF) from 1996-2002 entailed high levels of violence and widespread displacement. The district's development plan (2010-2013) notes that resettlement has since occurred and security has improved significantly.

Agriculture is the main source of income and livelihoods. Maize, cassava and beans are the principal staple crops, with cash crops such as cocoa and palm oil accounting for a substantial portion of household revenue in lowland areas. Other livelihood activities include casual labour and petty trade.

Local researcher on the way to Kakuuka III village, Sindila Sub-county, in the Bundibugyo highlands

Development interventions in Bundibugyo

The study focused on two villages: Bulereya Farm village, situated in the lowlands of Kisubba Sub County, and Kakuuka village on the slopes of the Rwenzori Mountains in Sindila Sub County. Various development agencies operate across Bundibugyo, including civil society as well as government actors. Cumulative contributions of a number of such interventions were considered with regard to their impacts on adaptive capacity at the community level. Details of the scope and objectives of the projects assessed in the research are provided below.

Oxfam has a number of coordinated interventions operating under its **Rwenzori Livelihoods and Disaster Preparedness Support programme.** This three-year initiative was set up to ensure that poor women and men in the disaster-prone Rwenzori region are empowered to achieve sustainable livelihoods, influence those with power over them and ultimately improve their standard of living. The programme sought to give voice to community priorities, such as support in improving livelihood diversity, food security, agro-processing activities and DRR planning.

World Vision Uganda is implementing a wide-ranging **livelihoods programme** aimed at supporting education, agriculture, primary health care and community advocacy activities. **Save the Children** supports **education, livelihoods programme and children's rights awareness.** Other noteworthy actors include the World Wildlife Foundation (WWF)'s **River Catchment Project,** which supports water management on the Lamya and Semliki rivers.

Numerous local and central government programmes are also active. One key programme is the provision of improved crop seeds and the introduction of new crops under the **National Agricultural Advisory Services (NAADS).** The local government provides enhanced seed varieties and promotes improved natural resource management practices. Other government interventions include the provision of mosquito nets and anti-malarial drugs, as well as water guards for the prevention of cholera and other water related diseases under the Ministry of Health.

Private sector companies ESCO and OLAM Uganda help cocoa farmers with **improved agronomic practices and provide a market for the sale of cocoa.**

Figure 11: Development interventions in Bundibugyo

2.3.2 Gulu

The district of Gulu in north-west Uganda is one of seven districts forming the Acholi sub-region. Rain-fed agriculture constitutes the principal means of livelihood and income generation for 95% of the district's population. Other major livelihood sources include casual labour, brick-making, local transportation, agro-marketing and agro-processing. A third of the district comprises of arable land under agriculture, with the remainder divided between open swamps, forested areas and game reserves. Vegetation coverage is predominantly intermediate savannah grassland, characterised by abundant acacia and common grasses.

Like much of Uganda, Gulu has a high population growth rate[8], placing mounting strain on natural resources and infrastructure. The district has low socio-economic status, with 62% of the population living below the poverty line. Life expectancy is low, at 43 years, and over half the population is under the age of 18.

Conflict and civil war are prominent features of Gulu's recent history and development. Between 1987 and 2007, Northern Uganda experienced fighting between the government and the Lord's Resistance Army, resulting in the displacement of almost the entire population of Acholi land. During this period, much of the population was heavily dependent on relief aid. The effects of prolonged conflict and reliance on external assistance have had considerable implications for livelihoods and development pathways. As such, Gulu faces a host of development challenges as it strives to recover from decades of conflict.

Development interventions in Gulu

CARE International runs the **'Roco Kwo' program**, a five-year multi-sectoral initiative addressing sustainable livelihoods, peace-building, conflict resolution, gender equity, psychosocial support and gender-based violence. One of the principal support mechanisms is through a village savings and loan scheme. Under the livelihoods component, agricultural inputs such as improved crop varieties (i.e. beans, sesame and cassava), oxen, ploughs and goats are provided. The principal target group is women and girls.

Several interventions have been implemented by local and central government. The **Peace Recovery and Development Plan (PRDP)** was aimed at rebuilding Northern Uganda in the aftermath of the prolonged conflict. The three-year initiative commenced in 2007, and sought to improve the living conditions and quality of life of displaced persons and facilitate their reintegration. The **Northern Uganda Social Action Fund** supports rebuilding and empowering communities, and the revitalisation of the economy of Northern Uganda. Its main objectives relate to the consolidation of state authority, peace-building and reconciliation. Another key government-led intervention is the **National Agricultural Advisory Service (NAADS)**.

Other actors in the area include international and national organisations, such as Save the Children, Action Aid, ACCORD, Samaritan's Purse, Action against Hunger, World Vision and Reproductive Health Uganda. These organisations have each implemented projects aimed at basic survival needs, capacity-building, skills training, reproductive health, human rights, peace and reconciliation, reintegration of abducted children and income generation.

Figure 12: Development interventions in Gulu

2.3.3 Kotido

The district of Kotido is located in the north-east of Uganda, in the Karamoja sub-region. Kotido is one of the poorest districts in Uganda (Mutambi et al 2007). A shortage of public and private investment in basic infrastructure, poor access to markets and weak external support for economic development have all contributed to low levels of human development (Oxfam, 2008). The district is semi-arid and has sparse vegetation coverage. Safe water coverage is low, with only 45 percent of the population having access. As in Gulu and Bundibugyo, the population density is high and growing rapidly; over 60 percent is under the age of 18 (Kotido District Development Plan 2010–2013).

Agro-pastoralism is the principal livelihood of Kotido's people. Charcoal production is also a key source of supplementary household income, particularly during hard times. Livestock play a central role in livelihood activities, and cattle-rustling is a prominent feature of pastoral livelihoods in Kotido. A practice long employed by herders, rustling typically involves the theft of cattle to replenish herds after depletion by drought, or to pay bride price. In recent years, the degree of violence and conflict involved in such raids has escalated (Leff, 2009). The government has responded with disarmament programmes, but tensions remain.

Rengen Sub-county, Kotido district, during the dry season. Cattle face difficulty in finding pasture.

Development interventions in Kotido

Oxfam Uganda has had activities in Karamoja for over two decades. Recently, Oxfam has moved away from service delivery to a focus on Capacity Building for Empowerment (CBfE) through its **North Karamoja Pastoral Development Programme**. The initiative seeks to support resilient pastoral livelihoods, working with local government to empower rural communities. Oxfam also has activities aimed at supporting community-based groups such as the Jie Community Animal Health Workers' Association and the Water Pump Technicians' Association, enhancing service provision to communities and supplying spare parts to practitioners. Group members have received training to manage revolving funds for cereal banks and community stores.

Save the Children's **Peace Building and Human Rights Project** comprises various components, including training of animal health workers, promoting alternative livelihoods for youths, enhancing peace-building initiatives, facilitating dialogue for conflict resolution and strengthening child protection structures. It is targeted mainly at young people and, in particular, those who do not attend school. Other initiatives include savings and credit schemes, bee keeping, cattle health and small business investment.

The World Food Programme (WFP) and World Vision Uganda are involved in **food distribution and food-for-work schemes** during times of crisis. Other actors such as FAO and ACTED are also active.

Figure 13: Development interventions in Kotido

Section 3: Exploring adaptive capacity at the local level

Exploring adaptive capacity at the local level

This section synthesises key findings from ACCRA sites in Bundibugyo, Gulu and Kotido. It highlights common features and provides an overview of how development interventions are impacting upon people's adaptive capacity.

3.1 How are people responding to change?

In exploring how development interventions are influencing people's capacity to respond to changing climate and development pressures, it is useful first to understand how people are dealing with change at the local level. ACCRA's research suggests that the impact of particular climate shocks and stresses is often mediated through other interacting drivers and processes. For example, focus group discussions reveal that the impacts of prolonged drought on pastoral communities in Kotido will typically be felt in the form of pressures on scarce water resources, higher food prices and increased incidence of cattle-rustling. Each of these, in turn, is partly directed by informal local structures, natural resource management and ethnic and regional tensions, as well as changes in the social and economic environment. Many adaptation actions documented in the research are undertaken in response to multiple pressures, and not to one singular event – whether due to increasing seasonal variability, market changes or diminishing natural resources. Thus, in considering how development interventions can support communities in responding to climate change, it is imperative to recognise that adaptation actions are rarely taken in response to climate variability and change alone. Rather, they reflect and interact with wider social, economic, political and environmental factors.

A new coffee-disease resistant variety introduced by NAADS in Kakuuka village, Bundibugyo.

Brick-making in Gulu as an alternative income source.

Charcoal production is a major source of supplementary income for communities in Kotido, particularly during times of hardship.

Members of the community dig the ground in search of water during the dry season in Kotido.

Findings from ACCRA's field research document numerous responses that people have taken to adapt to a changing climate. These responses cover a range of types, such as incremental responses, where people have made small changes to their existing activities and livelihood practices. One example of this is small changes to agricultural practices in all three sites (Gulu, Bundibugyo and Kotido,) responding, in part, to greater uncertainty and variability in rainfall patterns. This includes the adoption of improved varieties of staple foods, like sorghum, cassava, coffee and bananas that are better suited to conditions of drought and have greater resistance to pests[9], as well as improved cultivation techniques, such as terracing and agro-forestry (Bundibugyo). Many of these actions have, in part, been facilitated by a number of development interventions operating at the local level. Other examples common to all three sites relate to the adoption of new forms of supplementary livelihood activities, such as brick-making, sand-mining and charcoal production during times of hardship. Respondents describe how such supplementary activities have become increasingly important for livelihood and household well-being, given changing climate and development pressures. In Bundibugyo, certain alternative livelihood options like sand-mining and stone quarrying are also becoming increasingly common, taking advantage of more frequent incidences of rock and landslide events in highland areas, as well as higher levels of silt, sand and gravel being deposited by rivers further downstream.

Forms of more transformational responses, whereby people and households have taken actions that have resulted in major changes to their structure and livelihoods, are also documented. One example is the increasing incidence of relocation and migration from water-stressed, semi-arid areas of Kotido to the district's adjacent wetland belts, due partly to perceived increases in the incidence of drought and increasing rainfall variability. It is important to note that all types of adaptation action described by the research arise as a result of a number of interacting drivers, of which changes in climate are but one of many. Indeed, within the research few, if any, examples exist of observed adaptation actions occurring purely as a result of climate change across the three research sites. For example, ACCRA's research documents numerous examples of farming households relocating from highland to lowland areas in Bundibugyo. The principal reasons given for this transformational response are increased exposure to hazards (largely in the form of landslides and high levels of surface runoff) and the spread of malaria to higher altitudes. Key informants note that both are thought to be partly due to climate variability and change, as well as degradation of the local environment through unregulated deforestation and poor agricultural practices in highland areas. However, respondents explain that reasons for this action are equally due to wider development pressures, such as improved access to formal markets and better health and educational facilities.

Similarly, though respondents have taken actions to adapt to changes in their climate, not all have been successful and sustainable. Indeed, the majority of responses and innovations to changing climate and development pressures at the local level are unsuccessful, and there is little evidence to suggest they will be sustainable in the longer term. Reflecting this, the vast majority of actions taken to adapt across the three research sites prove to be reactionary in nature, often with little consideration as to the immediate implications on the environment and their long-term consequences. All the focus groups raised issues relating to environmental degradation, increased levels of intra-community conflict over scarce natural resources, and the sustainability of responses as a result of various adaptation actions. Respondents also described a general lack of awareness and technical capacity to make forward-looking decisions, taking into account changing future scenarios.

These issues points to the need for local communities to enhance their capacity to adapt to changing climate and development pressures, and to be better able to anticipate, deal with and respond to such changes. Many communities do not have the tools and resources to enhance their capacity alone, and will require assistance and support from government and development partners. Indeed, many transformative responses appear to be reactionary and taken as a last resort. In the same light, development partners should consider how their existing interventions are supportive of adaptive capacity at the community level, and how they allow people to take informed and effective decisions and actions. In doing so, development partners should strive to ensure that communities have the capacity to adapt successfully and sustainably in the long term.

Oxen beneficiary in Lajwatek village, Koro Sub-county, supported by CARE International in Gulu.

3.2 How are development interventions contributing to adaptive capacity?

Although the development interventions assessed in ACCRA's research have no particular focus on addressing issues of climate change, numerous project outcomes have directly and indirectly influenced households' capacities to respond to changes in climate and development pressures. Respondents from all three research sites point to the contributions that these interventions – whether DRR, Social Protection or Livelihoods approaches – have made in enabling individuals to respond to climate variability and change. ACCRA's research suggests that the largest impacts can be seen with regard to contributions to two of the LAC's five characteristics: 'the asset base' and 'institutions and entitlements'.

3.2.1 Supporting livelihood assets in the face of changing climate and development pressures

At the household level, the ability to adapt is closely associated with the availability of, and access to, livelihood assets and resources (Vincent, 2007). Focus groups and key informants point to numerous examples in which development interventions have contributed to creating, strengthening and diversifying livelihood assets, for example: supporting animal traction for agricultural enhancement and training programmes (Gulu); establishing infrastructure for rainwater harvesting (Kotido); assisting in the establishment of village saving schemes (Gulu); and providing cash-for-work projects (Kotido), land and soil management (Bundibugyo). All demonstrate the role of project interventions in generating, protecting and diversifying key livelihood assets. Respondents with a low economic status also note that many such initiatives have reduced the need to exploit their asset base during times of shock and stress, typically through the sale of livestock or household commodities.

Livelihood programmes across the three research sites have had strong positive impacts on the diversification of assets and livelihoods. Households with a greater diversity of assets and livelihood options are considered more resilient and better able to adapt to changing conditions (Nelson et al., 2007). Beneficiaries and informants describe how, in successful cases, recipients of development assistance have gained alternative sources of income and reduced their dependence on the exploitation of scarce natural resources during times of hardship. Moreover, numerous examples of support for skills and training for alternative livelihoods are evident. For example, in both Bundibugyo and Kotido, programmes have targeted youths in the provision of guidance and resources to enable the adoption of non-farm livelihoods, though questions have been raised concerning the relevance of newly acquired skills in light of local needs and changing markets (see 3.3.1 and 4 a).

Similarly, research findings suggest a close correlation between the availability of assets and the ways in which people are adapting, innovating and trying out new practices at the local level. Evidence of innovation is present across all economic groups. However, group discussions note that how individuals choose to innovate, and the levels of risk they tolerate, differ among economic groups. There are suggestions that poorer members of the three communities may be more willing to experiment and adopt innovations in livelihood practices and strategies, particularly during periods of shock and stress. Moreover, a number of documented examples suggest that many of the more transformative responses to changing climate and development pressures – such as permanent migration from highland to lowland settlements in Bundibugyo, or switching from pastoral to agriculture-based livelihoods in Kotido – are more readily adopted by households with low levels of access to livelihood assets.

Focus group discussions suggest that households with greater access to livelihood assets tend to respond with incremental measures, often in a bid to protect their asset base. Examples of these incremental forms of adaptation include changing agricultural practices, such as terracing, pesticide-spraying and the application of fertiliser, each of which requires significant financial inputs. The link between well-being and adaptation/innovation is little understood, and requires further research and analysis. Nonetheless, development interventions that seek to address adaptive capacity and support innovation, either directly or indirectly, need to recognise that different social and economic groups will innovate and adapt differently.

Sorghum affected by ergot, or 'honey dew' disease, in Kotido.

3.2.2 Addressing restrictive institutions and promoting equitable entitlements

ACCRA's research highlights the central role of social processes in shaping how people respond to changing external pressures. In understanding how people cope with and respond to, shocks and stresses, it is important to recognise the role of institutions in influencing behaviour. Institutions lay down the 'rules of the game' that govern organisational structure, belief systems and behaviour. In the context of rural Uganda, social institutions are largely informal and take a number of different forms, including household gender roles and responsibilities, religious and ethnic belief systems, and rules regarding collective ownership rights to natural resources. Each of these has its own informal rules, structures and norms that shape individual behaviour. Institutions are important in the context of climate variability and change as they have significant influence over individual and collective decision-making processes, and often govern entitlements to key resources during times of need (Jones and Boyd, 2011).

Focus group sessions across all three sites point to the significant role that local and traditional institutions play in influencing coping and adaptation response measures. Moreover, findings suggest that key livelihood decisions and activities are often heavily based on past practices. In Bundibugyo, for example, farmers describe how, despite acknowledging distinct perceived changes in seasonality, traditional seasonal calendars still dictate when crops are planted (in this case, the institution being the common collective rules and norms that dictate when farmers should plant their crops). By stopping people from deviating from common practices, certain institutions and norms can prevent them from adopting more appropriate practices and livelihoods. Institutions play an equally significant role in determining entitlements to the assets needed to cope and respond (see Figure 14 for a description of different institutions and agencies influencing community and household actions). Indeed, restrictions in entitlement relate not only to financial capital, but apply equally to social, natural, human and political capital.

Local institutions, roles and governance in Gulu Institutions and agencies identified in La Jwatek village through community discussions	
Clan/Elders networks	• Oversee the regulation and management of water and land resources • Advise youth on community practices and roles • Arbitrate over issues of local and community conflict • Consult the local gods for blessings, good weather, healing etc
Family networks	• Decision-making, allocation and disposal of resources at household level • Social and financial support during times of stress
Local Councils	• Directing development initiatives in the area • Resolving conflicts and seeking support/relief in case of a disaster
Religious institutions	• Moral, spiritual and ethical support

Figure 14: Local institutions, roles and governance in Gulu

Issues of gender are also present across each of the research sites. Findings suggest that women are subject to multiple institutional barriers and restrictions in entitlement that direct most aspects of their livelihoods. As an illustrative example, the behaviour of a 'typical' woman from an agriculture-based household in rural Gulu (though similar principles apply to all three research sites) will partly be directed by customary household roles and responsibilities for women governing household chores, the preparation of meals and the collection of water. It will also consist of institutional restrictions with regard to access to political power and decision-making processes: difficulties in attending, participating and actively influencing the outcomes of village and council meetings; frequent challenges in having their land rights respected; and low levels of influence regarding livelihood decisions and control over primary household assets in a typically male-headed household. Focus group sessions suggest that, during times of hardship, women are required to take on greater responsibility in providing for household needs. Primary roles, such as the collection of food, energy (typically firewood) and water, and caring for family members, are each exacerbated. Discussions among female focus group respondents in Bundibugyo also point to increased domestic violence during times of climate stress.

The institutional restrictions facing women play a significant role in determining how they react, and the extent to which they are permitted to respond to shock and stress, with direct implications for their adaptive capacity. While changes in livelihoods can be relatively quick, institutions typically remain rather rigid and take much longer to evolve. Efforts to facilitate incremental adaptation, such as improved farming practices or the adoption of alternative livelihoods, can be achieved relatively easily. It is far harder to overcome entrenched institutional beliefs and norms, such as those associated with gender restrictions or ethnic marginalisation. Many of these institutions are deeply rooted in the social fabric of rural Uganda.

In all three sites there is evidence of development interventions supporting marginalised people and those worst affected by institutional barriers. A number of programmes have helped under-represented groups to express their needs at the community level. Examples of this include support in the creation and promotion of women's groups, workers' associations and youth groups (Kotido and Bundibugyo). Respondents note that these groups have provided a platform for voicing concerns and accessing political power at multiple levels, from district and village decision-making bodies to influencing livelihood and household choices. A number of government interventions have also played a role here. For example intervention-supported community groups have given voice to more marginalised members of the community in Gulu in demanding greater access to basic services and amenities, such as the rights to clean water and school enrolment. The provision of universal education[10] and quotas for women, youths and disabled people in local councils are examples of countrywide initiatives seeking to promote greater equity.

Development interventions can also help marginalised groups find alternative livelihoods and enhance their capacity to deal with hardship. In Kotido, food-for-work and cash-for-work interventions have helped reduce the need for poorer and marginalised members of the community to remove children from school during times of prolonged drought. In Kotido, Save the Children's interventions have focused on providing youth with skills and training in adopting non-farming livelihoods. In Gulu, intervention support has, in certain cases, also assisted in the provision of financial assistance during times of hardship to those in need through the creation of village savings and loans groups.

Womens group in their weekly savings and credit meeting – supported by CARE International in Gulu

Youth supported by Save the Children in setting up a restaurant business

3.3 Exploring the gaps in development practice

Through the application of the LAC framework as an analytical tool, ACCRA's research points to three characteristics of adaptive capacity that require greater attention and coordination by development partners. While acknowledging the important role that interventions play in supporting 'the asset base' and 'institutions and entitlements', significant gains can be made by focusing greater attention on support for 'innovation', 'knowledge and information' and 'flexible, forward-looking governance'.

3.3.1 Focusing on innovation

An enabling environment that allows for innovation to occur is a central component of adaptive capacity. ACCRA's research finds that individuals are continually innovating, experimenting and taking advantage of new opportunities. Some successful innovations are being replicated, scaled-up or shared at the community level, such as the adoption of improved planting techniques (through terracing, agro-forestry, etc.) in Bundibugyo, or promotion of improved, or better suited, crop varieties across all three sites. But respondents also describe numerous barriers to innovation, in terms of contributing to the inability to innovate, as well as failure to ensure successful take-up of innovations. Examples of such barriers include: a lack of relevant skills and knowledge; poor communication and awareness of successful innovations and practices; a lack of resources and capital to invest in scaling-up new practices; risk aversion; and a reluctance to deviate from traditional livelihood practices. All these factors exist across the three research sites, and may be useful

entry points for development interventions aiming to facilitate successful adaptation. However, though making significant contributions to the ability to innovate, none of the projects studied deliberately sought to enable innovation, and contributions towards an enabling environment for successful and sustainable innovation remain poorly recognised in the evaluation of project objectives.

Discussants note that non-beneficiaries, particularly those with access to political power and with a higher economic and livelihood status, often set livelihood trends and are most able to take risks. Similarly, the adoption of new practices is often dependent on family ties and social networks as individuals seek to replicate the actions of those close to them. As such, the focus of development partners solely on vulnerable and marginalised members of the community may risk neglecting those most capable and willing to innovate. Moreover, many project interventions provide beneficiaries with prescribed innovations that are deemed most relevant to local communities, though issues of relevance, take-up and suitability remain. For example, alternative livelihood training in goat-rearing for youths was provided by one government intervention in Bundibugyo, though beneficiary discussion groups saw many of these new livelihood options as unsuitable and unsustainable in the context of their immediate needs.

It is important to note that few development projects are providing communities with an enabling environment for them to innovate and experiment autonomously. Yet this support is key to allowing communities to respond to changing needs, and allowing households to develop their own capacity to explore new opportunities. Respondents note that the most successful and sustainable innovations are often those initiated by the community themselves because beneficiaries have more investment and involvement in them. Development partners need to consider both how their interventions impact on the local capacity to innovate, and how to maximise their support for relevant and informed innovation in responding successfully to changing climate and development pressures. As the types of adaptation actions may be different across wealth groups (see section 3.3), development interventions need to recognise that their support in creating an enabling environment for innovation and adaptation will not be homogenous across groups. Perhaps the most basic role that development programmes can play is through supporting the documentation – both in terms of successes and failures, as well as who innovates and why/how – the evaluation and communication of relevant and successful innovations.

Innovation: implications for development

1. Remove barriers. The research found that people were trying to innovate, but faced many barriers. Building adaptive capacity necessitates addressing the barriers that prevent people from being able to innovate for themselves.

2. Leave a legacy. The interventions studied focused on introducing an 'innovation' that was perceived to be a 'solution' to current needs. This leaves no legacy beyond the utility of that activity. Instead, these activities could be used as entry points to support communities to innovate for themselves, thus meeting their immediate needs and building knowledge and skills to innovate further.

3. Let communities lead. Findings suggest that the most successful and sustainable innovations were those that were self-initiated with the community. Where innovations came from outside, they were either considered inappropriate or their value was not fully appreciated by the community.

4. Learn from the trend setters. Innovation occurred more frequently among members of the community not targeted by interventions – or even talked to by development actors. Development tends to focus on the deficiency of the most vulnerable, rather than what enables others to thrive. Analysis of who is innovating, how are they innovating and why are they innovating should inform development design.

5. Link to knowledge and information. Few innovations in the research sites were reported to be successful and sustainable in the long term; this is likely due to limited knowledge and information to support innovation choices.

3.3.2 Focusing on knowledge and information

Knowledge and information are central to adaptive capacity, allowing individuals to make informed decisions, respond to external shocks and stresses, and to plan for future changes. Despite widespread perceived changes in the local climate, the vast majority of documented responses across the three sites are in the form of changes to livelihood practices, in an attempt to 'bounce back' and maintain structures and functions. Similarly, most adaptation actions documented in the study tend to be reactive (occurring after particular events) and have wider environmental and social impacts. For example, in Kotido, increasing numbers of community members are migrating to fertile 'wet-belts' in the north-west of the district in search of more abundant and reliable water resources, moving from pastoral livelihoods to agro-pastoral and agricultural practices. Respondents spoke of significant issues of land management, the exploitation of natural resources and increased conflict as a result of encroachment on the wetlands. Numerous such examples point to the need to consider how adaptation actions are impacting ecosystems and livelihoods in the long term. This informed approach is particularly relevant in preventing unsustainable practices and maladaptation.

There are few examples of planned adaptation actions – incremental or transformational – being undertaken by development actors in the light of available climate information across the three research sites. While regional climate information across much of Uganda is fraught with uncertainties, broad characteristics can be isolated to inform activities. Both government and development partners could use accessible climate information in ways that help to minimise the impacts of long-term climate variability and change on project outcomes, but little evidence of its integration in project objectives exists. Informants suggest that the reason for this may be due to a lack of capacity, particularly within local government, to interpret complex and often uncertain climate information, and to recognise the associated implications on programmes and the actions that need to be supported in promoting adaptation and adaptive capacity. Greater support for improving technical capacity and awareness within local planning and decision-making bodies around issues of climate change, and adaptation policy and practice is vital.

Sources of formal weather and climate-related information are available for the three sites. In Bundibugyo, for example, seasonal forecasts are generated by the National Department for Meteorology and broadcast on local radio. It is the intention of these broadcasts to provide local farmers with information to inform their short-term decision-making on when and what to plant, and which cultivation practices to employ. But respondents report significant problems relating to the communication and reliability of this information. Many respondents express low levels of confidence in seasonal forecasts, reporting failures after making decisions based upon them. However, discussion groups highlight that information on how a seasonal forecast can be used, and the parameters of seasonal forecasting are not shared at community level. It is likely that, when decisions are made based on seasonal forecast information, they are based on wrong assumptions. Moreover, respondents generally feel the forecasts are wrong, even though they are generally accurate in terms of the meteorology specifications they present. This highlights a potential gap between information and knowledge, as vital information is available though it is both interpreted wrongly or isn't applied correctly, thus providing little use to the respondents.

Although development interventions do not typically include aspects of climate information in operational objectives, projects may have considerable potential to disseminate and communicate weather and climate information to a wide audience of beneficiaries. Given high levels of trust and reciprocity, certain development interventions, particularly those supporting key livelihood practices and functions, may be well placed to distribute short-and long-term climate information to local users, making sure to state the degree of confidence that can be placed in it. Moreover, such information can be used to inform and guide intervention activities, allowing development partners to evaluate outputs and objectives in light of long-term changes in the local environment (further elaborated in 3.3.1.). More can also be done to support the technical capacity of local decision-makers to interpret relevant climate information. Regardless of accessibility, information relating to short-medium-and long-term climate forecasts is available to help guide regional level policy-making in Uganda. However, few district and regional policy-makers have the capacity, or the support, needed to interpret and make use of it.

Knowledge and information: Implications for development

1. Access is not the only barrier to information. Although access to information is often a key barrier to adaptation, the research found that, even where information was available, the capacity to use it appropriately was lacking. Information only has value if there is knowledge of how to use it.

2. Anticipate change, rather than respond to problems. Most actions reported in the research were reactive, occurring after particular events which left people worse off. Climatic and other changes can be anticipated, and people are in a stronger position to plan for change before it occurs, than after it has disrupted their lives and livelihoods.

3. Avoid maladaptation. Many of the intervention activities and individuals' own actions have been unsuccessful or unsustainable in the long term. The knowledge and skills to understand the future implications of their actions are lacking across government, NGOs and communities. Maladaptation is a very real threat if interventions do not consider likely future conditions.

3.3.3 Focusing on flexible forward-looking governance

'Good governance,[11] and the capacity of communities to factor change into societies' decision-making processes, is an important component of adaptive capacity. Decision-making – whether through local elder groups, district/sub-county councils or NGO project management – needs to be set up in a manner that offers flexibility to respond to a range of different shocks and stresses, incorporates future projections appropriately (knowing the parameters of this information), and is reviewed and revised based on changes to circumstance and conditions that are likely to occur in the future.

With regards to planning at the community level, much of the focus is on reactive response. Each of the districts analysed has numerous development plans and governance bodies, including District Development Plans (DDPs), District Disaster Management Plans, Disaster Contingency Plans (DCPs) and Disaster Management Committees (DDMCs) at district and lower levels. Although forward-looking elements are apparent, the majority of actions are short-term and appear focused on addressing specific hazards, such as landslides and floods. In terms of policies specifically aimed at addressing climate change adaptation, issues of climate variability and change are poorly mainstreamed into formal planning processes, there are problems of coordination and responsibility at all levels, and there is little understanding of roles and responsibilities, especially at the local level. Indeed, many of these local committees have little awareness of activities at the national level, such as the NAPA and the NDPMP, and how they affect their own operational objectives.

At the national level, issues of climate change are poorly mainstreamed across sectors. Government development plans give little recognition to the impacts of climate variability and change on existing operations, and do not sufficiently promote actions to support adaptation and enhance adaptive capacity. This has direct implications for local planning, as centrally disbursed funds to local governments are largely limited to Uganda's five National Priority Programme Areas (education, health, clean and safe water, feeder roads and agriculture - NAADS). Key informants at the district level note that low levels of awareness, and poor mainstreaming of climate issues within the five priority programme areas significantly limits the ability of local government to support adaptation, enhance adaptive capacity and promote climate awareness.

On the ground, formal governance structures at the district and community level show little in the way of informed long-term planning, and there is little recognition of the actions required in light of future changes in climate and development pressures. Key informants suggest that the reasons for this include a lack of accessible information on which to base decisions, low levels of awareness and capacity, and uncertainty about how to tailor interventions accordingly. Development partners may, in many instances,

be well-placed to play a strong role in strengthening formal decision-making and policy processes in a forward-looking, participatory and equitable manner. In practice, however, issues around supporting good governance are found to be of low priority for development partners working across the three sites. Moreover, issues of restrictive social institutions, limited influence of engagement in policy on the part of marginalised groups, and elite capture of power are present across all three sites, and play a strong role in influencing who controls key resources and how decisions are made at the community level. Indeed, few development partners have demonstrated a conscious effort to formally consider issues of the wider political economy in project design; by reviewing existing, or conducting new, assessments of the social, economic and political context at the local level, such as through governance studies or Political Economy Analyses (PEA)[12].

While a few isolated examples of support for district planning can be identified – largely in assisting the implementation of DDMCs (all sites) and DCP (Kotido) – NGO and government actors have not made significant progress on improving formal governance processes. Some of the most effective gains in supporting adaptive capacity can be made through promoting principles of effective governance. This means addressing the need for power and decision-making processes to be accountable, transparent and responsive, and ensuring that procedures of formal governance reflect the concerns of all members of the community through participatory and equitable means. Moreover, development partners are often in a strong position to provide information and knowledge to inform decision-making, as well as supplying training and tools to develop the technical capacity to identify appropriate policy actions.

Not only is it important for development partners to support the ability of communities to govern themselves, but development partners themselves can do more to incorporate flexible forward-looking governance into their own operations. Findings from across the three field sites suggest, however, that most development activities are geared primarily towards current development needs. Little, if any, thought is given to how interventions may need to be adjusted in light of future climate change and

Road and bridge infrastructure damaged by heavy rains in Bundibugyo.

changing development scenarios. Limitations in the scale, design and implementation of projects mean that interventions may fail to provide support for long-term solutions to future community challenges, with the potential of contributing to maladaptation.

With this in mind, in seeking to support adaptive capacity at the local level, government agencies and NGOs need to recognise that they 'can't build capacities in others that they don't have themselves. And if they can't learn, they can't teach either' (Eade, 2007: pp 637). Part of this may involve revisiting project objectives in the light of available information and projections. This may require significant changes in project structure and management to allow for the continual evaluation and assessment of outputs. While, for example, support for sustaining agricultural cultivation in Kotido may be beneficial in the short term, what do changing climate and development pressures mean for the sustainability of agricultural livelihoods in the short, medium and long term? What will decreasing rainfall patterns mean for interventions to protect kraals in the short, medium and long term? Addressing issues such as these is crucial in ensuring that the support that development partners provide is successful and sustainable in the longer term, preventing the adoption of maladaptive practices.

Flexible, forward looking decision-making: Implications for development

1. Plan for the future. Much development planning is a reaction to what has come before, and aims only to meet immediate needs. The research found that likely changes in climate and development pressures had not been considered in intervention design or local planning processes. Government needs to harmonise existing planning tools to facilitate mainstreaming of changing climate and development pressures into planning processes at national and local levels.

2. Flexibility to update and anticipate. While flexibility in planning and actions by development actors and individuals was evident in response to negative events, the research found no evidence of flexibility to make changes based on new information or knowledge in anticipation of changes. Managing change requires iterative processes to regularly review and revise in light of conditions.

3**. New approaches to decision-making are needed.** Maladaptation can occur when there is a focus on meeting immediate needs without appropriate consideration of likely changes. The research suggests that some activities promoted by government and NGOs, as well as individuals' own initiatives, may not be suitable in the long term. A shift from 'optimal' decisions ('best' in current conditions) to 'robust' decisions (reliable over the widest range of likely conditions) is promoted in Climate Change Adaptation, and may be appropriate more widely in development practice.

Section 4: What does ACCRA's research mean for development practice?

What does ACCRA's research mean for development practice?

Despite not having a direct focus on addressing issues of climate change, evidence from the three research sites shows that development interventions have considerable potential to enhance the capacity of local communities to adapt to change. In addition to recommendations on how interventions can better contribute to the five characteristics listed in Section 3, findings from ACCRA's research support three broad reflections on how development partners can help to ensure that their operations are best supporting local communities in being able to deal with changing climate and development pressures in the long term.

a) Development interventions can do more to support the agency of local beneficiaries

Adaptive capacity is, in large part, synonymous with an individual or community's agency, i.e. their ability to act independently and to make their own choices. Most development support is aimed at addressing identified needs. In many cases these needs are decided by external actors, with little knowledge of local priorities and far removed from the local context (Eade, 2007). There is much less emphasis on helping individuals to develop their own capacity and agency to respond to change. Across the three sites, the majority of development activities are focused on the provision of assets and resources to deal with shock and stress events, such as tree-planting schemes (Bundibugyo); the provision of enhanced crop varieties (all sites); and cash-for-work programmes (Kotido). Yet interventions that have had the most pronounced effect on enhancing adaptive capacity have supported the processes needed to allow individual agency and capacity development.

Many of these process elements will relate to the characteristics of adaptive capacity described in the LAC framework, such as: efforts to address restrictive institutions and poor entitlement amongmarginalised groups; supporting knowledge dissemination and shared learning amongst community groups; promoting more accountable and effective decision-making and governance mechanisms; and providing enabling environments for individuals to innovate and explore new opportunities. All can have a strong, positive effect in supporting the agency of beneficiaries. Examples of where current intervention activities have contributed to these processes are evident, such as: support for marginalised groups to voice their concerns through community groups (all sites); village saving schemes to support investment in innovation (Gulu); and strengthening shared learning processes among women's groups and farmers' collectives (all sites).

These activities play a strong role in allowing individuals to make their own decisions and respond to their own needs, and reflect the notion that supporting agency and capacity is 'about people and therefore not things' (Eade, 2007, p.634). This agency approach means that development partners focus less on supporting scores of projects and more on seeing interventions within the wider social, institutional, political and environmental context – local, national, regional and global. This does not imply that development partners need to focus solely on the process elements of intervention support. Instead, in thinking through how they support communities to adapt to climate variability and change, development partners ensure that they also recognise and coordinate actions to provide beneficiaries with the necessary tools to deal with climate change and development pressures in a successful and sustainable manner.

b) Development partners need a better understanding of the context to address the root causes of underlying social, political and institutional processes

As described above, the capacity of individuals to adapt is shaped by a host of social, cultural and historic factors. Each of these can have a strong role in either enabling or restricting adaptive capacity. Findings from ACCRA's research suggest that development interventions that seek to address restrictive institutions and cultural barriers are also some of the most effective in supporting adaptive capacity and promoting individual agency. However, as a whole, development partners are largely failing to adequately address and incorporate many of these wider social, cultural and historical processes within their operational activities, particularly those targeted at marginalised groups, such as youths, women and the elderly. Promoting better understanding and recognition of the local and wider political economy may help to tackle some of the more entrenched political and economic barriers to adaptation.

As a useful tool, PEA may have an important role to play in helping development partners overcome existing social structures and understand the complex context within which their activities take place. As international donors and development funders demonstrate increasing interest in using PEA to inform operational practice, so too government, NGO and civil society agencies can make use of PEA to maximise the effectiveness of their activities and address the root causes of vulnerability. The need for this is evident, as often these underlying drivers of vulnerability have a large influence on the five characteristics of adaptive capacity through, for example, access to spaces of power and influence or restrictions in entitlement. Doing so may be a relatively rapid and cost-effective method of allowing development interventions tackle social, institutional and political barriers to adaptive capacity.

c) Coordinating and prioritising collective action to support adaptive capacity

There is clear evidence that development interventions are having an impact on adaptive capacity at the community level across the three research sites. However, given that the interventions do not directly seek to support adaptation and enhance adaptive capacity, development partners often miss out on the potential to assist people and communities to respond to changing climate and development pressures through small changes to programmatic and operational activities. Findings from the research suggest that individual projects are often implemented in isolation, with many activities duplicated and lessons learned not shared with other local agencies and development partners. For example, issues of adaptation and DRR are treated separately from wider development interventions, such as Social Protection and Livelihoods approaches. As such, the contributions of wider development activities are not considered in light of adaptive capacity, with little effort to coordinate and harmonise collective gains between development partners. Such contributions are not formally acknowledged, and project outputs remain focused on delivering the primary objectives of the particular project – whether it is support for skill development and alternative livelihoods, or securing livelihood assets. Efforts to coordinate community, district and national activities are lacking, and may provide a useful starting point in helping to ensure that support is provided across each of the characteristics of adaptive capacity.

Finally, all the actors engaging at the community level, whether seeking to address issues of climate change or not, need to be aware of what aspects of adaptive capacity all project activities in the area are addressing. In recognising that adaptive capacity is made up of a number of inter-related characteristics, development actors – whether NGO, national/local government or communities – can use the LAC framework to assess what their activities are contributing, what areas need greater focus and attention, and how this support may be enhanced. This requires better processes of coordination and governance among all relevant development partners to ensure that all five characteristics are addressed within the community. This is not to say that every individual development intervention should strive to address all five characteristics. Rather, as a collective, government and development partners should ensure they are coordinating activities so that, where relevant, they can best support adaptive capacity at the local level.

Endnotes

1. For more information on the LAC framework and its characteristics, see Jones (2010), or access the consultation document on the ACCRA website: http://community.eldis.org/accra/

2. 'Hot' day or 'hot' night is defined by the temperature exceeded on 10 percent of days or nights in the current climate of that region and season.

3. Taken as the average of 21 global models run under the IPCC's A1B scenario. Predictions are at the median (50 percent) for the 2080 to 2090 period relative to 1980-1990 baseline – see IPCC (2007).

4. The climate models used are a sub-set of 15 from the 22-member ensemble used by the Intergovernmental Panel on Climate Change (IPCC) for their Fourth Assessment report.

5. All values are anomalies relative to the mean climate of 1970-1999.

6. Simulations were run using the PRECIS regional climate model. Information is received from the Department of Meteorology and sourced from the unpublished site reports. Importantly, though RCM data is helpful in establishing trends, it must be acknowledged that climate models have large uncertainties related to predicting certain elements of the climate system, particularly at smaller scales. Therefore, any outputs have to be interpreted with a thorough understanding of what particular projections can tell us and the associated uncertainties involved.

7. Note that the period years for modelled scenarios at each site are different. Both past and future trends are model simulations and do not directly incorporate observed data at each of the sites.

8. Predicted as 374,700 as of June 2010, compared to 298,527 in 2002.

9. Respondents note how the incidence and spread of various crop diseases has risen sharply. Both farmers and key informants suggest that, changing climatic conditions may be partly responsible for this rise, though further research is needed.

10. Though intended to be free to all, communities still have to pay small fees to cover a number of expenses, such as school clothing and stationery.

11. The principles of good governance at the local level are contested. Rogers and Hall (2003) outline a series of core principles for effective governance, noting that governance structures should be: open and transparent, inclusive and communicative, and equitable and ethical. Moreover, their performance and operations should be: accountable, efficient, responsible and sustainable.

12. At its simplest, PEA is concerned with the interaction of political and economic processes in society. It deals with the distribution of power and wealth between different groups and individuals, and the processes that create, sustain and alter these relationships over time (DFID, 2009).

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