

Strengthening Community Led Resilience to Threats of Climate Change in Africa

Case study - Uganda

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Abstract

Impacts of extreme events caused by climate change, particularly heavy rains that lead to floods and the prolonged recurrent droughts are now a regular occurrence across the entire African continent, hindering the region's ability to be able to meet the MDGs by 2015. Africa is already described as the most vulnerable and least prepared continent to these impacts and with the lowest adaptive capacity levels attributed to limited financial, technological and institutional resources available.

Rural communities in Africa are the most affected and vulnerable because they are often the poorest, rely heavily on rain-fed, small scale subsistence farming, are uninformed and live in unplanned settlements. The external enabling environment is ineffective too with lack of or poor and unplanned infrastructure, limited or no industrial activities, no regular disaster risk assessments and above all, no working policy on climate change adaptation.

Teso Region in Uganda is described as one of the most vulnerable regions in the country faced with recurrent prolonged droughts and incidents of erratic and heavy rains, the most recent of which were the floods of 2007. Communities describe the current state of events as '*reactionary*' in nature instead of a more proactive environment.

What they need to be more resilient is timely and right information, education and awareness programmes, diversification of rural activities, introduction of appropriate technologies for energy and water efficiency as well as women involvement in the planning process are the main issues raised by communities necessary for their empowerment. However, these cannot be implemented without the external enabling sectors most notably the early warning systems, regular risk assessments, rural development and CDM, financial incentives and the active media. The use of the Participatory RRA approach to development is highly recommended.

Key words: Participatory Rural Appraisal, Vulnerability, Resilience, Adaptive Capacity, Adaptation, Contingency Planning.

Executive Summary

Africa as a whole is described as the most vulnerable and least prepared region in the world today to the impacts of climate change and with various climatic predictions pointing towards increase in the frequency and intensity of extreme weather events, adaptation will be necessary. The levels of achievement of the UN Millennium Development Goals by 2015 in Africa have been rising over the years across the continent. However, there is a generally agreed position among different stakeholders including academia, civil society, development practitioners as well as the wider UN setting that some of these achievements are being compromised by the impacts of climate change on the economies and livelihoods of Africans, most notably increases in the number of hungry, malnourished and poor people whose livelihoods have been set back by recurrent droughts and flooding in the previous decades.

Climate and development are closely linked to each other particularly for the majority of African countries because the main economic activities that contribute most to GDP are directly related to climate in one way or another. This applies to the tourism and the predominantly rain-fed agricultural sector, which also includes the fisheries and horticultural sub-sectors. Impacts of climate change, most especially flooding, heat waves and prolonged droughts, have led to very negative results across the continent in the form of reduced agricultural output, reduction in fish stocks, water stresses, and spread of waterborne diseases, losses of traditional lifestyles, forest fires and degradation of grasslands, among others. These have contributed to the increasing vulnerability levels across the continent, particularly in rural poor African communities who are the most affected.

This research, carried out in the Teso Region of North Eastern Uganda, was designed to explore the main underlying factors that hinder community led responses against the threats of climate change and also provides an analysis of the current external enabling environment in and how it can be strengthened to ensure sustainability of intervention efforts at the community level. How can the local people be empowered to take the lead since they are the most affected? How can the external enabling environment be strengthened to ensure sustainability of their efforts?

To achieve this, a participatory approach (PRA) was applied in a bid to have rural communities fully participate and to have a self reflection of their environment and way of life and subsequently to open up in identifying their own needs and priorities and in a way, own their development process. The thesis underlines the need to have a shift away from the conventional *reactionary and prescriptive* approaches to disaster risk reduction to the more *proactive* approach that involves preparedness deeply rooted in community participation. Donors, civil society, researchers and also rural communities not only in Uganda but Africa, as a whole, are the intended audience with some key lessons to be applied both at decision making levels and the local levels.

There is need to provide rural communities with the right, timely and accurate information on weather and climatic patterns. They have to be taught about the causes and how they contribute to their own vulnerability through the practice of unsustainable ways of life. The other aspect of information deals with forecast data and the frequency of communicating the information. The earlier the communities know how the weather is going to be in the next two to five days, the better for them to devise means of escape and other coping strategies like using less water.

Contingency planning is necessary at every level, more so at the community level because they are involved in their own development process. Contingency plans are important because they map out different roles and responsibilities to be played by each stakeholder, including the

local people and therefore to eliminate any duplication of activities and delay in their implementation that could have been caused by lack of coordination, which is usually the case in many response operations on the continent.

Diversification of livelihoods at the community level is critical as it removes or reduces dependency on rain-fed agriculture. Vulnerability on the continent is high because of heavy reliance on one type of activity. Rural areas require light to medium industries to start with especially those that offer synergy with farming that the communities are used to. One applicable option is the agro-based processing industries that utilise locally grown fruits and vegetables to make processed products that also ensure the use of local labour.

Energy is a key driver for development and there exist opportunities to develop cleaner energies in Teso. The region receives upto seven months of direct sunlight which can be exploited for solar power to be used at both household and non-household activities. Bio-mass can also be exploited especially as the region has a sizeable number of households that own cattle.

Women play a key role in reducing vulnerability, only if they are involved in the development process. Eighty percent of all those affected by the 2007 floods were women and children. They form the bigger part of labor involved in agricultural production and are responsible for most of the chores in the home. Educating and involving them and letting them make decisions is a plus for rural communities.

Empowering rural communities is one thing, but sustaining their resilience efforts requires support from external sources and the enabling environment to have their efforts sustainable. The professional category of respondents presents what they think an effective enabling environment for a rural region like Teso should be. Early warning systems are necessary because they provide timely information on likely events that might occur and this would work well with the contingency planning exercise. There is also need to have regular vulnerability assessments especially as the frequency and intensity of extreme weather events is predicted to increase. Assessments are useful for development of synchronized work plans for disaster risk reduction practitioners. Assessments also provide data that can feed into the contingency planning as well as early warning systems.

The diversification of rural livelihoods can only be made possible with encouragement of rural economies. Basic infrastructural establishments like farmer access roads, electricity through rural electrification and investment in mini hydro and solar energies, schools and hospitals all attract investments to a region. For poor rural communities, synergistic medium type industries could offer a start.

Financial incentives and the Clean Development Mechanism (CDM) play a big role in sustainability efforts. Incentives in form of tax holidays for affected businesses, soft loans, removal of taxes on emergency equipment like food (including seeds), medicines and clothing offer communities an important life-line to continue their daily livelihood activities. Micro credit institutions at village levels can be empowered to provide these services. For CDM, opportunities are still low in Africa and there is room for the government to attract investors in that field as Africa holds a lot of potential, particularly in the energy sector.

The role of media cannot be under estimated. The most effective methods of communication within an African rural setting are through plays and huge bill board posters. These need to be encouraged.

For the early warning systems to work, the regular assessments, technologies and monitoring systems to properly function, capacity building and technological transfer is very important. Africa and Uganda in particular lack the skilled personnel required for the above activities to work efficiently as they have worked elsewhere. This is where developed countries come in, to offer training and support to both practitioners at the policy and technical levels.

Therefore, to be able to bridge the gap between the top and the bottom, the Participatory Rural Appraisal (PRA) approach should be adopted because community participation offers an opportunity to identify the actual needs of the population and also offers policy and decision makers a platform to act in a more realistic manner, acting based on the reality on ground. For a country like Uganda, climate change adaptation activities should be mainstreamed into community plans because now that climate changes that cause extreme weather events are confirmed as certain and are predicted to increase, it raises the need for planning for these events at the lowest levels. This calls for more capacity to be built for local level leaders.

For a start, emphasis on rural development should focus on the development of agri-business since rural communities are predominantly farmers. This ensures the use of local resources as raw materials in agro-based processing industries and also employs local personnel. Rural farmers should also be encouraged to play a central role in adaptation by practicing afforestation or agro forestry methods. As in the case of Niger, governments should offer incentives to farmers to encourage them in the form of free seeds and farming equipment. For those that do not, local by laws should be made and applied on them.

Further research has been recommended on why CDM investment in Africa is very low and minimal compared to other regions. What could be the underlying reasons for this trend, especially when other developing countries like China, Mexico and Brazil are reaping more?

There is also need to find out how best foreign aid targeted for climate change adaptation in Africa can be made more effective than it has been in the last decades. Billions of dollars have been poured into Africa since the 1960s, yet poverty is still rampant across the continent. New approaches need to be applied to administer this development aid much more effectively.

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Abbreviations

AEO - African Environmental Outlook

AfDB - African Development Bank

CIGI - Centre for International Governance Innovation

CBO – Community Based Organisations

CCU - Climate Change Unit

CFSVA - Comprehensive Food Security Vulnerability Assessment

CDM - Clean Development Mechanism

CSTI - Centre for Science and Technology Innovation

DFID - Department for International Development

DSoER - District State of Environment Report

EFSA - Emergency Food Security Assessment

FAO - Food and Agricultural Organisation of the United Nations

FAOSTAT - FAO Statistics

FBO – Faith Based Organisations

GDP - Gross Domestic Product

GEF - Global Environment Facility

GoK - Government of Kenya

GoU - Government of Uganda

HDI - Human Development Index

HIV - Human Immunodeficiency Virus

ICRAF - International Centre for Research in Agroforestry / World Agroforestry Centre

IPCC - Intergovernmental Panel on Climate Change

LDC - Least Developing Country

MAAIF - Ministry of Agriculture, Animal Industry and Fisheries

MDGs - Millenium Development Goals

MoWE - Ministry of Water and Environment

NAPA - National Adaptation Programmes of Action

NDP - National Development Plan

NEMA - National Environment Management Authority

NFA - National Forestry Authority

OPM - Office of the Prime Minister

PRA - Participatory Rural Appraisal

PEAP - Poverty Eradication Action Plan

PRB - Population Reference Bureau

SEI - Stockholm Environment Institute

UN - United Nations
UNCDF - United Nations Capital Development Fund
UNCCD - United Nations Convention to Combat Desertification
UNDP - United Nations Development Programme
UNECA - United Nations Economic Commission for Africa
UNESCO - United Nations Education, Scientific and Cultural Organisation
UNFPA - United Nations Population Fund
UNEP - United Nations Environment Programme
UNFCCC - United Nations Framework Convention on Climate Change
UNICEF - United Nations Childrens' Fund
UNIDO - United Nations Industrial and Development Organisation
UNIFEM - United Nations Development Fund for Women
UNOCHA - United Nations Office for Coordination of Humanitarian Affairs
USAID - United States Agency for International Development
WFP - United Nations World Food Programme
WB - World Bank

1 Introduction

1.1 Background

Climate change and variability and its related impacts, has for more than two decades, dominated global headlines as a key environment and sustainable development issue, particularly in developing countries. Africa, as a region, is considered to be the most vulnerable to the impacts of climate change and variability mainly due to the financial, institutional and technological deficiencies to adapt to the threats (UNFCCC, UNEP 2007, FAO, and WFP 2009). Impacts of climate change, according to the United Nations, are having a hugely negative effect on the realisation and attainment of the Millennium Development Goals in these countries by 2015 (UN, 2007), as they increase the already chronic levels of poverty, hunger, malnutrition and disease on the continent.

Climate change is described as any changes in climate over time, either due to natural variability or as a result of human activity (IPCC, 2007). The UN World Food Programme describes it as changes in originally stable or predictable global or regional weather patterns over long periods of time and is evident through extreme events like floods, tsunamis, cyclones and droughts, with countries in East, Central and Southern Africa, including South Africa the worst affected (WFP, n.d).

Regions and countries, the world over, have different and individual experiences as regards impacts of climate change, depending on the climatic zones they experience, as well as their geographic, social-economic and political / administrative circumstances. This means that levels of vulnerability, adaptive capacity and responses to the threats and impacts of climate change are as diverse and not particularly the same.

Figure 1-1 describes the process of climate change with its key processes, characteristics and threats.

Main Climate Characteristics

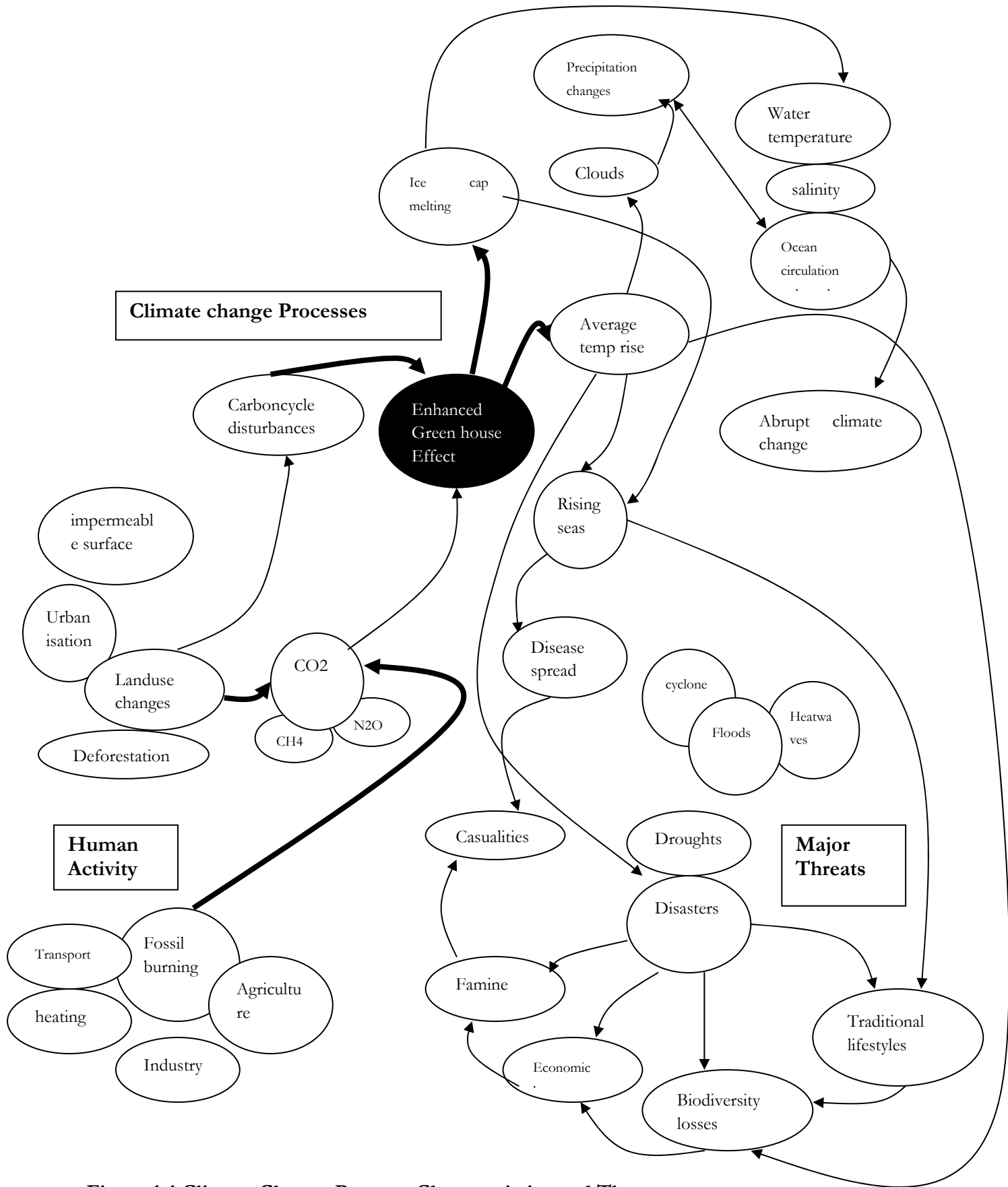


Figure 1-1 Climate Change Process, Characteristics and Threats

Source: UNFCCC (n.d)

The increased use of fossil fuels leads to emissions in the atmosphere in large quantities of green house gases like carbon dioxide (CO₂), while agricultural land use practices have also contributed to emissions of methane (CH₄) and Nitrogen oxide (N₂O), which have led to the *green house effect*, thus climate change. Climate change is characterised by among others, increases in average temperatures (global warming), melting of ice caps, reducing snow cover, increasing ocean acidity, and changes in precipitation patterns. Globally, the main human induced activities responsible for increasing the occurrence of climate change caused by increasing concentration of greenhouse gas emissions are industrialization, with the Stockholm Environment Institute reporting of 80% increase in yearly CO₂ emissions since the 1970s with the majority of this increase caused by industrial activities in Western Europe, the US, Canada and Japan. Within the past decade, the largest growing economies of India, China, Brazil, Indonesia and South Africa have also significantly contributed to emissions (SEI 2008).

Table 1-1 shows per region and per capita contributions to greenhouse gas emissions, 2004

Table: 1-1 Total GHG Emissions in 2004

REGION	MtCO ₂	% of WORLD TOTAL	TONS CO ₂ Per Person
World	30,689.5	100.00%	4.8
Asia	10,388.7	33.85%	2.9
Europe	6,651.5	21.67%	9.2
North America	6,570.0	21.41%	20.2
Middle East & North Africa	1,960.7	6.39%	4.5
South America	871.8	2.84%	2.4
Sub Saharan Africa	676.2	2.20%	0.9
Central America & Carribean	558.0	1.82%	3.2
Oceania	401.4	1.31%	12.6

Source: World Resources Institute, 2008

Globally, the three continents of North America, Europe and Asia contribute to more than three quarters of all emissions. Sub Saharan Africa has the least emissions per capita attributed to the fact that consumption levels with regards to activities that are responsible for much of the emissions are low. Rates of industrialization, mechanized agriculture and much fewer cars for instance, per capita all lead to very low emissions.

The key human induced activities that exacerbate vulnerability in Africa are the indiscriminate deforestation and the use of poor farming methods like bush burning, over grazing and overstocking that create pressure on vegetative cover. Population increase creates a lot of pressure on the land resources as communities seek more space for growing food and feeding

their animals, thus increases in rates of deforestation, and swamp reclamation (UNFCCC, UNCCD, 2002 & PRB, 2006). Over stocking and over grazing also creates pressure on vegetation and certain short tree species which are destroyed in the process. African communities, particularly the rural based ones are among the most vulnerable. Many African countries south of the Sahara including Uganda are heavily reliant on economic activities that are directly connected to climate, including agriculture, tourism and fishing. So any extreme conditions mean direct impact on the economy and livelihood, not only at national level, but the community and household levels.

Table 1-2 indicates some of the general impacts of climate change on the African continent and explains why the adaptive capacity is very low.

Table 1-2: Regional Impacts and Vulnerabilities to Climate Change in Africa

Impacts	Sectoral Vulnerabilities	Adaptive Capacity
<p>Temperature</p> <p>Higher warming throughout the continent</p> <p>Drier sub tropical regions (Mediterranean, Horn of Africa and parts of Southern Africa) to become warmer than moister tropics (Parts of East and Central Africa).</p> <p>Precipitation</p> <p>Decrease in rainfall in much of North Africa and Southern Africa</p> <p>Increase in annual rainfall in East Africa</p> <p>Increase in rainfall in the dry Sahel to be countered by evaporation</p> <p>Extreme Events</p> <p>Increase in intensity and frequency of extreme events including droughts and floods</p>	<p>Water</p> <p>Increasing water stress</p> <p>75 – 220 million people may face severe water shortages by 2020</p> <p>Agriculture and Food Security</p> <p>Food production affected due to loss of productive agricultural land, shorter growing seasons, uncertainty about what and when to plant</p> <p>Increase in number of people at risk to hunger</p> <p>Yields from rain-fed crops halved by 2020</p> <p>Fish stocks to be compromised by rising temperatures</p> <p>Terrestrial Eco Systems</p> <p>Drying and desertification in the Sahel and Southern Africa</p> <p>Deforestation and forest fires</p> <p>Degradation of grasslands</p> <p>25-40% of animal species in national parks in Sub Saharan Africa to be endangered.</p>	<p>Low adaptive capacity to both climate variability and climate change in Africa is attributed to the following;</p> <p>Low GDP per capita</p> <p>Wide-spread and chronic poverty</p> <p>Low levels of education</p> <p>Little consideration of women and gender balance in policy planning</p> <p>Limited access to capital</p> <p>Inadequate infra-structure</p> <p>Eco-systems degradation</p> <p>Complex disasters</p> <p>Conflicts</p>

Source: UNFCCC

Being a continent largely dependant on rain-fed agriculture, the agriculture and food security sector is and will be more affected, with yields according to UNFCCC expected to go down by approximately 50% within a decade. This has implications both on the micro and macro levels because individual households will be affected through loss of food and extra incomes, while at the wider national levels, GDP will also be affected in terms of reduced agricultural out put of key cash crops and food crops.

1.2 Objectives and Research Questions

The thesis research therefore aims at discussing climate change and vulnerability in Africa as a whole and Uganda in particular, with a focus on rural communities and how their adaptive capacity can be strengthened to reduce vulnerability and minimise risk while also looking at the external environment and how it can be made sufficient enough to support community led efforts.

Below are the main objectives and research questions.

1.2.1 Objectives

- Explore factors that delay / hinder community led response and intervention efforts before, during and after a threat has occurred.
- Understand the enabling environment, including community structures, public awareness programmes, information sharing, emergency planning systems, education programmes, etc, and its role to ensure sustainability of community adaptation and resilience efforts to future threats.

1.2.2 Questions

1. How can local people be empowered to lead intervention efforts in their communities before, during and after occurrence of extreme weather events?
2. How can the current enabling environment be strengthened to ensure sustainability of community led efforts to increasing the adaptive capacity to future threats of climate change?

1.3 Research Methodology

1.3.1 Action Research

This chapter addresses the kinds of data collection methods that were used in this research. For this particular kind of study that required a great deal of information both from the top and the bottom, secondary and primary data were used and collected using a number of methods. Data was collected from key UN Agencies both working in Uganda and those that are not, mainly the World Food Programme, United Nations Development Programme, UNICEF, UNEP, UNCCD, UNFCCC, WMO, FAO, Non-Governmental Organisations like OXFAM, CARE, Teso Region Administrative Offices, National Meteorological Centre, Office of the Prime Minister and key individual informants, mainly from the professional category.

To get a clearer picture of the situation in the field, newspaper articles of the two leading dailies, *The New Vision* and *The Monitor* were also consulted. Field information was collected primarily using the Participatory Rural Appraisal Technique, PRA (refer to 3.1.1) and the use of focus group discussions was the most widely used tool under the PRA although direct observations, face-to-face interviews and brainstorming sessions were also widely applied.

The PRA model is action research oriented offers communities an opportunity to participate in information giving and sharing as well as searching for solutions to their own challenges (B. Bhandari, 2003). The study thus involved local people and outsiders with different disciplines.

Action research according to (Carr & Kemmis, 1986), is defined as,

'...a form of self reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of the practices and their situations in which the practices are carried out...'

This mode of research is closely linked to self reflection and is designed in a way that brings about social change (Bodgan et al, 1992). Researchers applying this model collect evidence exposing unjust practices and environmental dangers and recommend actions for positive change based on community traditions and capacity.

Using the random method of sampling often used by WFP during its Emergency Food Security Assessments (EFSAs) to avoid bias and regional imbalance, 300 household heads were selected for the study from 3 out of 6 districts in the wider Teso Region. Because Soroti district is the biggest and with the largest population, the study randomly selected household representatives of the entire study area, with Soroti having more respondents (191 household heads) compared to 91 from Amuria and 48 from Katakwi. The heads of household model was used because it would be difficult tracking down individual respondents and besides, the household head would, in principle, be representing five other members since the average number of people in any household in Uganda is six people (GoU & UNFPA).

To guide the study, two African case studies of community resilience to climate change impacts in Niger and Kenya were used and analysed. The purpose was to look for best practices and see how they can be applied in rural Uganda, particularly in Eastern Uganda while at the same time identify challenges facing communities in those countries and how they can be avoided from happening in Uganda. Analysis of these case studies viz-a-viz the Ugandan situation was done using the Characteristics of a Disaster Resilient Community model (J. Twigg, 2007).

Table 1-3 illustrates of how the study was organised showing key activities and the key parties involved.

Table 1-3: Key Components of the Research Process

Key Activity	Key Parties Involved	Responsibility
Sharing of the research plan and consultation with relevant stakeholders	Supervisor, WFP, FAO & OPM	Researcher
Mapping of the research area	Researcher, WFP	Researcher
Data collection	Local communities, professionals from WFP, FAO, CARE, OPM	Researcher
Analysis of data and final writing of the Masters Thesis	Supervisor & Researcher	Researcher

Source: Author

1.4 Research Design

To be able to achieve the objectives, the study used both qualitative and quantitative methods.

1.4.1 Quantitative Design

In quantitative research, the main purpose is to find the link between an independent variable and another dependent variable within a given population (Hopkins 2002). These kinds of research designs can be both descriptive, where subjects are normally measured once or experimental. When it comes to the descriptive study, associations between variables are the only one established, while causality is determined with experimental studies. If a researcher hopes to get a fairly accurate estimate of the link between given variables, then the descriptive study should have a sample of hundreds. However, the reverse is true because with the experimental study, one needs just tens or a fraction of the subjects. Estimation from this relationship between variables will less likely be biased if one considers a higher rate of participation within a sample selected randomly from a given population. For this particular study, 300 household heads from the communities were randomly selected from three of the six districts and these were selected depending on their respective population size so as to be representative. The other 10 professional respondents were not randomly selected. They were identified before to provide views from a policy perspective due to their expertise and knowledge in the field of climate change and livelihoods.

1.4.2 Qualitative Design

This kind of research usually starts with the review of various documentation and existing literature to gather data. It involves detailed descriptions of cases or systems or people, which descriptions are obtained usually through interactions with respondents by interviewing and observations.

According to (J. Neill, 2006), qualitative research has five main types namely;

- a) Case study: shedding light on a phenomenon by studying in-depth a single case example of a phenomena. The case could be a person, institution or an event.

- b) Grounded Theory: Theory is developed inductively from a corpus of data acquired by a participant observer.
- c) Phenomenology: Describes the structures of experience as they present themselves to consciousness, without recourse to theory or assumptions from other disciplines.
- d) Ethnography: Focuses on sociology of meaning through close field observation of social-cultural phenomena. Typically, the ethnographer focuses on a community.
- e) Historical: Systematic collection and objective evaluation of data related to past occurrences in order to test the hypotheses concerning causes and effects of these events that may help to explain present events and anticipate future events (Gay, 2006).

1.5 Primary Sources of Data Collection Used

In addition to data collected from review of available literature from sources mentioned above, including the review of case studies of community resilience in Niger and Kenya, a number of tools were used to collect field data and are as follows;

1.5.1 Focus Group Discussions

This was the main tool used at the community level. Qualitative in nature, the idea behind it was to involve the communities themselves in the the discussions with the researcher acting as a guide and a facilitator to the discussions. A typical group had a maximum of 50 household heads. The discussions were guided around climate change and changing seasons and how these are affecting their livelihoods.

1.5.2 Face-to-Face Interviews and Discussions

These were mainly applied to the professional category of respondents (**Appendix 6.2.1**) as well as local leaders, although a few community respondents were also approached using this tool. The interviews helped the researcher gain deeper understanding of the current enabling and external environment and how it can be strengthened to be able to minimise vulnerability. The illustration below shows one of the face to face interviews conducted during the study.

1.5.3 Direct Observations

The main advantage this approach had to the researcher is that it provided the actual situation on ground. Major issues observed were key economic activities and means of livelihood, housing structures and other infra structures, which enable the researcher to have a first hand look at the current enabling environment. Observations also created a foundation for what can be done or improved upon in as far as recommendations and conclusions are concerned.

1.5.4 Daily Calenders

This was used to mainly determine the key activities done at village and household levels in relation to time spent doing that activity on a day-to-day basis. For example, it was discovered that women now spend an average of half a day fetching firewood yet the same activity used to take just less than two hours more than a decade ago. This was an indication that perhaps deforestation is quite high and subsequently, the rate of afforestations are low. Another

advantage of this tool is that it identifies priority programmes that should be introduced within a community. For instance, using the firewood example above, taking a lot of time fetching firewood means that energy intervention programmes should be introduced for example solar energy or use of energy saving stoves.

1.6 Data Analysis

Data analysis is a process in which data that is collected (raw data) is organised in a way to derive information that is useful for the study being undertaken. For this particular study, data was analysed using the following methods.

1.6.1 Matrix Analysis

This involved the use of diagrams, graphs, charts and pie charts to describe the sample dealt with.

1.6.2 Typology

Here, the data received from different sources were classified and grouped to identify similar patterns and themes. This mainly applied to data on activities, relationships and settings at community level.

1.6.3 Event Analysis

This was applied mainly for information on changing climatic and weather patterns. Data collected on climatic changes were collected over a 30-year period from 1980-2010, which were used as the boundary years.

1.6.4 Use of Comparison

This was mainly used to analyse the case studies to specifically look for indicators in events and map out consistencies and differences. Similar events pointed out some basic information and ideas.

1.7 Scope of the study

For this study, the geographical study area was the Teso Region in North Eastern Uganda. The region has six administrative districts. However, three of them, including the largest, Soroti district were chosen for this study. The other two were Amuria and Katakwi districts.

The study also involved heads of households, up to 300 in number that were randomly chosen. It also had 10 respondents from the professional category limited to those individuals experienced in the field of climate change and how it affects livelihoods. Uganda being an agricultural based country, it was relevant to include respondents from WFP, FAO, UNDP, CARE and the Office of the Prime Minister that coordinates disaster activities in the country.

1.7.1 Difficulties and Limitations

A number of challenges were faced during the study, most notably mobilisation of community members. Being the planting season, it was quite difficult to get the respondents during the

day since many were in the fields. This is the reason why the focus group discussions were held in the afternoon hours.

Respondents from the professional category were quite understandably busy, especially with the African Union Summit held in Kampala from 19th – 27th July, as each department and agency was directly involved in one way or another. This explains why information gathered from them was through the use of face-to-face discussions and not questionnaires.

The study was quite resource demanding especially with funds and time. More funds were spent in the field as community respondents needed something as a token in form of money, otherwise one would not be able to get sincere answers and a lively debate. A lot of time was necessary especially during the focus group discussions particularly as debates went on for considerably longer than earlier planned. WFP was kind enough to offer the author transport facilitation to the field as well as access to information, the office, telephone and internet services, which made the resource constraints considerably lighter.

The two main limitations to the study were shortage of time as well as limited data on climatic trends specific for Uganda and Africa, in general due to lack of, or incomplete or inaccurate information. Much of the information available showed trends from only as early as 20-30 years ago, which may not be sufficient to provide much more information.

1.8 Scope of the paper

Chapter one gives an introduction to the paper by describing climate change and its key processes and characteristics and its impacts and why the adaptive capacity in Africa is very low. The chapter also introduces the aims, objectives and key questions of the research as well as the methodology applied to fulfill the objectives. The audience to whom the research is intended is also mentioned.

Chapter two examines climate change in Africa in general and Uganda, in particular, in a broader detail and how communities have reacted to the threats through adaptation. Key impacts on the continent are addressed as well as the main human induced drivers that contribute to vulnerability. The chapter also introduces case studies from Niger and Kenya on how local communities have addressed their vulnerability.

Chapter three presents findings for the first research question. It gives a description of the PRA technique and its advantages over other conventional data collection methods and how it was applied in the field. Social-economic background of Teso is described as well as the description of factors necessary for enhancing resilience of community from a community perspective.

Chapter four documents the existing enabling environmental legislation in the region and how it can be strengthened to minimise vulnerability because without it, factors identified in the previous chapter cannot be implemented. The professional respondents largely contributed to this section.

Chapter Five presents concluding remarks and recommendations to the study. It also presents areas suggested for further research.

1.9 Target audience

Professionals including policy and decision makers in Sub Saharan Africa and researchers working in the fields of rural development, livelihood and climate change adaptation will benefit from this study because there is need to fully understand rural African communities and why they live they way they do and how they can be assisted to make positive changes from a proactive point of view instead of the prescriptive and reactionary method of work. The enabling environment also requires support from this category of people in terms of future planning and policy. This includes donors and civil society, who will hopefully be influenced by the information therein.

Africa's poorest rural communities will also find this study useful. Given that they are the most vulnerable to the adverse impacts of climate change and extreme events, ideas derived from the field, brought up by members from rural communities in North Eastern Uganda, will hopefully work as best practices for other marginalised groups in Sub Saharan Africa, a region described by UNEP as one of the most unprepared to stand up to these impacts.

The report will enhance shared learning and information exchange across all disciplines, backgrounds and levels. Decision and policy makers will learn from the community and will be able to make decisions solidly based on insights into community needs while the rural people on the other hand will be able to work towards achieving more sustainable livelihoods from the information they get from experts in the fields of sustainable development and climate change adaptation.

2 Climate Change in Africa and Uganda: Impacts and Opportunities for Adaptation

2.1 Introduction

This section reports on Climate Change in Africa including how it has affected livelihoods of the communities on the continent and its contribution to causing vulnerability and related impacts on key sectors of community livelihood namely agriculture, health, water and sanitation. It also highlights the ways in which the vulnerabilities caused by climate change are being handled both at the national and community levels with examples of case studies from Niger and Kenya as well as traditional coping strategies¹ on other African countries.

2.2 Situational Analysis - Africa

Climate Change and variability is now recognised as a key challenge to the sustainable development process and attainment of the Millennium Development Goals (MDGs) on the African continent today (World Bank, 2009 & UNECA, 2010). A number of countries on the continent like Uganda, Tanzania, Mali and Malawi have recognised climate change as a key priority in their development plans and therefore have incorporated it within their wider National poverty reduction plans and policies (NDP, 2010:315 & M. Prowse et al, 2009) while others have developed and are already implementing their respective National Adaptation Programmes of Action - NAPAs (UNFCCC, 2008), an indication of their determination to be more resilient² to the threats posed by changing climate and variability and minimise vulnerability.

The UNFCCC defines NAPAs as a channel through which Least Developing Countries (LDCs) identify their priority activities that respond to their 'urgent and immediate' needs to adapt to the threats of climate change. Further delay would lead to increased cases of vulnerability at later stages. They use existing data and coping strategies at the community levels – as opposed to scenario based modelling, they are action oriented and country driven based on national circumstances. NAPA documents must be presented in a simple way that is easily understandable at all levels of society if effectiveness is to be achieved. Grassroots communities are the main stakeholders, especially when they are seen as an important source of information.

Africa's contribution to green-house gas emissions is the least compared to other regions (UNEP/AEO, UNFCCC, M. Fleshman, 2010). However, its communities have played and still play a very significant role in exacerbating the impacts of climate change by engaging themselves in various unsustainable human activities that have led to the increasing the rate of desertification on the continent namely overgrazing, monoculture, illegal logging, bush burning, over cultivation, excessive firewood collection and poor irrigation techniques, all of which are complemented by poor and ineffective policies and governance (UNDP, UNEP & UNCCD, 2009).

¹ Coping strategies / capacities refers to the means by which societies use available resources to face adverse consequences that could lead to disaster (UN/ISDR, 2004)

² Resilience refers to the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. It is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and improve risk reduction measures (UN/ISDR, 2004)

Emissions from green-house gases arising from deforestation and land and forest degradation are responsible for about 20% of the global total annual CO₂ emissions, which are not even included in the commitments of the Kyoto Protocol. Reducing or curbing deforestation and the above mentioned unsustainable practices will be crucial in counter acting the global temperature increase as well as having reductions in biodiversity loss and poverty (Royal Norwegian Embassy in Tanzania & IPCC, n.d).

Key among these impacts is the droughts which lead to challenges in food production especially because much of the agricultural activity on the continent is dependant on rainfall or rain-fed agriculture (S. Eriksen et al, 2008:7, FAO 2003). Prolonged and frequent droughts have greatly reduced and affected areas that are suitable for farming and agriculture, length of crop growing seasons and crop yield potential on the continent especially along arid and semi arid areas are leading to increased food insecurity, loss of incomes, of which the overwhelming majority is from agriculture (P. Kurukulasuriya et al, 2006) and to subsequent increases in rates of malnutrition. The most affected drought prone countries on the continent are Ethiopia, Sudan, Zimbabwe, Kenya, Namibia, Botswana, Mali, Chad and Niger (AfDB, 2002 & UNECA, 1999), where reductions in net productivity of the key crops like maize, sorghum, millet and wheat are projected to be at 10% by 2025 (S. Eriksen et al 2008).

In addition, fisheries are affected too, with fish resources expected to reduce in larger lakes across the continent due to rising temperatures and flooding that affect fish production and also destroy both the natural habitat of fish and fish farms / ponds (R. Washington, et al, 2006) The fishing industry in Malawi for instance contributes to approximately 4% of the national GDP and an estimated 400,000 people depend on it for their livelihoods. Droughts in the country over the previous decade have left many vulnerable to hunger, disease and poverty (UNDP, 2007).

The other key impact has to do with water issues. The continent is already faced with clean water shortages and this is likely to get worse due to climate change. Decreasing rainfall and runoff are expected to worsen the already existing water stress on the continent, thus affecting the amount of water available for domestic as well as industrial use. The Ethiopian highlands and Lake Victoria, both found within the Nile Basin, are very sensitive to variability in rainfall (UNEP & S. Eriksen et al, 2008:8). Reduced run off greatly affects the water levels within Lake Victoria in East Africa, which has an implication on both hydro power generation and production.

Incidents of increased rainfall have resulted into flooding in many communities. The 2007 floods on the continent across East and West Africa were responsible for a number of deaths due to drowning, spread of infectious diseases especially malaria, whose cases are likely to increase throughout the continent with higher temperatures causing the change in geographical distribution of vectors that are moving into new regions and higher altitudes (UNFCCC), infrastructural damages and destruction of crops and livestock. Estimates indicate that up to 650,000 homes were destroyed and approximately 1.5 million people were directly affected through loss of livestock, property, displacement (G. Conway, 2009:10).

Table 2-1 Vulnerability³ in Africa: Key drivers

<p>Most African economies are heavily dependent on environmental and Natural resources for their incomes, revenues, food, employment and exports (Agriculture, Fisheries, and Tourism). Changes in climatic conditions thus have huge impacts on the incomes and general livelihoods.</p>	<p>Poor communities and countries have much of their wealth in direct connection with natural resources and so any destructions to the environment will clearly destroy the communities and countries more</p>
<p>Subsistence and small-scale farmers are heavily reliant on rainfall. Lack of irrigation exposes them to vulnerability to any changes in rainfall patterns, however small variations might be.</p>	<p>Low incomes and poverty means lack of a formal kind of insurance for the poor.</p>
<p>Poorly resourced Governments and low institutional capacity means people cope largely on their own. Conflicts, brain drain and inadequate policies intensify the problems.</p>	<p>Lack of local weather information and data especially from Sub Saharan Africa, besides South Africa, makes it hard to predict with accuracy what is going to happen at country and even community levels. This leads to the 'Reactive' kind of response instead of the 'anticipatory / proactive type' of vulnerability response.</p>

Sources: G. Conway, 2009, S. Eriksen, 2008, UNDP/UNEP/UNCCD, 2009 & UNFCCC

The African poorest, usually ordinary and rural based communities are the most affected because much of their livelihood is sensitive to climate (OXFAM, 2008:1, G, Conway, 2009:2). The majority of the populations are rural based with up to 80% of the total population in most African countries living in rural areas (UNFPA 2005, and UN-HABITAT, 2006). Of these, over 60% are directly dependent on farming and upon the surrounding natural resources for their livelihoods (IFAD 2001, SEI & FAO, 2003:20), much of which is subsistence farming. Subsistence agriculture forms the main source of livelihood in rural areas with rural communities deriving more than 80% (WFP CFSVAM, 2007) of both their food and income needs from their small farms.

Lack of funding has been identified as one of the biggest challenges to the implementation of adaptation plans and programmes in Africa (T. Downing et al, 1997 & IPCC, 2007). Adaptation and strengthening resilience to climate change requires sustained levels of funding, otherwise there is a risk that adaptation will not be effectively addressed (UNFCCC). Lack of a sustainable financing mechanism leads to the reactive kind of response, usually an emergency based response that is short term and might prove to be very costly in the end.

There are efforts to help African countries in terms of funding for their adaptation plans and activities, with many of them at the international stage, both using direct donor support in form of financial, technological and human resources (bi-lateral) and through obligatory measures that are based on agreements and resolutions of a host of multi-lateral treaties.

³ Vulnerability to climate change refers to the degree to which a system is susceptible to, or unable to cope with, adverse impacts of climate change, including climate variability and extremes. It's a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity (FAO/WFP, 2008)

Figure 2-1 shows how climate change is affecting the continent per region and anticipated future impacts.

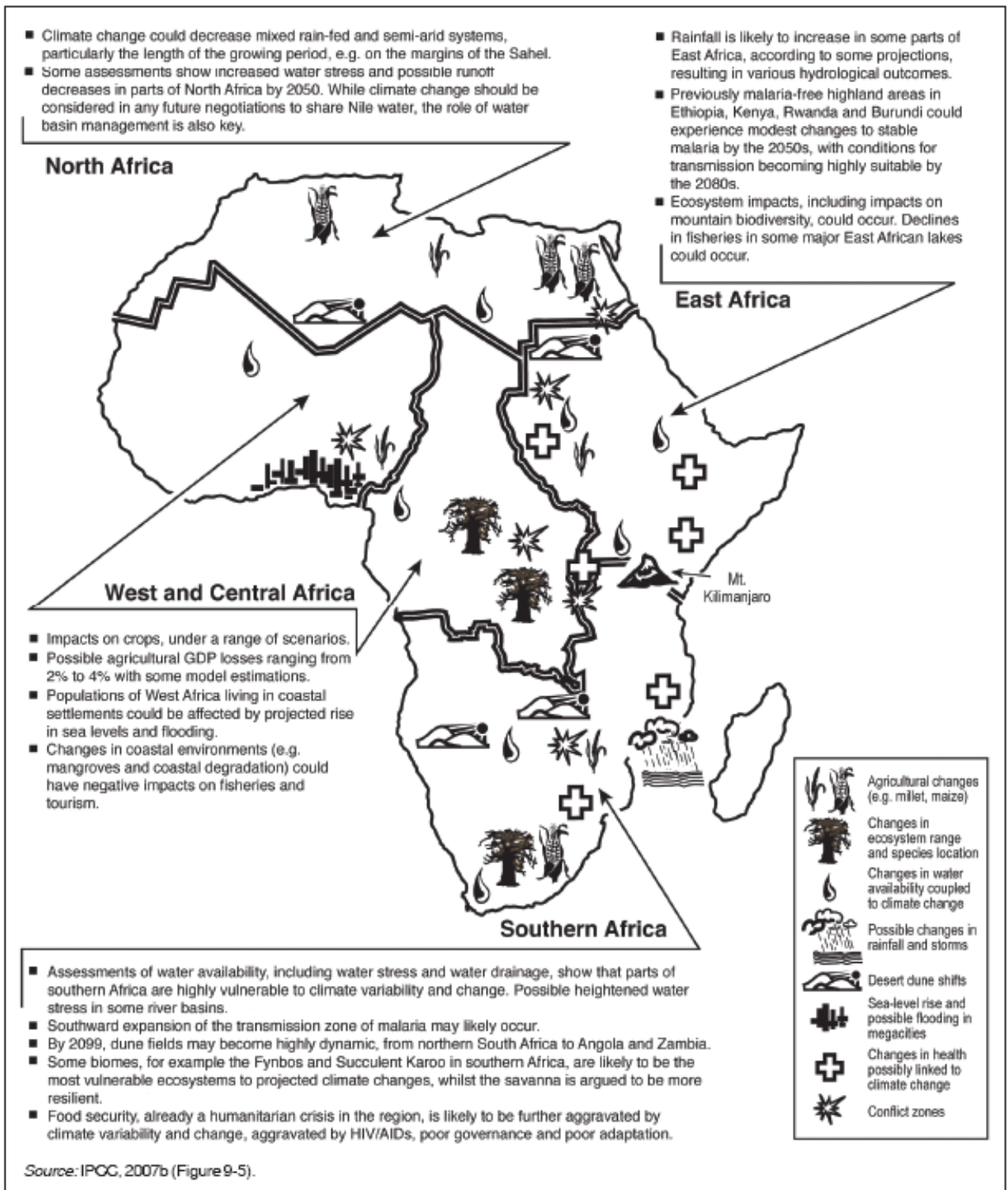


Figure 2-1: Region specific impacts, including anticipated impacts of Climate change in Africa

Source: FAO

The *Stern Review* reported that costs for immediate, strong and urgent action to address impacts of climate change will be much lower than those incurred while reacting to disasters

as and when they occur, thus the need to assist developing countries with resources to fund more proactive and anticipatory climate change mitigation and adaptation programmes (UNFCCC:36, Stern, 2006).

Article 4 of the UNFCCC requires developed states to provide resources to help developing states in their adaptation activities. The Buenos Aires Programme of Adaptation also mentions the need to transfer technologies from developed nations (Annex I parties) to developing countries, as a condition for effective implementation by developing countries. The technology transfer should be able to enhance indigenous technologies and capacities of the developing countries.

Table 2-2 Examples of Developed Countries contributions in addressing climate change in Africa for the period (2003 – 2010)

Country	Amount	Region / Country	Purpose
Sweden	6.3 M €	Africa	Monitoring, predicting and responding to climate threats
Norway	63.1 M €	Tanzania	Programmes to reduce desertification and degradation
UK (DFID)	21.6 M €	Africa	Improving forecasts & enhancing knowledge
Japan	75.3 M €	Africa	Environment and Economy / Low carbon society
EU	20 M €	Africa	Climate monitoring, Climate observation for information used for mainstreaming into development plans in Africa & Disaster Risk Reduction

Sources: UNECA, Norwegian Embassy in Tanzania, AAP/UNDP/Japan, 2010, Climate Change – the challenges for Africa, Climate Change and Adaptation in African Agriculture (SEI, 2008:25)

However, there are questions raised on the funding predictability and adequacy and concerns about developed countries not meeting their part of the bargain. For example, since its inception in 2001, the LDC Fund has received pledges of only US\$ 176M from rich countries, yet it needs US\$ 1.5 billion (UN-OCHA, 2010). The World Bank reports that funding for both adaptation and mitigation has been ‘woefully’ low and inadequate, with only 5% of projected needs met (World Bank, 2010:257). Questions have also been raised whether developing countries are exaggerating costs of adaptation and their ability to manage and spend funds given to them is highly debateable, given the high levels of corruption and poor governance.

Due to high incidence of chronic poverty and illiteracy, diversification of activities is very low, which leads to high dependency on small scale and usually low yielding farming for the rural poor. There is a direct relationship between poverty and impacts of climate change because poverty increases and is also increased by the impacts of climate change. The decade of 1990 – 2000 accounted for more than 97% of all deaths related to natural disasters occurring in the world’s poorest regions, with Africa the worst hit, and with 90% of all natural disasters

weather and climate related (DFID, 2006). The higher the poverty levels in a country, community or household, the lower the adaptive capacity of the poorest. The result is that during the occurrence of droughts or flooding, livelihoods are heavily if not completely destroyed, including property, basic infrastructures and livestock and with no other sources of income; vulnerability is high, which makes resilience and adaptation impossible (A. Challinor et al, 2006).

It's worth noting that the majority of African rural communities and villages lack access to basic services and developments like roads, communication, hospitals, machinery, schools among others. If they do exist, they are either few or outdated. This has increased the vulnerability of the poor in a way that when disasters occur, they are usually caught unaware due to lack of information. The recovery process is often slow and painful due to lack of facilities.

Climate change policies and work plans do exist but as in most developing countries, implementation is very poor and expensive.

2.3 Opportunities for Adaptation

2.3.1 Introduction

This chapter presents adaptation in Africa in general and how rural communities are addressing their vulnerabilities to impacts of extreme events. The chapter also presents two particular case studies from Kenya and Niger showing how rural communities in these countries have approached adaptation to climate changes, particularly droughts and highlights key the achievements therein. It gives an insight on the initiatives, steps and processes taken by the communities, with support from development partners and the respective governments and how they led to reductions in vulnerability. It highlights the similarities and differences as well as the learning points and best practices that can be applied to Uganda.

2.3.2 Coping Strategies from Selected Communities in Africa

Ability to cope and the capacity to respond at the national, community, household and personal levels is very much linked to the levels of social-economic development. Community led indigenous responses, using local technologies and labour have for long existed, with the most common being those used by pastoral communities in Eastern Africa where people moved with their property from areas affected by long droughts or heavy rains to other areas that were not equally affected. This practice still goes on among such communities in Kenya and Uganda (CSTI, 2009). In Niger, communities were sparser and only cultivated small fields amidst conserved bush, thicket and vegetation. Fields were often left to fallow and trees were regenerated to provide wood for energy before being cut down to prepare for the next planting seasons (World Resources:144). This however, has been compromised with the high population increase in the country.

Others include intercropping, utilizing home gardens, crop and herd diversification – for instance introducing goats instead of sheep like in Western Sudan, fertilization and pruning so as to double the tree population and curb soil erosion in semi arid areas which was common in Zimbabwe, Madagascar and Senegal (UNFCCC:35).

In Burkina Faso, water conservation measures have been applied and are still being widely used through the use of the *ZAI* technique, where pits are dug during the dry season to a

depth of 30 cm and a diameter of 10-20 cm. About 12,000-25,000 pits are dug per hectare and filled with composted organic matter. On the onset of the first rains, soil is added onto the organic matter and seeds are placed in between. This practice achieves three major aims in soil and water conservation as well as reduction in soil erosion.

The main advantages of the *ZAI* technique is that it captures both rain and surface water, offers protection to seeds from being washed away, ensures water availability at the beginning of the rainy season, reactivation of biological processes in the soil which eventually leads to the improvement in the soil structure.

However, these have proved to be either not working anymore, inadequate (UNFCCC) or efficient enough in strengthening the resilience and reducing vulnerability (G. Conway, 2009:2) attributed to the increasing scale, frequency and intensity of climate change impacts (WFP CFSVAM, 2007) thus the need to invest in newer technologies or strategies or improvement of existing ones to match the present and future challenges.

2.4 Case Studies from Niger and Kenya

2.4.1 The Nigerien Experience

Table 2-3 Niger in numbers: Key statistics

Population	14 Million
Per capita income	US\$ 240
Average Life expectancy	45 Years
HDI	174/177
Adult Literacy	29%
Under 5 mortality	256/1000

Source: UNICEF The State of the World's children, 2008

Niger is one of the poorest countries in the world, ranking 174 out of 177 countries on the UN Human Development Index (UNDP, 2008). It is part of the Sahel region that is prone to consistent threats of desertification (World Vision, 2007) with approximately four fifths of its territory lying within the Sahara (UNECA, 2001) which makes food production and livelihoods difficult in this part of the world (**Appendix 6.1**). This is not helped by the population growth rates, one of the highest in the world, with the fertility rate at 7.8 births per woman (US State Department, 2010). The country is described as ecologically vulnerable and is expected to have more frequent droughts as a result of climate change (World Resources, 2008: 143). It is affected by chronically low and erratic patterns of rainfall (H. Saleemul et al, 2003), a challenge that will only be multiplied by climate change (IPCC, 2007:444).

Yet inspite of that, the country has, through its farmer-led efforts, reversed desertification which has also seen remarkable increase on food production, incomes, food security and more importantly, self-reliance and increased capacity at the rural levels to cope with drought

(World Resources:142). Niger is now regarded as having one of the most successful natural resource management projects in the world today (World Resources, 2008:153)

By the 1900s, Niger was a sparsely populated country with rural households cultivating small pieces of land surrounded by vast bush and rich vegetative cover. Households were much smaller, relying on sufficient yields as well as an ample supply of wood from the woodlands for fire and lighting.

This however changed during the colonial times in the 1930s when land clearing and tree felling became common as the French colonialists forced Nigerien farmers into encroaching on bushland and forests to grow crops for export (World Resources:144). The colonialists also introduced new land policies that were a disincentive to farmers in such a way that the law stipulated all forests as belonging to the Government and that one needed to buy permits to be able to use them (Brough & Kimenyi, 2002). This made it difficult for the rural farmers to take care of the forests.

By 1960, Niger's vegetative resources were already stretched to the limit and the rapid population growth made the whole situation worse because by 1975, the majority of the remaining natural cover was transformed into farms to feed the growing rural communities (World Resources:145). This action exposed many fields to the often devastating Saharan winds (H. Saleemul et al, 2003), which led to loss of soil fertility and low harvests. The result was the beginning of a series of droughts that have hit the nation quite often.

Earlier interventions to solve the crisis were '*top-down*' based approaches, mainly involving donors and the government and local communities who were most affected, yet were rarely consulted about these projects (Hamissou, 2001:34-35). These efforts were also both very intensive and expensive and included training foresters as well as establishing exotic tree nurseries and fuel wood plantations (McGahuey et al, 2007:4).

According to Tougiani, some 60 million trees were planted in Niger over 12 years - however, only less than half survived (Tougiani et al, 2008:5). This led to the interventions being described as '*ill fated*' (World Resources, 2008:145), principally because the rural communities to whom the interventions were meant to be of help, were left out and therefore, no one was responsible for the maintenance of the wind breaks as well as for enforcing laws against illegal cutting or pruning of the newly planted trees and seedlings at the community level using village level management committees. On the technical side, exotic tree species imported by donors could not adapt to the harsh environment.

Farmer Managed Natural Regeneration (FMNR) Approach

Farmers and individuals are encouraged to practice re-forestation to reclaim bare open lands using native tree species. Sprouting tree stumps are nurtured to grow into trees with the sole purpose of preventing desertification.

Source: World Vision / USAID / World Resources 2008.

It was not until three decades ago that development partners, donors and the government recognised that '*simple and low cost farming techniques*' would be more useful to address drought related problems at rural community levels. Development partners realised that *native* tree species offered the greatest promise because they were well *adapted* to Niger's conditions and

better still provided multiple benefits due to their regenerative capacity, including fuel wood, tuber, cattle fodder and edible leaves (World Resources, 2008:146).

Taking advantage of previously cleared fields, communities with support from intermediary organisations began replanting native trees and shrubs that could regenerate instead of spending already meagre resources in importing exotic breeds that had previously failed. Local farmers had the authority to choose on how much they could grow or harvest and how to use the wood. Community leaders led by example to ensure replicability.

The beginning of this approach was small and controversial with many villagers sceptical and not willing to adopt planting trees together with food crops on the same piece of land (World Resources, 2008:147). However, the motivation came around during the 1988 famine when those farmers that had already adopted the FMNR approach had realised an increase in crop productivity, while those that had not were in dire need of food aid and for one to qualify for aid, he had to adopt the practise as well. The drought served as an incentive to changing behaviour, from a society accustomed to clearing fields to one that practices protection and sustainable management of forests and vegetative cover.

Regeneration, now described as a *practice*, spread from household to household and covered communities and was driven by *self interest* with the motivation coming from an increase in crop yields at the household levels.

More importantly, such results would not have been achieved without considerable input from the central government and international organisations. These two establishments form part of the enabling environment that is crucial for adaptation and resilience to take effect, more so at community levels. Communities, however developed, do not exist alone in isolation and therefore the level of resilience and adaptive capacity is highly influenced by external capacities (J. Twigg, 2007). Favourable land ownership policies, intellectual input, land management expertise, capacity building, education and awareness programmes including funding for research on native species and providing weather information all helped to strengthen the adaptive capacity.

2.4.2 Kenya

Kenya has been described as a water scarce country (GoK & UNESCO, 2005). Climate change impacts have already left a negative mark on East and Central Africa's largest economy and are expected to hit the country even harder, with more threats on water availability, food security and agriculture, human and animal health and tourism among other sectors (CSTI, 2009), especially considering that it is approximately 80% Arid and semi Arid (GoK, 2009).

Figure 2-2 shows the diminishing available storage per capita of water in Kenya over three decades.

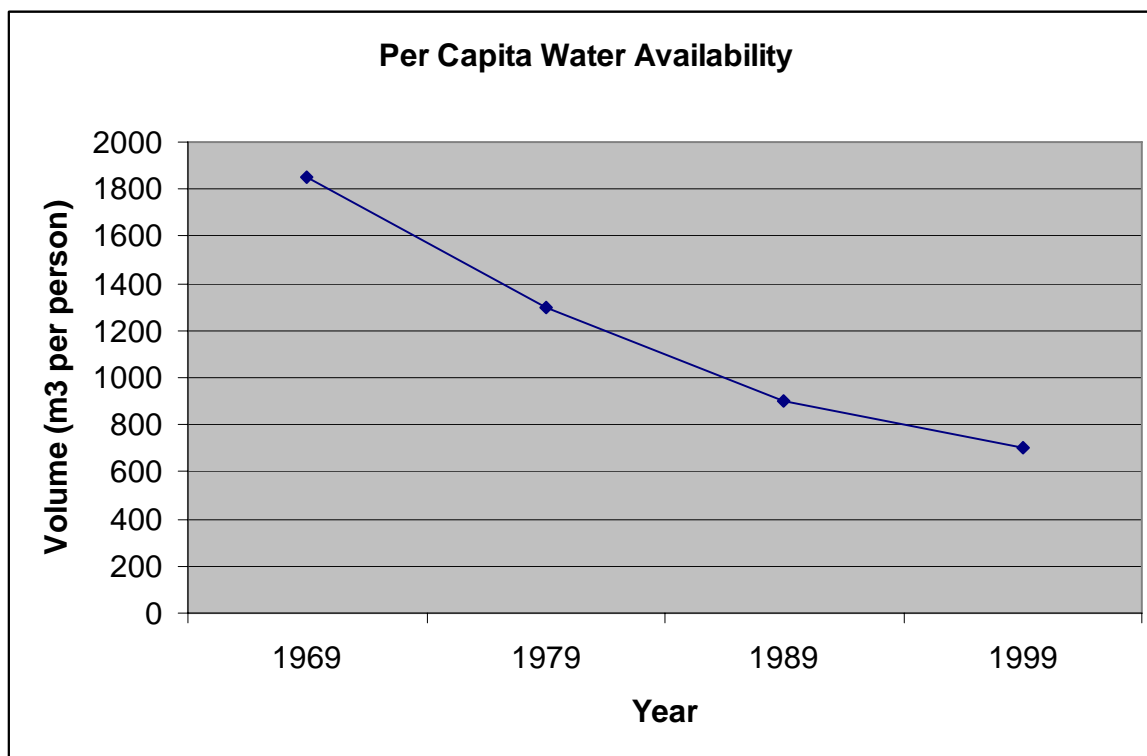


Figure 2-2: Water Availability in Kenya Per Captia

Source: UNESCO / Kenya’s Ministry of Water and Irrigation, 1998

Per capita water availability in Kenya has been on the decline and climate change has contributed to this state of affairs due to the recurrent droughts that continue to hit the country even up until now.

The main climate change impacts in Kenya recorded are the unpredictable weather patterns, including the increase in frequency and magnitude of droughts, floods, hotter temperatures and rising of the sea levels (UNEP 2006, CSTI/GoK, 2009). The country’s history of these events include the ‘devastating droughts’ of 1991-92, 1996-97 and 1999-2000. In between were the floods of 1997-98 as well as the 2007 floods between July and October that caused a lot of damage in East Africa (UNEP/GoK 2000).

These have resulted in degradation of catchments, siltation in and around water bodies originally meant for water supply and hydro power generation, worsening water quality, rivers drying up and lake levels receding at an alarming rate (GoK, 2005). There have been reports of cases of conflict, some of which were violent amongst communities caused by increased competition on the few available water sources throughout the country (UNESCO).

Like all low income countries, its the poor rural communities that are hit hardest and communities in Kenya are no exception to climate vulnerability. In the Sakai sub location east of the country, extreme weather events have greatly affected the communities’ livelihoods due to the ever increasing droughts and erratic rainfall patterns. The area has also been hit with a string of recent flooding, all of which have led to;

- Household food insecurity that leads to hunger and starvation and malnutrition;
- Increased conflicts due to competition of already scarce recources especially water;
- Reduced livestock feeds;

- Loss of cattle;
- Insufficient wood for cooking;
- Increased food prices;
- Vulnerability to disease;
- Increase in poverty rates as livelihoods are severely affected;

In an effort to reduce the worsening of these challenges, a community resilience project was initiated with support from UNEP, GEF and the Kenyan Government whose main objectives were to increase food security at the household levels by combatting drought, poverty reduction by improving livelihoods and incorporation of climate change and adaptation into the planning process (CSTI). Local communities were engaged at all stages.

Some of the key interventions to strengthen resilience were:

1. Regular weather information dissemination at a ***'downscaled'*** level, where communities and farmers were given information converted from the scientific form to a more simple one easily understood by locals. This was important to know what crops to grow and how much to cultivate amidst the uncertainties.
2. Training of community members on appropriate agricultural practices through the use of demonstration sites, farmer to farmer training that promotes replicability.
3. Use of cropping calendars, which outline the suitable farming and animal husbandry activities that should be undertaken during the rainy and dry seasons.
4. Construction of dams for easy accessibility of water. The idea used here is that the dams trap excess water during the rainy seasons and then the people can use this water for both domestic and agricultural uses during the dry seasons. For maintenance of these dams, a selection of community members was made and they were trained to ensure sustainability of the dam.
5. In an effort to diversify the local rural economy, local groups were formed and trained in both entrepreneurial and financial management skills as well as establishment of a micro credit scheme aimed at providing financial services and advice to the communities. This ensured that dependency on farming was reduced.

2.5 Analysis / discussion

Both case studies highlighted the fact that solutions to addressing the impacts of climate change are largely home based and lie within the communities themselves. Interventions began with involvement of local people themselves in the planning and implementation of activities. Development agencies and the government only came in to fill gaps that could not otherwise be filled by locals especially financial and technical support.

In both cases, the concept of resilience within the community goes beyond coping strategies or paying attention to the local peoples vulnerability to the disaster and subsequent needs during the emergency. Here, both cases show that resilience involves much more attention to what communities can do to and for themselves and how their capacities can be made stronger.

Both stress the importance of communication and information sharing, particularly when it comes to weather information. This is the key to any community based climate change adaptation and resilience strategies (CSTI, 2009:13, FAOSTAT, 1999) because it prepares communities by way of knowing for instance, what crops to grow and when, as well as what activities should be carried out in relation to the prevailing weather. Information on weather should be relayed in a meaningful and timely manner. If communities know that there will be delayed rains for instance, they can also practice more water efficiency measures. Information on anticipated heavy downpours can help them be prepared to engage in flood protection and water harvesting measures. The Information must also suit the relevant stakeholders (Buenos Aires PoW:1).

Community participation at all levels of the project cycle is key. This is justified because it is the rural communities which are most affected by impacts of climate change and therefore must be involved and take lead in most adaptation initiatives. This promotes a sense of ownership and sustainability.

One of the key issues / elements here is the role of the enabling environment in the form of development partners. Climate change adaptation in developing countries requires support from the developed nations principally because they lack the financial and technological resources to implement adaptation and resilience programmes on their own (UNFCCC). In both cases, positive results would not have been achieved without foreign support in form of money and technical capacity.

Under the Programme of Action for the LDCs for the 2001-2010 decade discussed in the 3rd UN Conference on the LDCs in 2001, there was recognition amongst all parties that adaptation to climate change impacts should be handled using the principle of ‘common but differentiated’ responsibility. LDCs contribute least to greenhouse gas emissions yet they are the most vulnerable. They should identify vulnerabilities among themselves and possible adaptation measures while the developed partners should provide the financial and technological support (UN, 2001a).

Perhaps the most important similarity is the use of small land holder farmers to be at the forefront of strengthening resilience at the community levels. More than 80% of people in Sub Saharan Africa are directly involved in agriculture and farming and of these, more than 75% are in rural areas. The majority use unsustainable farming practices including land clearing, bush burning, over stocking and encroachment on both swamps and forests among others, all of which exacerbate climate change impacts, thus the need to target them.

Simple technologies and practices that suit the local conditions and can easily be replicated. The use of micro-irrigation schemes for instance is one such technology. Water trapping mechanisms are put in place to trap excess water during the rainy seasons, after which it can be used during the dry seasons for both agricultural and home consumption.

Synergy and integration of adaptive strategies to fit into government’s key development priorities as well as achieving the MDGs, mainly halving poverty, environmental protection and reduction of disease. In both cases for instance, small land holder farmers were encouraged to plant more trees as per the authorities’ development plans to safeguard the environment as well as for promoting economic gains. This made them feel part of the development process because they took part in the implementation of government’s priority activities.

There is no single formula, policy or strategy sufficient to address the impacts of climate change and vulnerability. Resilience, mitigation and adaptation involve a collection of strategies that will address issues that lead to vulnerability. Responses and resilience to climate change should take a proactive and anticipatory approach, instead of a prescriptive and reactive one, where communities often react as and when the disaster occurs. An anticipatory approach ensures that communities are kept aware of what is currently going on and what is likely to occur in the future and are therefore given enough time to act and prepare so that by the time the disaster occurs, losses are minimized. Diversification of activities is also important particularly for those in rural areas because it ensures that if one source of livelihood is destroyed by flooding or persistently long droughts, there other sources that can supplement household income.

2.6 Situational Analysis – Uganda

2.6.1 Introduction

This chapter is a presentation of climate change in Uganda and how the country, described as one of the poorest and most vulnerable to the impacts of climate change is addressing the challenges. Different predictions based on various climatic models are also addressed. It also describes Teso Region, the geographical scope of this study.

Table 2-4 provides some figures on key social economic indicators about the country.

Table 2-4: Key social-economic statistics about Uganda

Key Theme	Facts
Population	<ul style="list-style-type: none"> Total – 31,657,000
Economy	<ul style="list-style-type: none"> HDI rank – 157 out of 182 GDP per main economic activity; Agriculture – 29%, Services – 53% & Industry – 18%
Health	<ul style="list-style-type: none"> Life expectancy at birth - 53 Infant mortality rate – 85/1000 live births Access to safe water – 52% Access to sanitation – 79% Population per doctor – 20,000
Education	<ul style="list-style-type: none"> Primary school enrolment – 86.7% Primary completion rate (Males 66%, Females 44%) Secondary completion rates (Males 20%, Females 17%)
Energy	<ul style="list-style-type: none"> Access to electricity – 3%

Sources: UNDP 2010, UNICEF, World Bank, IMF, WFP

Uganda, though having graduated from the Least Developing Country (LDC) category to the Medium Developing Country category in 2009 at position 157 out of 182 countries (IMF, 2010 & UNDP 2010), it is still described as one of the poorest countries in the world, with GNI per capita of only approximately US\$ 1,140 per annum, compared to countries like Sweden and Norway ranked at US\$37,780 and US\$59,250 respectively in 2008 (World Bank, 2009). The graduation from one category to another that is higher does not directly translate to reduced vulnerability to threats of climate change in Uganda, at least in the nearest short and medium term especially when it is referred to as one of the most unprepared and vulnerable countries in the world (CIGI, 2007).

Uganda's economy and welfare of population, like the majority of other African economies is heavily reliant on the environment and natural resources (Uganda NAPA, 2007) and the situation is expected to remain so for decades especially with climate recognised as one of Uganda's enabling sectors (NDP 2010), a point that reiterates the need to build and strengthen the resilience and adaptive capacity of local communities to be able to adapt to threats and nature-based disasters as they come. Failure to do so increases vulnerability. This is because of

climate's role in determining the performance of other key sectors of the economy, for example forestry, tourism, agriculture and fisheries.

It also implies that for the country to meet its development needs and attain the MDGs, climate change causes and impacts must be addressed, more so when more than 80% of the population is rural based and is dependant on the agricultural sector directly or indirectly (NEMA 2001 & WFP / FAO, 2007).

Vulnerability in Uganda, particularly on its agricultural sector on which the country depends and derives considerable foreign exchange capital is high (J. Keane, et al, 2009). No single region is immune to vulnerability although the Eastern and North Eastern parts of the country are more vulnerable than the other regions as evidenced by the increasingly recurrent droughts and flooding (UNFCCC, The New Vision 2007).

Agriculture's contribution to total GDP has been declining and one of the key reasons for that has been due to the impacts of extreme events. Poor, erratic rains and persistent prolonged droughts particularly in the Eastern, Northern and North Eastern parts of the country have been mentioned as some of the key reasons causing the decline (The New Vision). Under the services sector, tourism and travel are the key contributors to GDP.

Figure 2-3 indicates the most vulnerable parts of Uganda where extreme events are now occurring on a frequent basis.

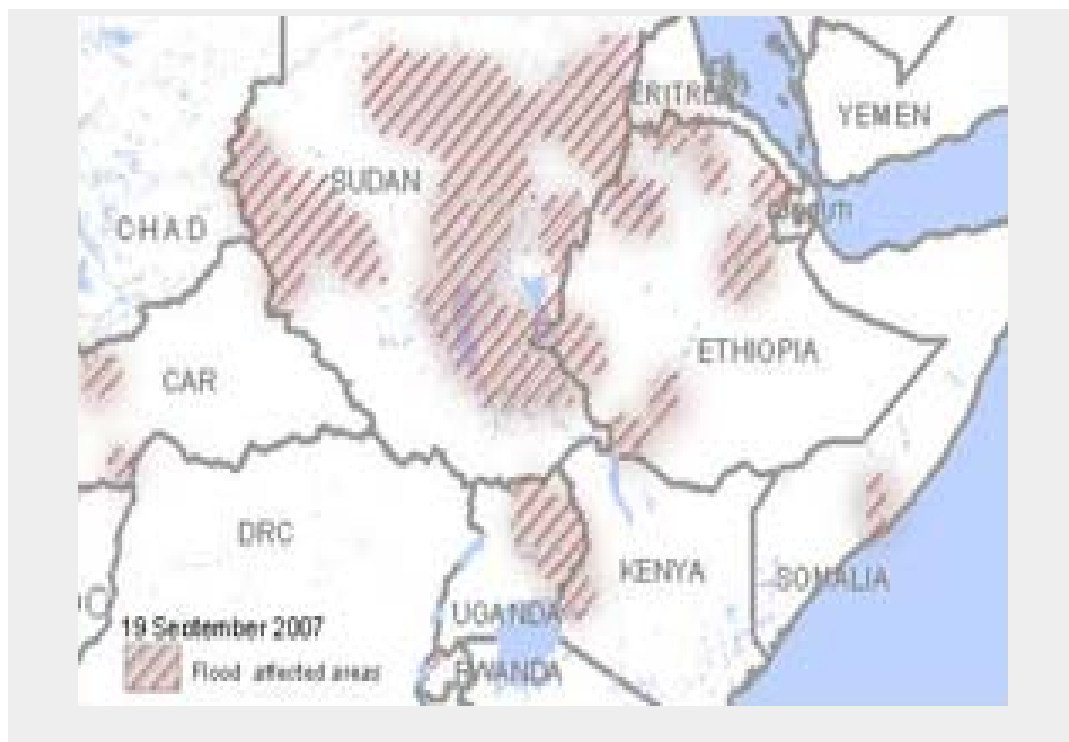


Figure 2-3: Map of the East African Region showing Uganda's most affected and vulnerable areas with regards to floods.

Source: UNOCHA 2009

2.6.2 Climate Change Predictions from various Models for Uganda

According to several accounts, Uganda is largely predicted to become wetter with more frequent rains this century (IPCC, 2007).

There is likely to be an increase in mean annual temperature of between 0.7^o C and 1.5^o C by 2020 and by about 4.3^oC by 2080 (DfID, 2008, WFP).

There are predictions too as regards changes in occurrence of extreme events in relation to severity and frequency with some models predicting an increase of 20-30% increase in extreme wet conditions at medium CO₂ emission scenarios (S.Eriksen et al, 2008 & DfID, 2008).

According to the IPCC and DfID, temperature increases in Uganda are more certain and likely to occur by 2020 than the rainfall changes which are also expected but less certain and these will have impacts upon water resources, food security, human health and the eco-system diversity.

2.6.3 Evidence of Climate Change and related impacts

Frequency and intensity of droughts has been noted over the past three decades. Drought is referred to as the key effect of climate change in Uganda (Government of Uganda, 2007). Seven of them were experienced between 1990 – 2000 (Uganda NAPA, 2007) affecting up to more than one million people's food security.

The melting of the ice cap on Mountain Rwenzori in South Western Uganda, the third highest peak in Africa has increased and has affected livelihoods including tourism. According to the climate change Unit of the Ministry of Environment, the highest peak of the mountain was covered with 536 acres of ice in 1906 but this was reduced to just 45.7 acres by 2006. The unit explains that much of these changes have taken place in the last 20 years as evidenced by satellite images taken in 1987 and 2005. Both the National Environmental Management authority and the Ministry of Environment attribute this to global warming.

The frequency of El Nino rains have increased incidents of infectious diseases like malaria, dysentery, cholera and have caused infra-structural damages. The most severe incident of El Nino rains occurred in 1997/98. Besides causing great infra-structural damages and leading to loss of hundreds of lives, the El Nino induced floods caused an estimated 60% drop in agricultural exports due to a destroyed transport system as well as destruction of fields of crops. Upto to more than 300 ha of grain were reportedly destroyed (Uganda's Report to the UNFCCC, 2002). Relatedly, there are incidents of unusually heavy amounts of rainfall that have lead to flooding, the most recent occurring in 2007 (Uganda NAPA). According to the IPCC, Uganda is expected to become wetter with more heavier rains than normal expected.

2.7 Contributing Factors to Increased Vulnerability

2.7.1 Deforestation and Land Degradation

Deforestation and land clearing have been taking place in the country for decades, though the practise has intensified over the years due to the expansion of subsistence farming at household levels. These activities, alongside the increasing climate variability, surface and groundwater pollution as well as over harvesting of natural resources are listed as the main environmental challenges facing Uganda today (NEMA, 2009). More land is encroached upon

within forests and reserves, which is currently the biggest challenge faced by the Government when it comes to protection of its reserves (NEMA, 2009).

Land degradation and swamp reclamation to create more space for agricultural land, housing and infrastructural development, all of which trigger flooding during the rainy seasons are a common practise both in the rural and urban areas. The destruction of wetlands has largely gone unpunished and ordinary people are further encouraged by the fact that senior political figures and parliamentarians themselves are also constructing houses and other developments therein, an indication of the poor institutional and legal frameworks within the country. A closer look at the situation shows that deforestation occurs at a rate of 2.2% annually with key drivers for this trend being high population growth rates. Ninety percent rural dwellers depend on firewood for their cooking needs. On a generational time scale, Uganda has lost up to 1.3 million ha of its forest cover (26%) between 1991 – 2005, a deforestation rate that will make the country lose its forested land by 2050 if unchecked (NFA 2009, NEMA 2009, J. Bburnett 2009 & W. Kakuru, et. al, 2004).

2.7.2 Weak Institutional Capacity

Poor policies coupled with weak institutional and legal capacity, corruption and nepotism hamper protection efforts. Patronage and presidential *'priviledges'* where local people have *'free reign'* over forest reserves to exploit and use them indiscriminately in exchange for votes are common. For example, the president has persistently been at odds with the Uganda National Forestry Authority (NFA) – an institution formed by an act of parliament to protect the country's forests, and has repeatedly halted forceful eviction of illegal settlements within protected forests claiming that the poor people need land to stay and grow their own food as well as meet their energy needs. However, the NFA regards this as a pure political tool (J. Bburnett, 2009).

2.7.3 High Population Growth Rates

The country has one of the highest population growth rates in the world, with current fertility rates standing at 6.7 children per woman (UNFPA & WFP), compared to the global and African average of 2.7 and 5.1 respectively (PRB, 2006). The Washington DC based Population Reference Bureau also reports that Uganda's annual growth rates stand at 3.1%, way above the global average of 1.2% (A. Herro, 2006). According to the Uganda NAPA, population growth rates are actually highest in the most vulnerable areas, which puts more pressure on the already vulnerable eco-systems. Coupled with poverty and illiteracy and having the highest population density in the region, high populations result into over cropping, over grazing, deforestation, swamp encroachment and other unsustainable practices.

Figure 2-4 shows the growth trend of Uganda's population from the period 1969 to 2008, an approximately threefold increase within forty years.

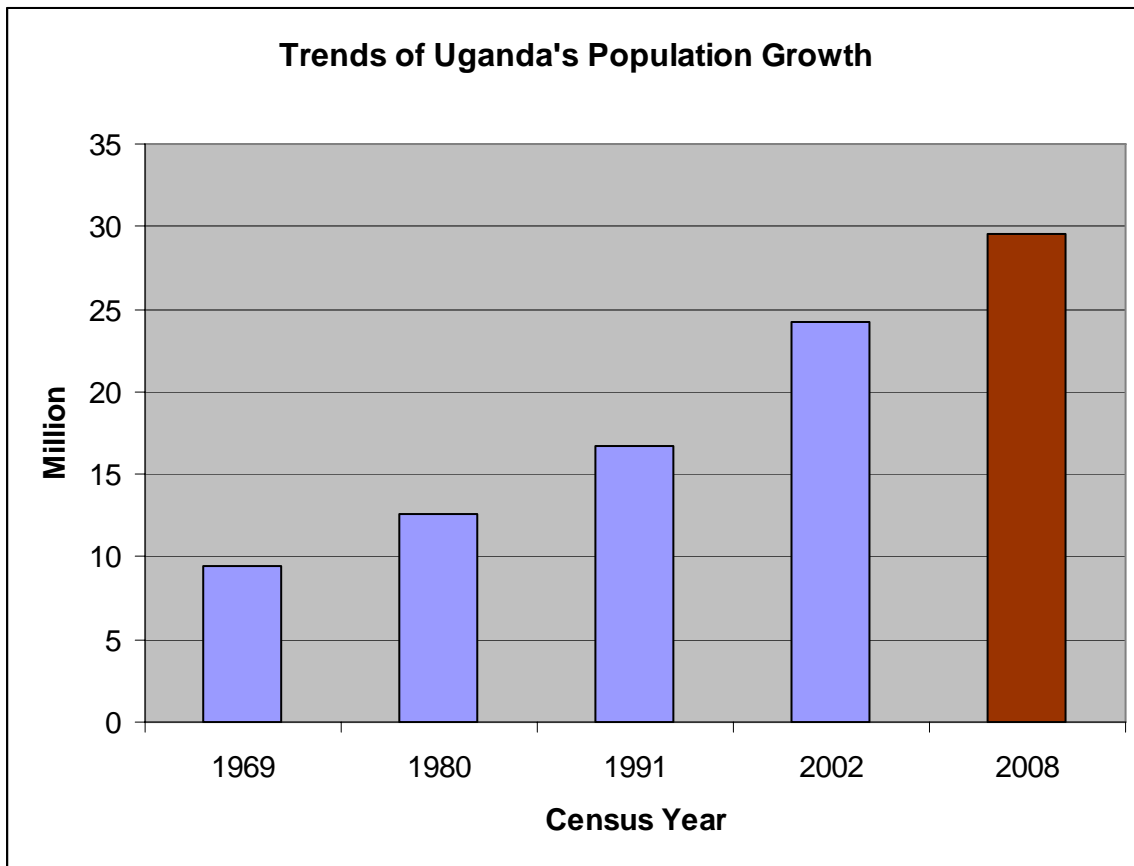


Figure 2-4: Uganda’s Population Growth Rates

Source: Uganda Bureau of Statistics, 2008

The United Nations has described this growth rate as alarming and *worrying* (The New Vision, 2009), especially because it is not matched with economic growth and development, a factor that plays a crucial role in increasing the adaptive capacity of individuals and societies (IPCC, 2007).

2.7.4 Unsustainable Land Use

Poor farming methods like bush burning, over cultivation, over grazing, monoculture, over cropping and over stocking play a significant role in exacerbating disasters attributed to climate change. Bush burning is the cheapest and most common way of killing pests as well as unwanted vegetation yet it contributes to production of CO₂ and exposes land to degradation and loss of vegetation (UNCCD, 2002). Additionally, soil structure is affected through erosion, compaction and emergence of unwanted low-value vegetation as seen in the pastoral areas of North Eastern Uganda, all of which play a role in increasing vulnerability (W. Kakuru et al, 2004).

2.8 What Uganda is doing on Climate Change Nationally and Internationally

The non-existence of a national climate change policy until now could be an indication of the fact that climate change, including mitigation and adaptation processes is either inadequately understood in the country or is not a priority. The National Adaptation Programmes of Action describes it as a '*phenomenon*' that is only understood by the minority in Uganda most especially the Ministry of Lands, Water and Environment (MoWLE), development partners as well as academics including university students (Uganda NAPA, 2007). At the Governmental level, Uganda has established a Climate Change Unit (CCU) at the Ministry of Water, Lands and Environment, whose main roles are as follows;

1. to serve as the focal point of the UNFCCC to spear head objectives of the UNFCCC in Uganda.
2. it coordinates (Lead Agency) climate change actions within the country by various actors as an institution mandated by the Ministry of Water and Environment.
3. to sensitise different actors / sectors to meet their roles including ministries, departments, schools and the community.
4. to monitor and implement climate change actions by different stakeholders
5. to serve as the National Designated Authority for CDM projects (Approval and Implementation)

One of the key mandates of the CCU is to make preparatory steps for the formation of a national climate change policy. At present, the CCU is running a roadmap supported by the Royal Danish Embassy in Uganda to a tune of US\$ 400,000 from 2010 up to 2012, with the aim of coming up with a policy. However, the unit faces challenges of funding especially with the government part of the bargain still not coming in as planned and donors are never willing to release money unless the government shows commitment first. The unit is also under funded, only receiving a total sum of US\$ 100,000 for the financial year 2010/11 (CCU, 2010). According to the unit, this is just a drop in the ocean considering the magnitude of the challenges brought in by climate change and the activities it is expected to do.

Integration of climate change as a development issue into the new National Development Plan (2010/11 – 2014/15) is a positive step. Realisation that climate change affects development and should thus be addressed as a development issue is an indication of commitment by the Government. Among the key strategies aimed at strengthening adaptation and resilience especially at the community levels are capacity building using both institutional and human development, increasing climate change awareness through education and training at all levels including the role of emissions and poor unsustainable practices at village levels and provision of incentives for avoided or reduced malpractices (NDP, 2010:317).

Internationally, Uganda signed the UNFCCC on the 13th June, 1992 and ratified it on 8th September 1993. The main obligations of the country are to adopt appropriate adaptation and mitigation mechanisms to address causes and impacts of climate change and undertake educational and awareness activities. However, the treaty is not yet incorporated into local legislation at various levels, while key national sectoral policies are also yet to integrate climate change including the oil, mining, manufacturing and transport sectors primarily due to low levels of capacity and limited financial resources (NDP, 2010).

Few achievements have predictably been attained in the implementation of the convention in Uganda most notably the Forests Absorbing Carbon dioxide Emissions (FACE) project aimed at massive reforestation and enrichment planting of previously degraded protected areas in Eastern and Western Uganda as well as building the capacity of the Meteorological department to provide timely climatic and weather information (NEMA & MoLWE).

Uganda has also launched the National Adaptation Programme of Action (NAPA) in 2007, born out of the Seventh Conference of Parties in Marakech, Morocco (CoP 7). The main talking points and priorities are reforestation, climate change awareness at all levels including village and community levels and utilisation of early warning information particularly for the agricultural sector. However, its implementation has been dodged by the lack of sufficient funds and more importantly the lack of skilled manpower required for writing and preparing detailed proposals and mobilisation of funds (MoLWE).

The Government is also working together with the United Nations through the Five Year *United Nations Joint Programme on Climate Change in Uganda* that started in 2010. Several UN Agencies will provide financial, human and technological resources to assist the Government in the mitigation against future climate change and build its adaptation capacity to the changing climate at National, District / Provincial and Community Levels.

Table 2-5 illustrates some of the activities and interventions.

**Table 2-5: The United Nations Joint Programme on Climate Change in Uganda.
Joint Programme Package**

Strategy	Activities	Agencies involved	Geographical scope
Policy & Planning	Support formulation of a Climate Change policy and its implementation	UNDP, FAO, WFP, OCHA, WHO, UNCDF, UNEP, UNFPA, UN-HABITAT, UNESCO	National
Finance	Support Development of Government climate change Fund	UNCDF, UNEP	National
Research	Support government to develop a climate change research agenda as well as a platform to share climate change adaptation and mitigation best practice	UNEP, UNDP, WFP, FAO, UNESCO	National
Advocacy	Delivery of climate change sensitisation campaigns, capacity building in areas like disaster risk reduction and contingency planning in drought and flooding prone areas	UNDP, WFP, FAO	District & Villages
Complimentary Inputs	Automatic weather stations, Early Warning Systems, Watershed management, Environmental Protection, Livelihood diversification	WFP, FAO, UNSECO	District & Villages

Sources: United Nations World Food Programme - Uganda Country Office, 2010

The involvement of various UN Agencies - all of whom are present in Uganda in the policy formulation and implementation as well as research stages is a clear indication of the magnitude of the problem of climate change impacts and threats in Uganda. It also indicates the need for a clear policy to offer a direction if any of the interventions mentioned are to be fully achieved. The MDGs as well as Sustainable Development cannot be achieved if climate change is not addressed because it influences all the aspects of the MDGs.

2.8.1 Implementation Challenges

Conflicting targets and objectives between the development partners and the Government. While there are calls to check the alarming population growth rates from the development partners (UNFPA, 2010), the President on the other hand is quoted in various media outlets as encouraging population growth, even calling it a resource and a blessing.

Limited funding is a big problem. According to the Climate Change Unit, during the last financial year 2010/11, the unit was only given US\$ 100,000 for activity implementation, an amount seen as inadequate to carry out its activities sufficiently and to the satisfaction of all stakeholders, including the community at the lower levels who have not been sensitised enough on climate change issues. This, according to WFP, is an example of lack of political will or commitment, which is also backed up by the fact that there is no policy in place to address issues of climate change.

2.9 The Teso Region

2.9.1 Teso Region Profile

The Teso Region, located in North Eastern Uganda, is composed of six administrative districts namely; Soroti, Kumi, Katakwi, Kaberamaido, Pallisa and Amuria Districts. It's located between 1° 30' N and 2° S Latitude and 33° E and 34° 15' W Longitude, with a total land area of 12, 864.3 sq. km (Ministry of Finance, Planning and Economic Development). The region borders the drought prone Karamoja region in the North East, Lango and Acholi regions, which have both gone through more than two decades of civil war but are now under recovery to the North and West and the Busoga region in the South. The region is part of the cattle corridor that is characterised by droughts and recent flooding in 2007 (DSOER, 2004).

Figure 2-5 shows the Teso Region as well as its position in relation to the remainder of Uganda.

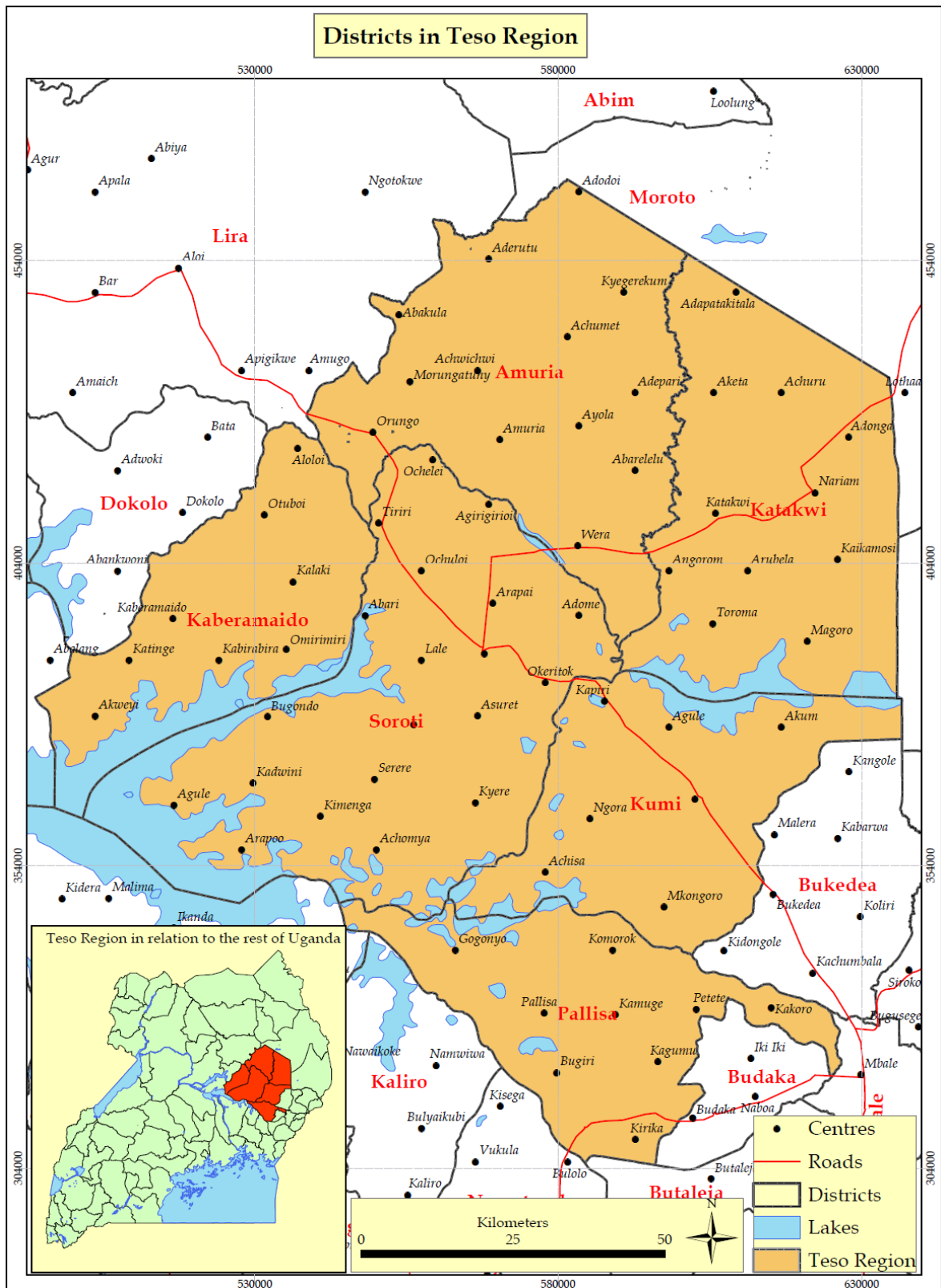


Figure 2-5: Map of Teso region in Uganda

Source: Vulnerability Assessment and Mapping Unit - UN World Food Programme Uganda, 2010

2.9.2 Population

The region has an estimated 1.5 million inhabitants (6.6%) of the total national population and an average population density of 121.3 people per sq. km. According to the Uganda Bureau of Statistics, the region has the highest population growth rate of 5.1% (The Daily Monitor, 2009), much higher than the national average of 3.1%. This trend in population growth for a region prone to impacts of climate change particularly droughts and flooding is worrying as it presents situations of too much pressure being applied on the few resources available like land and environmental resources like forests and swamps. A lot more land is needed to grow food as well as provide shelter for the growing population, most of whom are chronically poor.

Table 2-6: Teso Region Population per District (2007 Projections)

District	Males	Females	Total
Katakwi	69,586	74,766	144,352
Kumi	158,741	171,845	330,586
Soroti	231,313	243,255	474,568
Kaberamaido	78,618	82,581	161,199
Amuria	126,153	141,707	267,860
Bukedea	71,717	78,650	150,367
Totals	736,128	792,804	1,528,932

Source: Uganda Bureau of Statistics, 2007

2.9.3 Main Economic Activities and Livelihood

The region, like majority of other regions in Uganda is predominantly agro based with subsistence farming the main mode of farming practiced among the majority of the population. According to the Ministry of Agriculture, Animal Industry and Fisheries, as many as 80% of the inhabitants in Teso are directly involved in farming on one way or another, regardless of the scale (MAAIF, 2007). Both food crops and cash crops are grown, mainly cereals including sim sim, millet, beans, potatoes and cassava. In addition, a number of the households practice animal husbandry at varying levels, including sheep, cattle, goats as well as poultry. Other key economic activities include small scale industries like metals and mechanics, carpentry, service industries like retail and wholesale shops, banking and schools, among others.

Being a predominantly agricultural region, it means that the majority of the population heavily relies on climate and environment based resources and any variations in climate impact heavily on the livelihoods of the local communities through for instance causing food insecurity. Dependence on wood fuel and charcoal as the main source of energy & cutting down of trees is also rampant.

2.9.4 Climate Change in the Teso Region and its Key Impacts on Livelihood

The Teso Sub Region has greatly been affected by impacts of extreme weather events mainly in the areas of agriculture and food security, health and water. This, in turn, has affected the local economy and livelihoods of the communities plus the overall development of Uganda as a whole. Floods and droughts are the key manifestations of climate change in this part of the country. The 2007 floods from June to November were the heaviest in the last 35 years and the region was the worst affected of all regions in Uganda (FAO/WFP, 2008). The region has also faced prolonged dry spells in 2008 and 2009.

The second rainy season for 2010 has also provided inadequate and ineffective rains as evidenced by August 2010, which, traditionally is supposed to be a very wet month but has been described as the driest August witnessed in the Teso region in the last decade by the farmers during the field data collection exercise. These extreme events have affected crop production thus leading to low agricultural yields and food insecurity (WFP, 2007) as well as increases in incidents of water borne diseases within the region (OXFAM, 2008). Figure 2-7 indicates some of the losses of agricultural yields in Amuria district, part of the Teso region as a result of the 2007 floods. Key food items are indicated.

Table 2-7: Planted Area and Area Lost from Amuria District: Report on the effect of water logging and Floods in Amuria District, Teso Sub Region

Crop	Planted Area (ha)	Lost Area (ha)	Productive Area
Cassava	9,110	5,193	3,917
Maize	2,061	453	1,608
Ground Nuts	13,725	5,902	7,823
Beans	2,371	1,138	1,233
Soya Beans	209	100	109
Sweet Potato	3,281	1,542	1,739
Rice	1,113	223	890

Source: FAO/WFP, 2008

Even before the 2007 flooding, there were documented cases of unusually erratic and heavy rains most notably in 1961/62 and 1997/98 rains and droughts, the worst of which is said to have occurred in 1993/94, 2004/5/6 and 2008 (DFiD, 2008). Being a predominantly rain-fed agricultural based society, the region can be described as vulnerable because any variations in weather patterns and the occurrence of extreme events exposes the local communities to threats of reduced agricultural productivity, less water resources, water borne diseases and general loss of livelihood.

3 Presentation of Research Findings

3.1 Introduction

This chapter reports on the major findings of the research for question 1 regarding empowerment of local communities and what they need to lead intervention efforts when it comes to addressing impacts of extreme events. Results in this section are explained by way of presentations as well as discussions of the key thematic areas that were identified when collecting primary data. Subsequent discussions are intended to both reiterate what other authors and writers have said about the concepts of climate change, resilience and adaptation at community levels especially in poor African rural communities as well as the wider world in general.

3.1.1 The Participatory Rural Appraisal Technique (PRA)

For purposes of answering the first question, the PRA methodology was applied. The FAO describes the PRA methodology as a tool that enhances the;

‘...feeling of a greater degree of ownership and responsibility in the rural poor for better results and social acceptance of the programme...’ (FAO, 2003). It’s a tool whose methods are aimed at enabling local people to share, analyse and enhance their knowledge of life and conditions, to plan and to act accordingly (Chamber, 1994).

The main advantage of the PRA model is that it helps in ***‘breaking the silence of the poor and disadvantaged groups’*** in society and recognises the importance of collective local knowledge. With PRA, the local people themselves prioritise their own needs because they know more than anybody else what affects them and thus eliminates the likelihood of ‘foreign’ interventions being imposed on them. In a way, the local people participate in their own development.

The PRA methodology ascertains needs of a community, identifies key priority areas for intervention within a community and can also be used during the actual implementation of given projects in rural areas. Much of this information may not easily be obtained by use of other conventional techniques like the use of questionnaires especially being that these are rural people and it was a planting season, meaning that community members would not have time to fill the questionnaires because they would be exhausted from the day’s work. The issue of inability to read and write also arises and justifies the use of the PRA approach in this case. Many of the rural dwellers cannot express themselves or their views in form of reading or writing. Questionnaires would therefore require more enumerators to cover more households and that means more time and financial resources.

Table 3-1 shows the advantages of using PRA as opposed to other conventional means, with particular regard to this research.

Table 3-1: Benefits of using the PRA methodology compared to conventional means for this particular research

PRA	Conventional Means
Empowering the poor and weak to assert their priorities, make demands and act	Questionnaires prepared way in advance and key issues on ground are usually neglected. A structured questionnaire limits the interviewer to ask what is required of him in the majority cases
Community participation in the appraisal, implementation, monitoring and evaluation of activities	In most cases, more questionnaires are required, usually long ones so as to be able to include as much as possible
Expression of local diversity	Time consuming
Triangulation: Using different methods and a number of informants to get closer to the truth	Higher risk of prompting answers from the interviewee

Source: FAO, 1997 & 2003

3.1.2 The main tools of PRA applied in the field

The PRA can be applied using a number of tools to derive information at community levels. For this particular research, the following tools were applied to collect data on a number of key issues;

- The priority matrix, ranking or proportional piling: With this tool, after the communities have identified, for example, the key problems and their respective intervention mechanisms / areas, they rank them in priority order which one should receive higher attention. For this particular study, 100 stones were used each time priorities or problems were identified and stones placed on each. The one with the highest out of 100 indicated the highest priority and the reverse is true for the lowest.
- Maps: These were used to identify locations, particularly villages and households that are said to be more affected by impacts of extreme events. Locals collectively agree on these areas since they know them more than the outsiders. The maps were also used to allow locals to place priority interventions on locations they thought needed those respective interventions. For instance, for locations that required infrastructures like hospitals or schools, the locals would place symbols depicting them on the map.
- Other tools used were the transect walk, which describes and shows locations and distribution of community resources and main landuses (World Bank n.d) and direct observations, which were mainly used to reduce bias. These were crucial in providing information about the general livelihood situation in Teso region, including the food security situation at both household and community levels, coping strategies during times of crisis, community assests like health centres, water sources and natural resources.

3.1.3 Application in the Field

For this research, community sensitisation about the research project to be done was first carried out by taking advantage of WFP's regular field activities. As WFP carried out its work in the communities, the thesis author simultaneously informed community respondents of an up-coming research that required their presence and contribution. This was the cheapest and most ideal method of sensitisation and awareness.

The actual sessions began with the author presenting the aims of his study assisted by an interpreter to be able to keep communities involved. The devastating floods of 2007 provided the foundation and stimulation for the villagers to present their views of how events unfolded, especially a week before the floods happened, during the actual occurrence of the flooding and a week to about 3 months after the occurrence. Key talking points to stimulate the discussions further were who were most affected and where, in particular, in the region? What was the extent of the damage at the community and household levels? Was the assistance from donors delivered in time and was it adequate and appropriate? To what extent did communities think they were directly or indirectly responsible for contributing to the problems and their own vulnerability?

The researcher also briefly presented the case studies of Kenya and Niger to show how their fellow rural community members are addressing resilience to impacts of extreme events. These also formed the talking points of the discussions with the aim of picking out similarities and differences and which best practices to adopt for the Teso Region. A group had a maximum of 50 persons (household heads).

For the professional category, the main method of communication was through face-to-face interviews and open discussions and therefore, the PRA methodology did not apply to them.

3.2 Characteristics of the Respondents (Social – Economic)

The exercise involved quite a considerable variety of interviewees and respondents at various levels of social standing, education, knowledge and influence in the field of climate change adaptation and resilience at both community and policy based levels. At the community level, **300 respondents** who were strictly **household heads**⁴ or heads of their respective families were involved in the study. About 65% of them were small land-holder farmers at the community rural levels, all of whom practice and are involved in subsistence level agriculture. All of them were local residents based in their respective three (3) Sub Counties namely Gweri Sub County (Soroti District), Usuk Sub County (Katakwi District) and Town Council (Amuria District). The major focus was on local small scale farmers and community elders whose deeper knowledge of the surroundings was necessary for his study.

The other group of respondents was drawn from the '**professional**' category of people made up of policy and decision makers from both the Government as well as Development and Donor partners. Government respondents were from the Office of the Prime Minister (Disaster Preparedness Unit) and District local leaders. Donor respondents included officials from UN Agencies mainly WFP, FAO and UNDP as well as international Non – Governmental Organisations working in rural areas.

Refer to tables 3-2 and 3-3 in the text.

⁴ In Uganda, the average household is estimated to have 6 members according to the United Nations & GoU planning data.

Table 3-2: Number of Community level respondents (Heads of Households)

Administrative Location	Number of Household HEADS / Respondents
Soroti District	161
Katakwi Dsistrict	48
Amuria District	91

Source: Field Data

Table 3-3: Number of Professional Level Respondents

Organisation	Number of Respondents
World Food Programme	4
CARE	1
Office of the Prime Minister (Disaster Management Unit)	2
Climate Change Unit	1
UNDP	1
FAO	1

Source: Field Data

3.2.1 Age characteristics of respondents

For this particular study, more than 50% of the respondents were above the age of 40. This implies that considerable amount information received, particularly from the field / community level dates way back decades ago, with respondents clearly being in position to describe the changing nature of seasons as they have come along.

Table 3-4: Age composition of the respondents

Age Group	Number of Respondents
< 20	31
21-30	33
31-40	89
41-50	93
51-60	47
>61	17
Total	310

Source: Author, 2010

Respondents with this average age, both at community and policy and decision making levels are regarded as as those with a mature and sound mind, hence have a high authority and ability

to provide data and information from an experience and knowledgeable point of view when it comes to issues concerning personal observations on changes in seasons and climate over time.

3.2.2 Gender Composition

Being a male dominated society, it was not surprising that more males turned out for the discussions than the women. However, it's the women who spend more time in the fields engaged in agricultural activities as well as in collection of firewood. They also are the most marginalised and less educated yet they are at the frontline of the key economic activities of agriculture. This also means that they are responsible, directly and indirectly for a considerable amount of the ill and unsustainable practices applied to provide for their livelihood, most especially over cultivation, deforestation, swamp reclamation, bush burning, over population, among others. They therefore, have a huge role to play when it comes to formation of community adaptation and resilience options, especially when they form 51% of the population in Uganda (GoU).

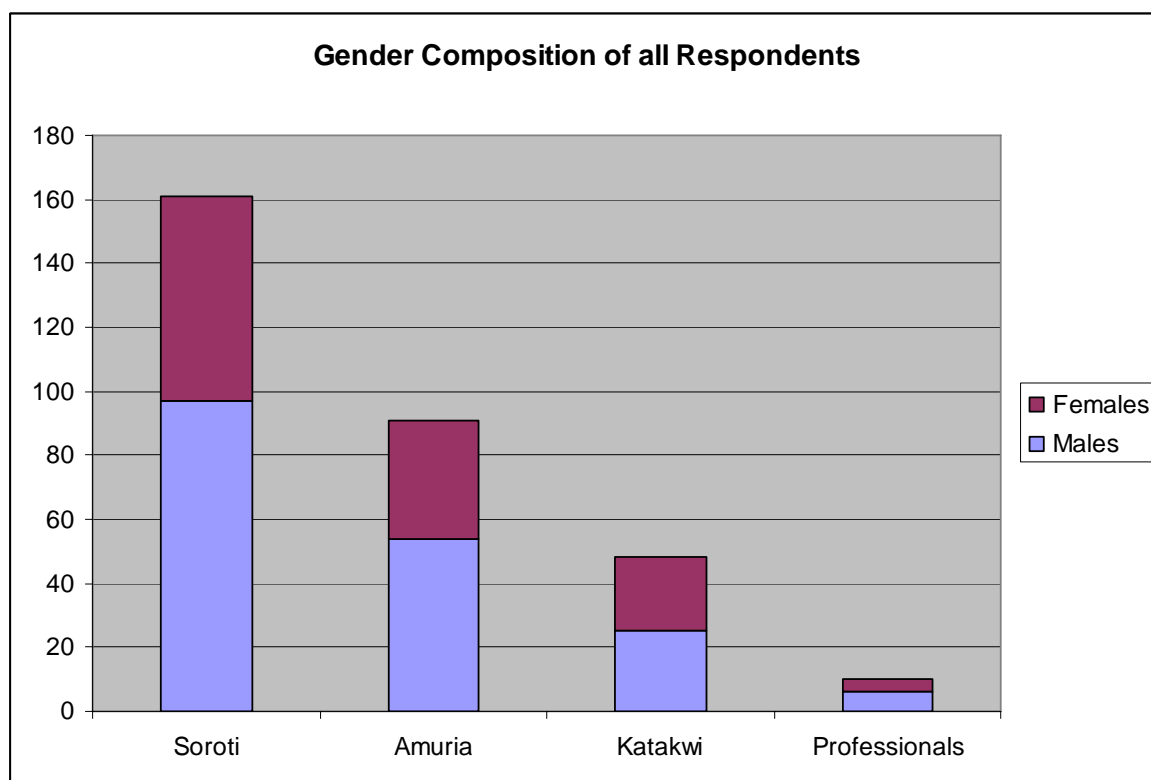


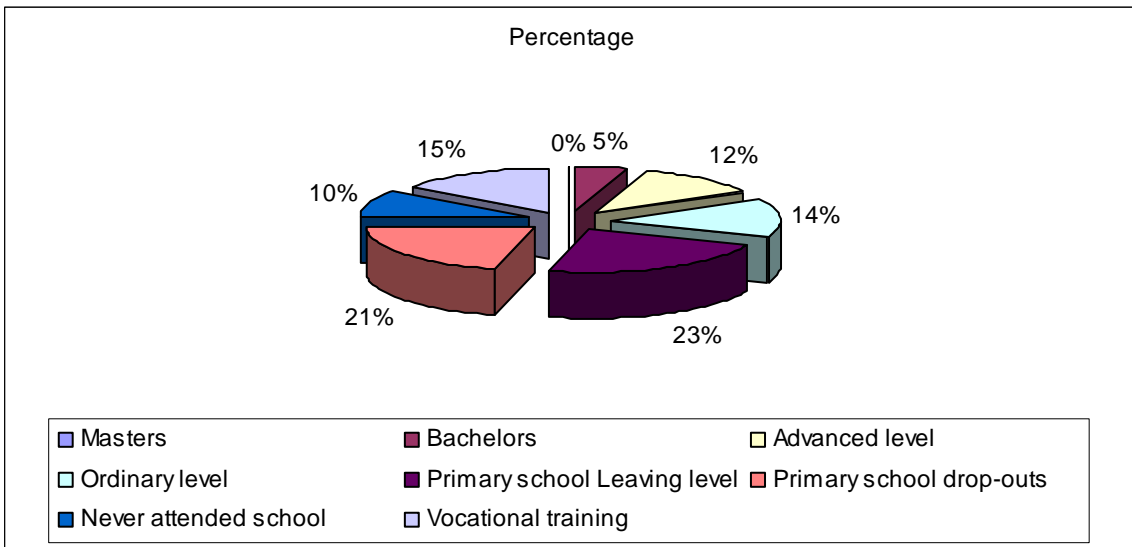
Figure 3-1: Gender Composition of Respondents

Source: Field data

3.2.3 Education Levels

Findings from the field indicate that of the 300 household heads, only 16 have a university degree (Bachelors), 37 have higher Diplomas received from various colleges in the country, 37 have an Advanced Level (Pre University) Certificate, 41 have an Ordinary Level Certificate, 66 stopped at the Primary Leaving Level, 64 of them were school dropouts before their Primary Leaving Examination, 31 never attended school at all while 45 of them have vocational

training qualifications in various fields mainly carpentry, bakery, tailoring and welding as indicated below.



Source: Field Data

The data shows that this is not a highly educated society with 1 in 10 never having attended school. With no Masters Degree qualifications and only 5% Bachelors degrees among the village level respondents (all men), the community's rural population is mostly educated to the Pre University level and levels below. The main reasons given for this are the fact that education is expensive beyond the Primary level with parents only willing to send the oldest children and mostly boys beyond, while the girls stay at home to help with household chores.

The boys' also feel that after the Ordinary and Advanced Levels, they are old enough to start their own lives and families, which probably explains the high birth rate in the region, the highest in the country. Those that never attended school attribute this to poverty and the need to stay home to work in the fields, especially the women. In Uganda, as the class levels increase, so do the drop out rates from school especially for women. Only 23% on average, of all school children enrolled complete the primary level with 21% for girls and 24% for boys (UNICEF, 2006).

Yet concepts of climate change are dealt with at much higher levels of education, mostly at the Advanced Level and beyond. This means that majority of the population are not knowledgeable about the subject and how climate change and its impacts can be addressed or be more resilient through practicing better and sustainable methods of livelihood.

3.2.4 The main economic activities of the respondents

The research findings showed that of the 300 respondents at the community level in the three locations, 195 of them (65%) were directly involved and dependant on agriculture *alone*, for both food and income from the sale of surplus harvest. This implies that the community is strongly agricultural based with much of their livelihood based on climate and natural resources.

The other key activities mentioned and identified were charcoal production and firewood trade, engagement in casual labour, which mainly involves working on other peoples farms, fetching firewood and water, etc, small scale businesses like retail shops dealing in household

items like soap, paraffin, sugar and dependence on gifts and remittances from relatives living in bigger towns as shown in figure 3-3.

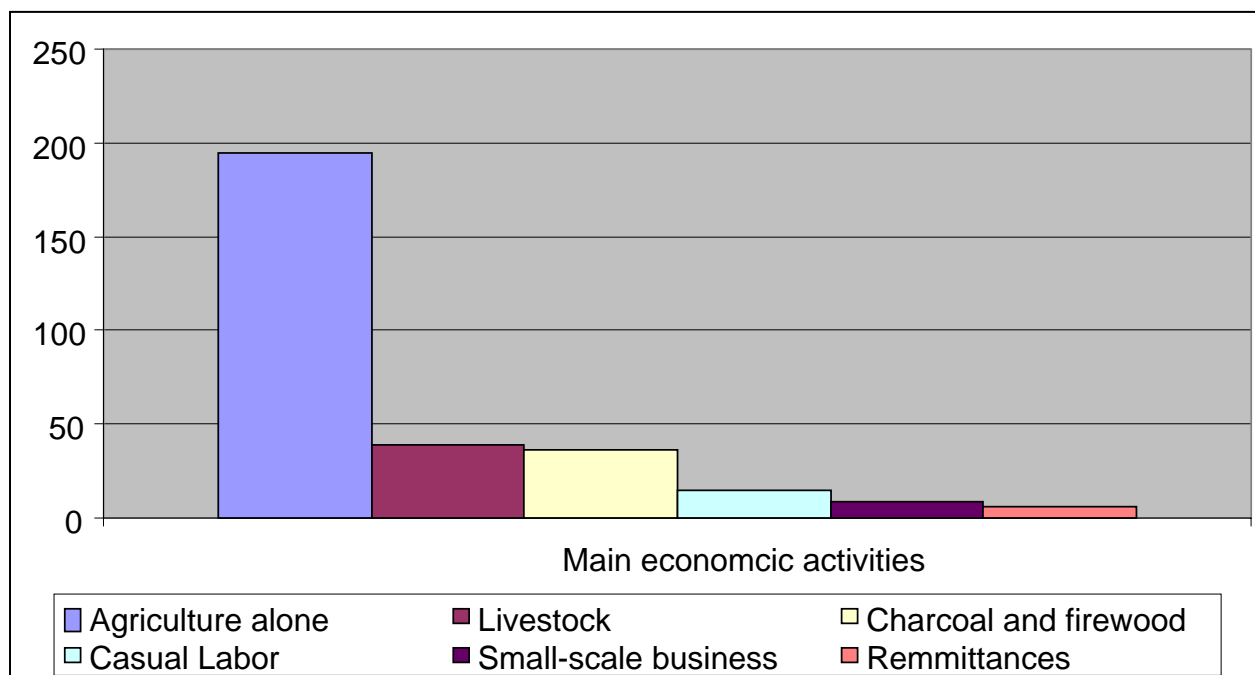


Figure 3-3: Main Economic Activities at Community Levels

Source: Field Data

For the professional category, the findings revealed that all the 10 respondents were highly skilled individuals with various backgrounds in the fields of Governance, Environmental and Natural Resource Management, Development, Law and Policy. Each of them worked in one way or another in the field of Climate Change at a leadership level in Uganda. Of the 10 professional respondents, 6 confirmed that they have other private businesses and engagements (most of which are owned and managed by them, including real estate, schools, private firms and retail shops), that they are involved in besides their official jobs. The main reason given was because of the need to diversify their income sources and also to have a ‘safe landing’ ground should they have to leave their official posts.

3.2.5 The Key Infrastructure and Energy supply

There is no electricity at all in all the three locations of the study (village level). Communities are heavily reliant on trees and vegetation for firewood. There is dominant use of charcoal and wood for cooking and lighting. According to the National Forestry Authority, the Teso Region has one of the highest rates of deforestation and lowest afforestation rates in Uganda. About 70% of respondents know the dangers of deforestation but insist that poverty limits their ability to use cleaner options like electricity and use of energy saving stoves. The state of rural electrification in the region is very low with electricity only available in the main towns and district centres and it only benefits town dwellers. It is estimated that less than 2% of

people in the whole Teso have access to grid electricity (UEDCL)⁵, with the main reasons for this being poverty and corruption at the highest levels.

Findings revealed that 247 of the 300 community respondents (82%) entirely depend on wood fuel and charcoal for their energy needs. The rest have alternative energy sources, mainly the use of paraffin for lighting their lamps and stoves for cooking. Two household heads noted that they have very small generators that are only used during community level functions like weddings. They are rarely used due to the high cost of petrol, which at the time of this research was at an equivalent of US\$ 1.5 per litre, too high for people of the region where poverty is chronic and people eat once a day especially during the times of food shortages (WFP CFSVA, 2009).

Although there exists mobile telephone network connectivity, only 41 of the 300 (13%) respondents at community level had access to mobile telephones. The high cost of both the mobile handset and airtime credit is said to be the chief reason for not having access to this service, especially with Uganda having one of the highest telephone tariffs in Africa (Makerere University Faculty of Economics and Management, 2007). This therefore, limits the flow of information and data that is essential in disaster management and vulnerability reduction.

Other infrastructure inadequacies include the very poor road network, with only Soroti having tarmac roads within the centre of town owing to its historical privilege as the biggest town in the region. The other two towns do not have tarmac roads and the murrum roads available are not adequate during the flooding seasons, for example.

3.3 Enhancing Resilience to Climate Change at Community Levels

‘.....i am 71 years of age and i have been involved in Local Government Administration since 1971 here in Teso, moreso Soroti.....am a farmer too and i can testify that the seasons have changed since the 1980s todate.....this is August for example..... a traditionally rainy month for this region but for the last 7 years August has tended to be dryand this is the driest August so far.....sadly we the local people are not prepared for these changes....and what makes me worried as a leader is that my people do not know the dangers of changing seasons or what is causing them..... majority think its the gods or they are cursed.....we are not even helped by the weather forecasts which are never true and people have lost trust in them....., the floods of 2007 caught us unawares, the droughts are now more frequent.....if we knew enough, we would at least prepare ourselves to survive and adjust.....assistance is needed from those Americans and Japanese..... and Europeans otherwise Uganda cannot do it alone and will never.....’

Source: Extracted from interview with Simon-Peter Ejakaiti, Soroti District Disaster Management Committee and Natural Resource and Environment Advisor to the District Chairperson, 2010

Research findings from the community, using the ranking system of the participatory rural appraisal revealed six key priority areas that can form the foundation of being able to adapt to these climatic changes and thus be more resilient when future threats occur.

This quotation describes the state of affairs in the region. The local communities, including the uneducated, have realised that the seasons are changing and have been doing so for more than two decades. This notice has come from the fact that they are heavily reliant on

⁵ UEDCL stands for Uganda Electricity Distribution Company Limited. According to one of the Area Supervisors who preferred anonymity due to lack of detailed figures, he estimated less than 2% have access to electricity in Teso based on billing records over the last 12 months.

agriculture and have therefore, been considerably affected by the changes especially when it comes to food insecurity. There have been losses of agricultural output due to flooding and prolonged droughts over the last thirty years and according to the World Food Programme and FAO, food insecurity in the region has mainly been due to the unpredictable climatic patterns that affect the farmers' ability to grow food (WFP CFSVA, 2009).

A very good example is August, which traditionally is a very wet month necessary for the second planting season, but for this year 2010, it has been very dry and many farmers have not planted their seeds for fear of losses. This will in turn create a cycle of food insecurity because when it comes to harvesting; there will be less food to harvest.

3.3.1 Information

Findings revealed that the local people in the rural areas have very limited access to climatic and weather information. Of the 300 respondents at the community level, only 97 (32%) knew and had information about climate change and its causes and how it can be addressed, (they knew the role of the greenhouse gases and activities that produce them and had ideas on mitigation measures including reforestation) although up to a certain limited level, especially not knowing issues to do with international agreements and organisations set up to address it. 133 of them (44%) have heard about it from different fora but do not know about it in broader detail. Also, 70 (24%) of all the respondents in the 3 villages combined had no clue or idea about the concept of climate change.

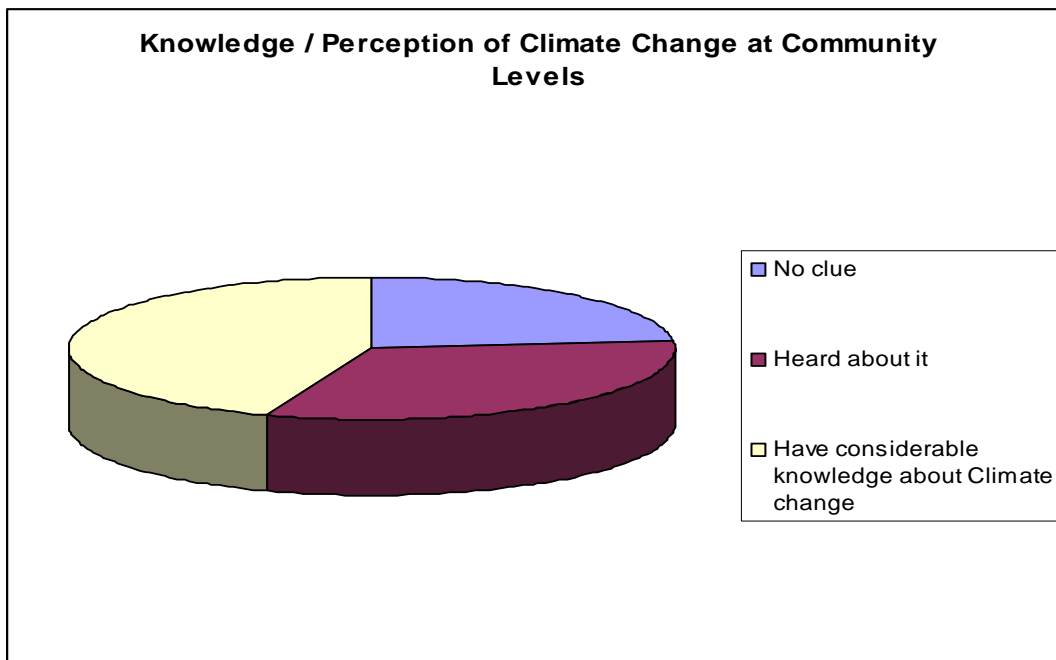


Figure 4-4 Perception of Climate Change at Community Level

Source: Field Data

The situation is not helped by the fact that the weather and climatic pieces of information relayed are seldom accurate. They are usually relayed on a daily prediction basis and are presented on only one radio station out of the more than six stations, the *Voice of Teso*. For example, as explained earlier, it was announced at the beginning of the month that the Region would receive heavy rains, which has traditionally been so in preparation for the second planting season. However, according to the respondents, August has been relatively dry, with

respondents in Soroti and Amuria claiming it has ironically been one of the driest months of the year.

A couple of reasons are attributed to this state of affairs as confirmed by Stephen Tanywa of the Meteorological department. He sides with the community to a certain degree and says that Uganda for instance has only 12 synoptic stations, stations that measure and analyse more than nine parameters, out of the optimum 36 required, since Uganda has 18 climatic zones. There are also more than 200 other stations countrywide that measure only rainfall and temperature patterns. According to him, these are very few. Their distribution is also a factor in as far as information gathering is concerned because monitoring and supervision is quite expensive.

Not to mention the bureaucracy, especially when it comes to the procurement of the latest modern equipment. During a recent presentation of the meteorological budget before Members of Parliament (Public Accounts Committee – PAC), Mr Stephen Tanywa noted that the the MPs found the costs of some equipment to be ‘*obscene*’, and did not approve the budget until after ‘*further consultations*.’ According to him, the MPs on the committee do not see the purchase of such equipment as priority most probably because they do not know their function. A rain guage from the UK costs an equivalent of US\$470. This sounds unreasonable to them. Other challenges include the staffing level at the Meteorological department, which is only at 60% skilled staff. This puts a lot of pressure on them to deliver and work over long periods at very low pay, which affects their output.

The meteorological centre and the government have now partnered with development partners and key stakeholders involved in activities directly connected to climate to solve the shortcomings which with the UN Joint Programme on Climate Change earlier mentioned above being the latest of a series of partnerships.

‘.....unfortunately, weather forecasts over the radios are still not local enough or reliable enough to guide them.....traditional ways of forecasting rains....like the appearance of white ants and glo worms....appearance of certain clouds or stars are no longer the reliable guides.....they claim they once were.....’

Source: OXFAM, 2008

This has made the communities and more especially the farmers to be reluctant to sow their seeds for fear of losses and many did not sow as the expected rains didn’t come. Inaccurate and un-timely information has been blamed for the worsening food insecurity in the region.

According to the locals, the floods of 2007 and the prolonged droughts that occurred in 2004 - 2006, and 2007 – 2009 would not have affected these communities as badly and as tragically as they were had they been informed in advance about their anticipated occurrence. The communities believe that had they this prior knowledge, they would have employed measures to guard against the impacts like growing drought resistant crops, building bunkers to protect their property, water harvesting technologies among others. According to Simon-Peter Ejakaiti, member of the Soroti District Disaster Management committee, at least people would need a month to prepare in the event extreme weather occurrences happened. This is because they have to move with their cattle to distances as far as the main town, also considering that the transport network is not as reliable.

The month’s time would allow them to move within their available means even if it means on foot. For the droughts, the months notice would help them plan for what to plant or not to

plant. This however might not be possible because even the most advanced economies cannot predict what the weather will be like beyond perhaps two weeks. It certainly cannot be applicable to Africa, however, and information received at least in a weeks notice would help save lives and cattle as justified above.

According to the communities, any adaptation and resilience programmes should start with having the right information on what climate change is, its causes and its impacts and when these are likely to occur. For a region like Teso where both flooding and prolonged droughts are expected, this information is priceless. The information should also be available on as many channels of communication as possible, if possible especially on all radio stations since it's the cheapest means of receiving information in poor rural African communities, television stations for urban dwellers and others that can afford them, local newspapers especially for the local leaders who can afford the papers and then also pass this information to their subjects below them. Sixty nine percent of all respondents had access to small receivers that cost as little as an equivalent of US\$ 1.70. This was also stressed by the Buenos Aires Programme of Work on Adaptation and Response Measures Paragraph 5 (a) i – vii which stresses the issue of strengthening of information gathering and analysis and enhancing systematic observation as frontline aspects in building adaptive capacity and resilience of communities.

3.3.2 A Dedicated Policy on Climate Change Supported by Contingency Plans⁶

Of the 300 community respondents, 149 (49%) believe that the absence of a national working policy document on climate change hinders their ability to act at the community level. They believe that a policy's main advantage is that it clearly indicates what their roles are in times of disasters caused by climate change and also are able to hold other parties accountable should they fail to perform their duties as stipulated in the policy.

Using the example of the 2007 floods that were the worst recorded in the regions history, the community members argued that immediately after the aftermath of the disaster, there was a 'scramble' of roles to be played by different actors. The Government, the UN Agencies and International Development Agencies all wanted to do something to help the affected but because there was no prior contingency plan for the disaster of that magnitude and a policy, help took long to reach the worst affected.

Policies and contingency plans clearly outline the **FIVE W's** namely Who does What, Where, How and Why. The communities will definitely have a role to play in their survival but they cannot play this role if they do not know what they are supposed to do and how much responsibility they have.

The Country Director and Representative of the UN World Food Programme in Uganda agrees with this view and stated;

'.....a policy is a start.....it is necessary to give direction to avoid everyone doing their own thing.....' - Stanlake Samkange⁷.

⁶ WFP describes Contingency planning as the process of establishing programme objectives, approaches and procedures to respond to specific situations or events that are likely to occur including identifying those events and developing likely scenarios and appropriate plans to prepare and respond to them in an effective manner (WFP, 2009)

⁷ Prior to his appointment as WFP Representative and Country Director for Uganda, Mr Stanlake Samkange was Head of the Strategy, Policy & Programme Support Division based at WFP Headquarters in Rome

Uganda is a stretched and poor economy and Government cannot do everything on its own. International Aid Agencies and UN organisations too have limited funding and besides, their priorities are different with most of them in areas of health and education. Therefore, communities need to be supported by training them to act and to do their responsibilities well and not to wait for the government all the time; but this has to be supported by a policy which must be made available and known to every citizen.

The Climate Change Unit presently has a steering committee that advises Government and other departments on climate change matters while also strengthening national capacity for the coordination and implementation of activities related to climate change in Uganda in accordance with international procedure and obligations.

3.3.3 Education and Awareness Programmes

According to the respondents, education and massive sensitisation at the grassroots was the third most important way to strengthen their resilience. As mentioned earlier in the first point, a number of respondents, up to (24%) at the local level had no idea about the concept of climate change. During the various focus group discussions, a number of respondents clearly demonstrated that they are not aware of the causes of climate change. It was only after thorough debates led by the author in all the three case study locations that they began to have an idea and actually appeared guilty because they contributed to the impacts and their own vulnerability through the continuous use of unsustainable farming practices, deforestation, over population, over stocking and swamp reclamation.

It was also discovered that the issue was not one of the key components of village sensitisation meetings held every two Sundays in the region at village levels. When asked what the key discussion points were during the sensitisation meetings, the respondents pointed out Girl Child education, HIV / AIDS, Security and protection of livestock from the neighbouring cattle rustling tribes in the North and taxes. The situation is not helped by politicians and district leaders, who despite their knowledge of the problem, at least to a certain extent – do not talk about it when having their debates on radio. The respondents clearly demonstrated their anger and dissatisfaction at the fact that local politicians spend much time talking about political differences just to stay in office at the expense of the suffering poor.

Fifty one of the 300 respondents at the community levels thought that climate change should be incorporated within the school syllabus from as early as Grade / Form 5 to pre University level and should be compulsory especially since there is a considerable number of people dropping out at this level, even if they dropped out then, they would at least know, to a certain degree, what climate change is and how they can be preventative and more resilient. The idea here is to have children growing up well informed of the situation that surrounds them and if it is not taken seriously, it can have a negative impact on their future lives and livelihoods. For the old generations, massive awareness programmes through community assemblies, radios and political rallies can offer cheap and easily accessible options of knowledge gathering.

For Martha Mwesiga, Coordinator of the Climate Change Forum, there is need to take advantage of the fact that the old generation and to a certain extent the middle and younger generations of the rural communities in the developing world, especially Africa in general and Uganda, in particular, never received formal education where most of the issues of climate change are taught and discussed. All they know is as a result of what they observe but in many cases have no clues of what the key causes are. This therefore, presents an opportunity to create awareness programmes and education that best suits them. Since the old can no longer

return to class, they can be sensitized through their local assemblies, churches, gatherings, community meetings and rallies. These are much cheaper and more community friendly. They also make them feel involved and interested.

3.3.4 Diversification of Livelihoods

It was interesting that nearly all respondents at the community level pointed out that the chronic poverty inflicting them is a primary key factor in why they are always vulnerable to the impacts of climate change. As indicated above, 65% are reliant ONLY upon farming for their livelihood. All the food and income comes from the farming activity that also includes cattle rearing. The rest of the 35% are engaged in small business, charcoal and firewood trade and livestock.

This means that the rates of diversification of livelihoods are so disappointingly low. When disaster strikes such a community that entirely depends on the environment and natural resources, it creates a recipe for further disaster because their entire livelihood consisting of plants and animals is destroyed. Prolonged droughts and heavy rains that lead to floods destroy crops, both in the fields and those that have been harvested and kept in granaries, as the floods sweep them away. Droughts are a pre requisite to fires too and there have been cases through testimonies given by respondents that during the dry seasons, fires are easily started and usually destroy granaries thus worsening the already precarious situation.

The communities agreed that for them to be more resilient, they have to be involved in a couple of more activities which, if possible, should be non environmentally based although for a country like Uganda that has one of the lowest technological, manufacturing and industrialisation rates in the world according to the International Monetary Fund (A.Selassie, 2008), this seems a difficult option.

Further economic activities were identified following a couple of brain-storming sessions, activities that are Teso Region specific and they were mainly diversification in the agricultural sector instead of only growing food crops for home consumption. The main activities included growing other types of crops, specifically fruits and vegetables with a commercial purpose. These would be both beneficial for the environment, as well as improving the financial situation of the communities. Other activities included bee keeping and agro forestry.

However, for this to be successful there has to be a ready and additional infrastructure especially the market to absorb the new products coming in from this region, stores, roads and machinery, among others. This market could be in-form of food processing industries built purposely to use the fruits and vegetables as raw materials. This means that the factory buys these materials from the communities, who then get additional income. Should disaster occur, they will at least have a cushion on which to lie and be able to move on.

A senior staff within the Agriculture and Market Support unit of WFP Uganda agreed with the community and stated,

‘.....diversification of incomes and livelihoods is probably the single most sure way of reducing vulnerability to climate change of poor African households.....but it comes with a heavy price in the form of supporting instrumentsmore roads, stores, machinery, agricultural training schools to cover the information and illiteracy gap.....its possible but more and better coordination and planning is needed, particularly from the top.....’

WFP is already currently implementing a five-year year **Purchase for Progress**⁸ programme (P4P) effective 2009, which is aimed at providing some of the supporting and enabling instruments for diversification to succeed especially, agricultural infra structures like building stores, expanding roads for better market access and farmer training. These services can not be done by the locals, considering their chronic poverty levels.

3.3.5 Appropriate Technologies for Energy Supply and Water Efficiency

In relation to the point above, having a diversified economy calls for development of the energy infrastructures.

The point here is that all these developments like the food processing industries as mentioned above which are intended to provide alternative sources of income need energy. However, with only 4% of the entire Teso population having access to grid electricity, with most of them in the towns, it's a tall order. The rates of rural electrification and grid extension are also among the lowest in the country. This is not helped by the chronic poverty levels that make the affordability of grid power quite prohibitive. The region is heavily dependant on firewood as the key source of energy, which places a considerable amount of pressure on the already reducing forest cover due to the inconsiderate deforestation levels.

Development of cheaper alternatives is crucial. Of the 300 respondents, 147 of them (49%) mentioned and agreed that solar and biogas energy would be appropriate for the region, considering that it has up to 7 months of direct sunlight and that the region has plenty of cattle whose droppings could easily be used as raw material. During the rainy seasons, cattle are usually kept within the homestead surroundings due to the fact that there is plenty of water and feed, so this could be an opportunity for dung to be collected at household levels. During the dry seasons when cattle are moving from one place to another looking for water and pasture, it becomes quite hard to collect as much dung as necessary but there is an opportunity to collect it in the morning before the cows are taken away. Dung can also be used as a raw material for making energy saving stoves as it has the ability to store as much warmth as possible, thus using less firewood.

Micro hydro solutions are not appropriate to the region because of its geology, as it is made up of flat plains. However, investment in both biogas and solar energy is quite high and they require full support of the government and international aid agencies. On paper, the newly launched National Development plan has an objective and strategy of promoting renewable energy especially wind, solar and biogas (NDP, 2010:155) but practically, this is yet to be done. Because of fear that this will not materialise, capacity building and training the locals in production of cleaner energies is important. Such cleaner energy is necessary, especially because it runs the necessary infrastructure like the hospitals, clinics, health centres, schools, and television and radio stations. Other alternatives include the use of energy saving stoves and ovens which can be made locally using local material. These will reduce firewood consumption and thereby, also reduce on the deforestation rates because they use far less charcoal as the sand / mud used to build the bricks stores a lot of heat long even after use.

⁸ The P4P programme focuses on activities that address two principle constraints facing farmers in Uganda, including Teso Region, namely poor infrastructures and low inadequate productivity, which according to respondents is also caused by the varying and changing climatic conditions. It is aimed at connecting small scale and low income farmers to markets and be able to realise broader incomes, thereby improving their lives and livelihoods (WFP, 2009).

3.3.6 Gender Issues

‘.....impacts are greatest on the lives of ordinary people, and especially women, frustrating their efforts to overcome poverty.....’ OXFAM

This has two important dimensions to it. The first is that women are the majority sex of the total population countrywide. On the national level, the figure is estimated at 53% of women of the total population. For Teso, according to the Uganda Bureau of Statistics of 2007, women form up to 51% of the total population within the region, compared to 49% men.

This therefore, means that building and strengthening the resilience of communities requires the consideration of investing in women at the helm. However, for many an African community, women are ignored and often sidelined when it comes to education and access to other social services. Africa is traditionally a male dominated society and this trend is still very strong in many countries. Although Uganda has made significant gains in improving the social standing of women, the majority are still trapped in this tradition (UN-OCHA, 2007).

During the floods of 2007, the UN-OCHA and UNICEF estimated that more women and children were affected than men, up to 80% of the affected 300,000 people. For any community to be resilient and whose adaptive capacity is strong, women centered programmes must be improved upon, most especially education and health services that are unique to women and children.

A senior official at CARE Uganda fully agrees and stated;

‘.....it is ridiculously pointless to invest in intervention options in any African society, particularly in the rural areas without first investing in the women.....they are the backbone of any economy.....as the typical saying goes, train a woman, train a nation.....’

The second aspect with gender has to do with the fact that it's the women who are involved more with the key household chores in the homes especially the farming and search for firewood. The fact that many are uneducated means that they will probably continue with using and applying the unsustainable practices that further contribute to vulnerability in the long run, most especially indiscriminate deforestation, swamp reclamation, bush burning among others, thus the need to involve them when it comes to educating them to practice better and sustainable farming methods, avail them with better and cleaner technologies and energies like energy saving stoves.

3.4 Discussion

Resilience to vulnerability of impacts of extreme events caused by climate change is largely about what communities can do for themselves (J. Twigg, 2007). As is usually the case in Africa, when disasters strike, rural communities are so helpless and normally wait for external assistance because much of their sources of livelihood are destroyed. From experience, this response comes in rather 'late' depending on given circumstances. For the floods of 2007 that hit North Eastern Uganda, including the Teso region, according to the Office of the Prime Minister, assistance from external sources, particularly the UN agencies, in terms of basic substances like food, water, shelter, drugs and clothing began arriving after a week.

This delay in assistance increased vulnerability. To reduce it, communities ought to be at a level where impacts of extreme events will not find them un prepared for instance, information flow on climatic and weather patterns is so crucial in achieving this. The Buenos Aires Programme of Work on Adaptation and Response Measures Paragraph 5 (a) (i) calls for

improvement in data collection and information gathering including analysis, interpretation and more importantly disseminating such information to the right end users, including the communities at the lowest levels who are most vulnerable. This should also be done in an appropriate way, suitable for local communities to access the information in their language as well as channel of use.

Similarly, the need to strengthen internal capacity building is crucial. This is necessary for the acceleration of education, awareness and training programmes at all levels, particularly for the local communities. Even if communities get the right information, using it is quite another issue. Internal capacity building ensures that communities know what kind of activities will be best implemented with the expected events. For instance, if prolonged droughts are expected, the knowledge received from training and education will be applied in the form of planting the right crops that will be drought resistant. Communities will also be expected to apply their knowledge in practicing water efficiency measures and use less water during the lean periods.

The University of Oslo points out that it's the poorest in society that are more vulnerable because they are the ones that suffer more harm, injuries and death resulting from droughts, floods and other extreme weather events (S. Eriksen, K. O'Brien & L. Rosentrater, 2008). This is backed up by the UNICEF Uganda Country Office that shows that of the 300,000 mostly affected individuals of the 2007 floods in Teso Region, more than 80% were living below the poverty line of less than a dollar per day. The main reason for this was the dependency on low input subsistence farming and having no other sources of alternative income. Poverty plays a crucial role in increasing vulnerability of those affected, especially when they wholly depend on farming for both incomes and food. The need to diversify local economies is paramount to achieving high rates of adaptive capacity thereby reducing their vulnerabilities. Rural economic development should be able to benefit the locals, both directly and indirectly as long as they obtain additional sources of income.

4 The Enabling Environment and Sustainability

4.1 Introduction

This purpose of this chapter is to describe the role of the external enabling environment in promoting sustainability of community led efforts to minimise vulnerability. The chapter describes what an enabling environment is about and also gives an over view of the current state of affairs in the Teso Region and how it can be strengthened and improved upon according to data obtained from the professional category of respondents.

No community in this world lives in isolation. Much as it is an ideal situation to have a fully resilient community, it's not possible. The strength of resilience and adaptive capacity of a community is very much influenced by external capacities especially when it comes to the integration and provision of emergency services, administrative and social structures, public infrastructure as well as responsible governance and political will (B. Osman-Elasha, 2008). All communities the world over are dependant on such external services although the extent varies with developing economies having a greater dependence. This is what is termed as the Enabling Environment (J. Twigg, 2007).

Resilience at the local level broadly entails what the communities **can do for themselves** and how their **adaptive capacities can be strengthened** instead of placing more emphasis on their vulnerabilities to threats or what their needs are during emergencies as is the case in many developing countries, especially in Africa and Uganda in particular. For these communities, top level resilience and their adaptive capacity can only be achieved when the enabling environment is sufficient to minimise vulnerability while at the same time maximising the use of disaster reduction measures with full community involvement.

4.2 The Current Enabling Environment

Using the model of characteristics of a resilient community (J. Twigg, 2007), the current state of the enabling environment in Teso was analysed in relation to the five key thematic areas that describe a resilient community. The results are as follows:

4.2.1 Governance

This theme cuts across all other themes because it stresses issues of accountability, planning, regulation, partnerships and institutional systems. The main components studied in this theme were political commitment and community participation at all stages of development. During the review of the three district development plans, it was apparent that the top five priorities were improving education especially structural improvement of primary school buildings and teachers houses, meeting revenue collection targets, food security, health and sanitation (including water services) and child protection. It's therefore, clear that disaster reduction, particularly as far as climate change mitigation and adaptation as well as environmental protection were not high on the priority list – at least as far as the top five is concerned.

As far as community participation is concerned, usually, the local people are consulted during the development of district development plans. According to the district leaders interviewed, they said it's mandatory to have communities participate in giving their views for consideration instead of the leaders providing them because they know what they go through on ground and the interventions are ultimately meant for them. However, the main loophole

here is that when it comes to the implementation of the plans at the community level, participation is limited for the locals because politicians at the district levels usually have their own people that do the planned activities. This is also fueled by ignorance at the community level which the politicians use to exploit the masses.

4.2.2 Risk Assessment

Under this theme, two areas were looked at including the hazard assessment as well as the vulnerability and impact assessment. Regular assessments are necessary because they keep policy makers and communities alike abreast of the present climatic and weather conditions as well as anticipated or future occurrences or threats, thus assist in planning. For this particular region, regular vulnerability assessments are done but in most cases, they are centred on food security vulnerability assessments carried out by WFP.

Other hazard and disaster risk assessments are not repeatedly and systematically carried out, especially drought or flood assessments on a regular basis. In Amuria and Katakwi, all the respondents reported that they have never participated or heard of any hazard related vulnerability assessment, be it for floods or droughts, which is one of the reasons attributed to limited information on occurrence of these disasters and how they can be dealt with. To this effect, one can report that the early warning systems are inadequate.

One important aspect of risk assessment is the valuing and use of local indigenous knowledge by external agencies. Of the 300 household heads used for the community study, 187 (62%) expressed disappointment that local knowledge is rarely taken into account by humanitarian and development agencies. There have been cases of these agencies bringing assistance based on their own experience and knowledge from other areas, which have not been successful in most cases.

4.2.3 Knowledge and Education

General public awareness about climate disaster risks and their management is very limited. As described earlier, only 32% of the respondents knew about climate change and its causes. Twenty four percent had no clue about climate change while 44% heard about it from different forums but not in deep details. There was consensus among the 76% respondents who knew about climate change that information on climate change is scattered although some radio stations and agencies do talk about it. It is not appropriate enough in terms of language, with the use of English widely used.

The timing is also not appropriate since most people spend time in gardens yet such broadcasts are usually during the day when they are busy cultivating or working in the fields. There are no high visibility awareness programmes or adverts. Media involvement is quite low too. Out of the six radio stations, only one station, the *Voice of Teso* broadcasts weather data and hosts a number of debates on regional issues of which climate change is not ranked among the top debated issues according to the respondents. The other stations usually present music and cultural shows.

There is no legislation that specifies the right of the community to be well informed as well as obtain information regarding risks facing them. As a result, they are largely ignorant of these risks and this contributes to their vulnerability. There is no appropriate education and training curriculum programmes for community planners and other practitioners in as far as climate disaster risk reduction is concerned.

4.2.4 Risk Management and Vulnerability Reduction

Under this theme, two sectors are addressed, namely the Environmental and Natural Resource Management and Sustainable Livelihoods.

With the environment and natural resource management, there exists local legislative and institutional mechanism that supports environmental management necessary for disaster management. There also exists official action to stop and prevent any application of unsustainable land uses, activities and approaches that increase the risk of disaster. However, as is the case in many developing countries, policies and laws are mainly on paper and are not effective because their implementation is barely existent.

For this region, 78% of the local respondents agreed to this observation and said there are by-laws at the district level urging people not to indiscriminately cut down trees and encroach on swamps but these are never followed up because of lack of sufficient personnel and funds to monitor and enforce. And besides, people are so poor and depend on the environment solely for their survival including the leaders themselves. So because the leaders are participating in such actions, they cannot stop the wider population from doing so lest they are not voted back into office.

As far as financial instruments are concerned, there are no financial incentives for those involved in disaster reduction activities at the moment, including reduced taxes on essential commodities like food, firewood or drugs. Additionally, there are no loans, credits services, insurance services or micro finance solutions to the poor to be able to restart livelihoods during and after the occurrence of disasters. Usually, as is the case, respondents said they depend on handouts after a short period of time mostly from development agencies, after which they are on their own, a very difficult trend.

4.2.5 Disaster Preparedness and Response

There exists a defined and agreed structure as well as mandates for both the government and non governmental actors in as far as disaster response is concerned at all levels. However, much as it's supposed to be based on a *'coordinated' approach*, it's usually on a *'command and control'* approach. Sixty six of the respondents said that during the response and recovery phase, the Government usually takes 'command' of all operations and that all these coordination meetings between the government and international development agencies are aimed at giving the government and even some agencies credibility for more donor support.

The government usually *'bows'* to its knees immediately after disasters occur because that's when it is also vulnerable and needs money since the budget for disaster response is usually inadequate to cover sudden attacks.

Disaster management capacities at local levels, including the technical, financial and institutional capacities are very inadequate to be able to support community level disaster response. As noted above, issues of climate change and its related impacts and effects are not well known at the community level. When you add this to the fact that the majority of the population are educated below the University level, problems arise.

4.3 Strengthening the Current Enabling Environment

Having looked at the present enabling sector in the Teso region, there is a need to improve it to be able to minimise vulnerability to impacts of climate change. Several issues arose as to

why the enabling sector is not at the desired level it is supposed to be, including issues of non compliance, limited funding to support monitoring activities and less access to information, among others. When asked to name their top three priority ways of strengthening the current environment (**Appendix 6.2**), the professional category of respondents replied as presented in table 4-1.

Table 4-1: Priority Areas for Strengthening Enabling Environment

Respondent	Top three Strengthening Priority areas
WFP 1	<ul style="list-style-type: none"> ➤ Climate change adaptation should be a priority in Government's development plan. ➤ Priority should also go down to the Village levels. ➤ Establishment of early warning systems.
WFP 2	<ul style="list-style-type: none"> ➤ Regular and systematic risk assessments. ➤ Infrastructural Developments. ➤ Rural Economy development schemes.
WFP 3	<ul style="list-style-type: none"> ➤ Early Warning systems. ➤ Regular vulnerability assessments. ➤ Financial Incentives for sustainable practices.
WFP 4	<ul style="list-style-type: none"> ➤ Scientific development including data sharing, earth observation, climate modelling and early warning systems. ➤ Active Media. ➤ Legislation to support Disaster Risk Reduction
FAO	<ul style="list-style-type: none"> ➤ Prioritise climate change. ➤ Diversification of the local economy. ➤ Inclusion of climate change into local formal education
CARE	<ul style="list-style-type: none"> ➤ Early warning systems. ➤ Regular and systematic assessments. ➤ Special Education mechanisms for women.
Office of the Prime Minister 1	<ul style="list-style-type: none"> ➤ Technology transfer and capacity building. ➤ Diversification of the rural economy. ➤ Incorporate DRR in national development plan.
Office of the Prime Minister 2	<ul style="list-style-type: none"> ➤ Regular Vulnerability assessments. ➤ Government to promote CDM. ➤ Financial Incentives.
Climate Change Unit	<ul style="list-style-type: none"> ➤ Incentives for those practising sustainable livelihoods. ➤ Promoting CDM opportunities through cleaner energy options. ➤ Massive education and awareness programmes.
UNDP	<ul style="list-style-type: none"> ➤ Funding to the central Government for its climate change related activities. ➤ Explore opportunities for CDM investments. ➤ Regular risk assessments and establishment of early warning information systems.

Source: Field data, 2010

From the illustration, a number of key common ideas were presented by policy and decision makers, most notably:

- Early Warning Systems;
- Regular and Systematic Vulnerability Risk Assessments;
- Climate change as a priority at all levels, sectors and departments;
- Rural Economic Development & Promotion of CDM;
- Financial Incentives and funding for adaptation activities;
- Active Media and Infrastructural Development;
- Technological Transfer and Capacity Building;

4.3.1 Early Warning Systems

The UN describes early warning as, ‘..... the provision of timely and effective information, through identified institutions, that allows individuals exposed to hazard to take action to avoid or reduce their risk and prepare for effective response and is an integration of four key elements namely; Risk Knowledge, Monitoring and Predicting, Disseminating Information and Response.....’ (UN & International Strategy for Disaster Reduction, 2006)

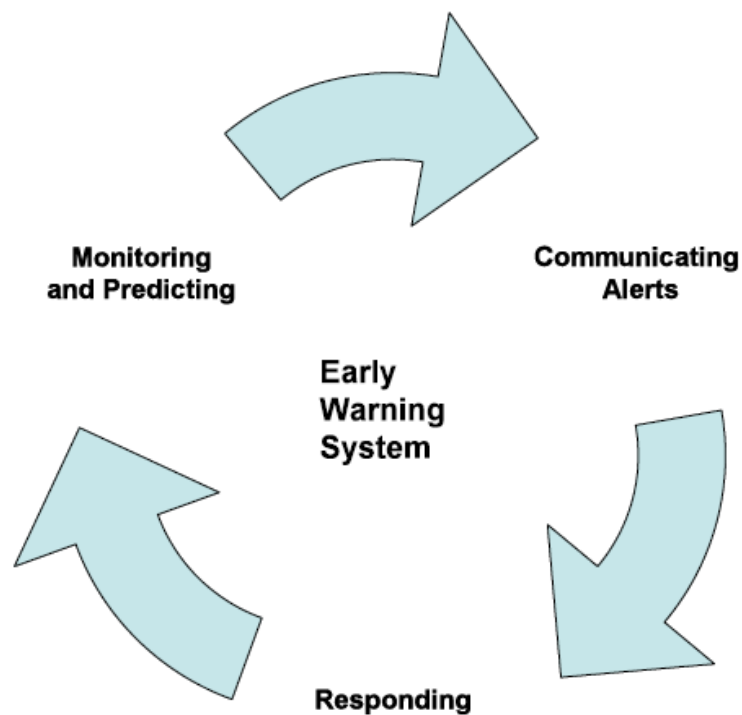


Figure 4-1 Early Warning System

Source: UNEP - *Early Warning Systems: State of Art Analysis and Future Directions*. V. Grasso.

Experience has shown that authorities in developing countries, especially those in Africa tend to leave **slow-onset or creeping hazards**⁹ unaddressed in favour of **sudden or rapid hazards**¹⁰ not realising that eventually, the creeping disasters will become urgent crises that will be more expensive and costly to deal with. The floods of 2007 caught the authorities and the people of the Teso Region unawares. There was no information distributed or disseminated to the local people to prepare them, thus the severe loss of livelihood, yet had this information been relayed earlier and accurately, predictions would have been made thus making mitigation of the disasters impact on livelihood, local economy and the environment more effective.

For a poor economy like Uganda that has no stand-alone warning system, there is need to develop cooperation and partnerships with developed countries for purposes of technological transfer, access to timely and accurate data and capacity building. According to the Climate Change Unit, establishment of a stand alone system for Uganda is quite an expensive venture and the only option now is for technical cooperation with developed countries and also neighbouring countries at the regional level, cultivating friendly relations so as to be able to have access to this information. WFP will, through the UN Joint Programme on Climate Change take the lead in supporting the Government in the installation of automatic warning systems in flood prone areas.

4.3.2 Regular and Systematic Vulnerability Risk Assessments

The main objective of any risk and vulnerability assessments is to provide much needed essential information for planning purposes as well as in assisting in the prioritisation of mitigation strategies. Regular assessments offer an opportunity to identify current and future threats and thus assist in the development of a synchronised workplan for disaster risk reduction practitioners. For a region like Teso which is predicted to have more climate variabilities in the future, particularly flooding and prolonged droughts, it's essential that there are mechanisms for having regular assessments to see how the locals are likely to be affected and what steps can be taken to mitigate any impacts that may arise in the future. Assessments are also necessary because they also provided data needed for the effectiveness of the Early Warning Systems. WFP carries out regular Emergency Food Security and Vulnerability Assessments, whose results are normally used to draw intervention and assistance plans. A similar strategy for climatic assessments is necessary for this region.

4.3.3 Prioritisation of Climate Change beyond National Levels

A look at the National Development Plan (2010/11 – 2014/15) indicates that climate is nationally recognised as an important enabling sector. However, there is not yet an official national climate change policy document in place. Additionally, regional development plans at district levels to the lowest levels of administration at the villages do not have climate change adaptation and mitigation programmes in their development plans. This can easily be interpreted as a situation where both the Central and Local governments have no urgent interest, yet the impacts of climate change are actually already felt and more are predicted to happen in Uganda particularly heavy rains and prolonged droughts in this part of the country (IPCC).

⁹ Long-term and cumulative environmental changes that usually receive less attention in their early stages. They include air and water quality, climate change, desertification process, climate eco systems change & loss of bio diversity (V. Grasso)

¹⁰ These include accidental oil spills, nuclear plant failures (V.Grasso)

According to the Climate Change Unit, there needs to be a separate entity specially dedicated and mandated to addressing climate change issues in the country with similar representation at the field level. For Uganda's case, it would be costly to have dedicated centres in each district due to financial implications regarding staffing and monitoring but regional centres would be more effective. Currently, the government requires that all departments and ministries incorporate climate change adaptation programmes into their activities but this is not the case due to low sensitisation and awareness. At the village levels, it is even worse because the district leaders have low knowledge too about climate change and how to include it in their planning so it's also not a priority. Until different entities recognise climate change as a challenge and have it as part of their core planning, other sectors of the enabling environment will also not develop.

4.3.4 Rural Economic Development and CDM

The development of the rural economy is crucial because it leads to the diversification of livelihood activities in rural areas. The current state of industrialization in Uganda is that more than 70% of factories and industries are situated in the southern part, with the rest of the 30% shared between the North, West and the East. This coupled with low development of infrastructure like a poor road network, low mobile telephone density, limited internet facilities, inadequate social services and more importantly, lack of electricity, all lead to low industry and investment opportunities.

Distribution of such industries and investments doesn't necessarily have to be large scale. Simple one with synergistic capacities for a region like Teso are good enough, considering that majority of the population is not educated to University level. Mid-scale ones include fruit processing industries, which buy raw materials in the form of fruits from local farmers, honey factories, ginneries, and maize grinding mills, among others. The idea here is to have industrial establishments using local resources as raw materials. This will create more jobs and widen the income base thus lowering dependency on farming.

As far as CDM is concerned, the benefits in Uganda are still low but according to the Climate Change Unit, there is potential especially in the fields of energy. The biggest challenge here in Uganda is knowledge on CDM and how it works. For the Teso Region, the biggest potential is investments in renewable energies particularly solar, bio-gas, wind and to a certain extent, hydro considering that the geology of the area is largely flat with few highlands. This is an area that has a lot of sunshine and rain alike and therefore, the potential to reduce emissions from burning bushes, deforestation and charcoal burning is high. However, for this to be effective, there needs to be massive awareness campaigns as well as education particularly at the higher levels targeting business men, local and foreign investors about CDM as well as Government putting in place incentives to attract western private companies to come invest their resources in this region thus contributing to sustainable development as well as developing the rural economy.

4.3.5 Financial Incentives

Usually, after the occurrence of disasters, lives are lost and livelihoods are severely destroyed that people have nothing at all. In Africa, and Uganda in particular, there are no compensations or insurance premiums paid to those affected. Also, businesses that have been severely affected are never compensated. Worse still, during the recovery phase, authorities do not provide other incentives like tax holidays, removal of taxes on some necessary commodities like food, clothing, medicines or iron sheets. If anything, prices go even higher

because some middle men want to take advantage of the scarcity of certain items to make profit.

This can however change with provision of incentives to help the poor communities cope and be able to stand on their own especially during and after the occurrence of disasters. For businesses, taxes should be reduced or waived, particularly transport taxes that are necessary to bring in essential commodities like food, medicines and fuel supplies. For those that have lost their livelihoods completely, start up capital schemes, soft loans and loan guarantees should be given to them. To be able to provide such services, the government should set up a special climate change fund at the national level specifically meant to cover such costs.

4.3.6 Active Media

Media plays a key role in African society. A very good example in as far as Uganda is concerned is the HIV/AIDS experience. When this pandemic rapidly spread in the 1980's, prevalence rates went up to more than 30% with some referring to Uganda as the world's AIDS capital. However, the situation dramatically changed that at one point, Uganda was being referred to as the best role model with a successful fight against the disease in the late 1990's, bringing down prevalence levels from 30% to less than 6% today (UNRISD, 2006).

One key reason attributed to this change of fortunes was the role of the media (Uganda AIDS Commission, 2007 & WHO, 2001). There were appealing giant bill boards across the country, news paper adverts, plays and skits about the disease in schools and other institutions, all preaching safer sex and abstinence. The same can be used for climate change adaptation and building resilience. Lawrence Aribo of the Climate Change Unit agrees and states that if only the same course of action can be applied today and people are told about the dangers of unsustainable practices, positive change would occur within the short – medium term.

4.3.7 Technological Transfer and Capacity Building

The Early Warning Systems, Automatic Weather centres, drought resistant seeds, irrigation technologies, monitoring systems, regular and systematic risk assessments, policy formulation, review and implementation all need up to date modern technology as well as skilled personnel. Both of these are substantially lacking across Africa and Uganda in particular. Developed countries that are responsible for much of their greenhouse gas emissions should have a moral and legal obligation to transfer some of their skills to Uganda. According to the Climate Change Unit for example, there is a roadmap that is currently taking place with the ultimate aim of coming up with a national policy. However, all activities in this roadmap are valued at an estimated US\$400,000. This is where the developed countries are needed to fill in that gap as well as providing leadership for tackling climate change impacts. Technological transfer ensures that the local people will be trained and will thus, take over the whole process of adaptation and mitigation of future disasters thus enabling sustainability.

4.4 Role of Intermediary Partners / Parties

In Uganda, direct implementation of activities at the grassroots / community levels is carried out by intermediary / implementing partners. The 'top', usually made up of the Government and respective ministries and departments, donors and policy makers, formulate policies, strategies and programmes as well as provide resources, including financial, technical and technological, needed to implement activities at the community level.

Direct implementation of the activities decided upon at the top level is done by the implementing partners. According to the Soroti Catholic Diocese Integrated Development Organisation (SOCADIDO), a Teso region Faith Based Organisation (FBO) working as a partner with major international multi-lateral organisations including UNICEF, WFP and FAO, their main roles include training and capacity buliding for communities, sensitisation events and physical delivery of tools and kits to the beneficiary communities earlier procured by donors and/or the Government. Other intermediary players include Community Based Organisations (CBO).

Figure 4-2 illustrates the different roles and responsibilities played by various stakeholders within the rural development framework in Uganda

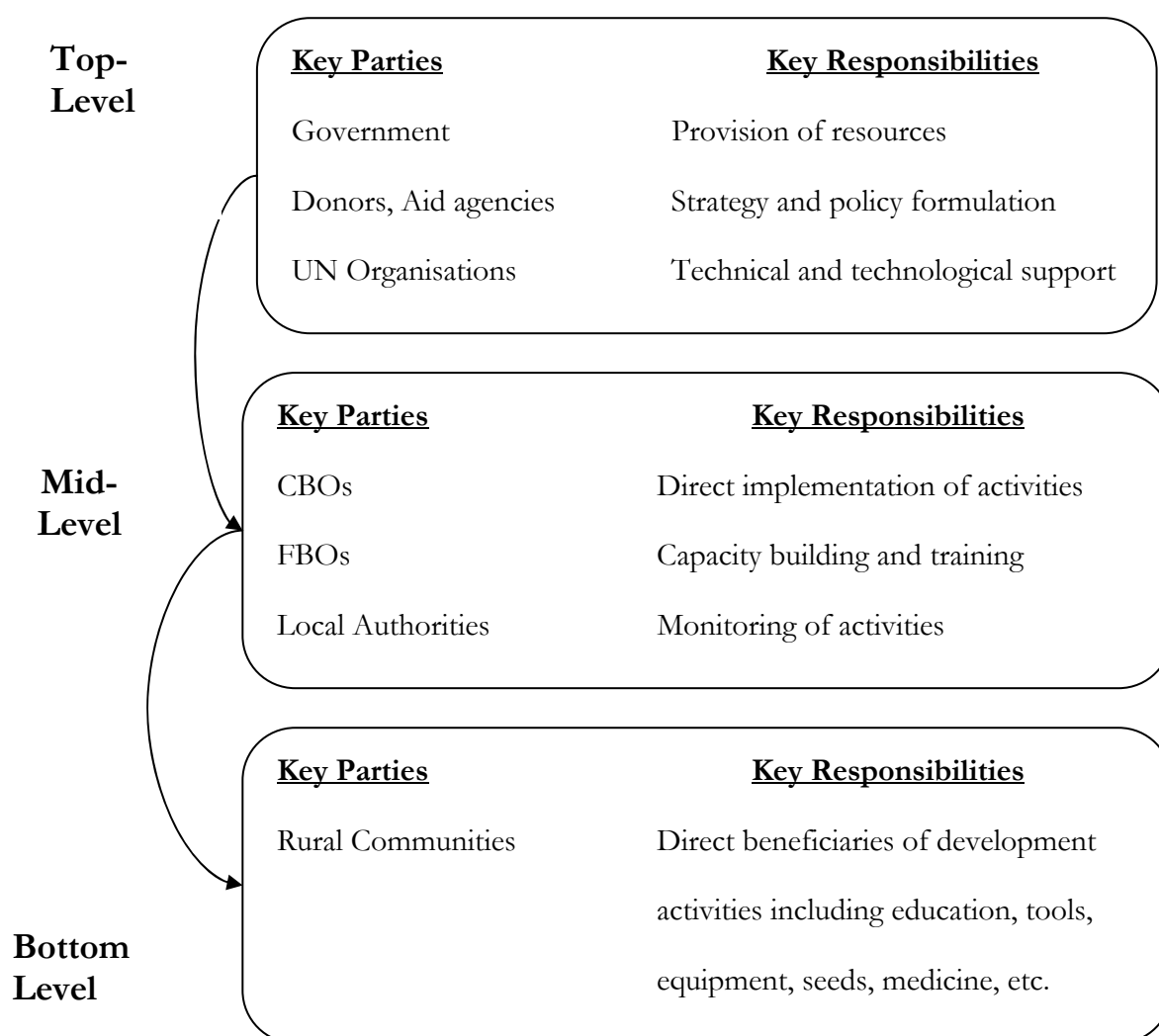


Figure 4-2 Composition and key responsibilities of stakeholders at different levels.

Source: Field data

5 Conclusions and Recommendations

5.1 Introduction

The purpose of this chapter is to present conclusions and recommendations based on the information obtained from the findings of the study. It's from this information that recommendations are made to improve on the current resilience levels as well as the enabling external environment in Uganda. This section also recommends other areas for further reading and research in the area of climate change and how it affects livelihoods particularly of the poorest communities in Africa and Uganda in particular.

From the study, it is evident that rural communities are extremely vulnerable to impacts of extreme events for a variety of reasons ranging from the lack of access to right and timely information to limited women involvement in matters of planning at all levels, from the national level to the village levels. This state of affairs, if unchecked, has a number of negative consequences including increased incidents of hunger and food insecurity as well as increases in already high levels of chronic poverty. The battle against these will only be achieved through ensuring that climate change is fully addressed, both at policy and implementation levels.

5.2 Conclusions on Strengthening Community Led Resilience to threats of Climate Change

The study findings established that much as Uganda has a well documented National Development Plan (2010/11 – 2014/15), which outlines the various strategies and actions needed to curb the chronic poverty, hunger and other social barriers to development in the country, lack of concrete and solid efforts specifically at local / village levels and the national levels including government ministries and departments to a considerable degree, to address impacts of extreme events caused by climate change, have had a continuous negative impact on the livelihoods of the rural populations in Uganda, especially in terms of food security, health and economic livelihoods.

The key goals of this study were to explore the major hinderances local communities face in standing up to their vulnerabilities and how they can be empowered to overcome these challenges and also have an understanding of the current external enabling environment and how it can be strengthened in order to ensure sustainability of community efforts against vulnerability.

Poor rural African communities are the most vulnerable to impacts of extreme events particularly droughts and floods. The IPCC has predicted warmer temperatures for Sub Saharan African nations as well as Uganda being predicted to become wetter with heavier rains (IPCC, 2007). These kinds of predictions, which the UNFCCC refers to as unequivocal, require that the most vulnerable communities in countries like Uganda be empowered to levels at which they can be resilient.

Findings revealed that the key hinderances facing rural communities in reducing their vulnerability included limited, 'inaccurate' and untimely information flow on climatic and weather patterns, heavy reliance on agriculture, limited education and awareness programmes, limited women involvement as well as lack of appropriate technologies. Reducing vulnerability should start from having access to the right and timely information on extreme

events. This is where planning begins, be it centralised planning or even household planning. Once the authorities are in position to know the frequency of occurrence of such events, they can plan ahead in form of building the necessary structures and mechanisms that will be required to ensure survival of their populations, for example infrastructures like access roads, hospitals. At the household levels, communities will be in position to plan their activities accordingly, knowing what to do and when. Since they are predominantly agricultural societies, right information flows will enable them plant drought resistant crops for instance in case prolonged droughts are predicted and also practice more sustainable ways of water efficiency or perhaps rice or yams or other crops that do well during times of heavy rains. What exists now is that communities are not aware and not informed of future expected climatic seasons coming up so they plant according to their historical seasonal calendars.

For Uganda's case, what is currently possible is timely information enough to save lives, both humans and cattle and a few other valuable items perhaps, since predictions for likely extreme weather events cannot be made for much longer than even a week. That is enough time for an ordinary household in rural villages to move his or her family to another location.

Diversification of the rural economy can play a crucial role in reducing vulnerability particularly for African communities. Heavy dependence on subsistence agriculture greatly limits the possibility of acquiring financial and subsequently food resources from other alternative sources. There is need to de-congest industrial and key service activities from the capital city and other big towns nearer to communities that are so vulnerable. There is also a possibility of encouraging the growth of commercial agriculture in the form of growing crops and rearing of animals for export or even sale to other areas within the country. For a region like north eastern Uganda, commercial agriculture is very much possible according to the Climate Change Unit. Thus not only does it provide extra labour positions, but also contributes to increased incomes. Relatedly, Agro-based industries would suit this even further because being an agricultural based economy, there are plenty of raw materials that could be used in factories and industries dealing in food, fruit and animal product processing, which could further create opportunities for growth at the community level.

The ultimate is however government commitment to addressing the impacts of these extreme events. From the findings, key government departments and ministries have not yet incorporated climate change adaptation and mitigation programmes into their development plans. Efforts at the community levels to empower rural people stand up to their vulnerabilities begin at the top. If there is no commitment in the form of a policy and funding to implement the policy, communities down in the villages will continue to suffer. A great example underlined in the study is the HIV/AIDS experience that made the Ugandan Government act swiftly and set aside resources in form of personnel, funding of activities and eventual formation of a policy, all of which contributed to arresting the situation and achieving results of reducing prevalence levels from 30% to 5%. The same approach should be applied for climate change adaptation in the country.

5.3 Recommendations

'.....we must shift from a culture of reaction to a culture of prevention...it is more humane..also much cheaper..' Kofi Annan (1999), former UN Secretary General.

Climate and development are two compatible components, particularly in Africa where key economic activities are heavily reliant on the climate. No longer can communities and governments look at it as just another of those environmental issues because the poor, especially in developing countries in Sub Saharan Africa are being affected on a more regular basis thus increasing their vulnerability levels. This places millions of people in an *'already-at-risk'* situation. This therefore, justifies that for climate change be incorporated and mainstreamed into national and community development plans. Sadly, this is not currently the case in many African countries.

The achievement of the MDGs in Africa and Uganda, in particular, has a strong linkage with climate change. Unless climate change adaptation is given greater attention and consideration through incorporating it at all levels in the development plans, the MDGs will not be met or will be partially realised. A multi-faceted approach is recommended to assist in this goal and is described in the following paragraphs.

5.3.1 Adopting a PRA approach

Community participation is crucial in community and rural development. They may not be highly educated and on paper, it might appear that they offer very little in terms of ideas for development. However, it has been proven that community participation in planning offers a lot of information that would otherwise not been known had they not been consulted. The PRA gives locals a sense of ownership of their own development process. Community participation offers the opportunity to prioritise needs and solutions that are relevant to the community instead of applying *'foreign'* interventions as was the case in Niger where French tree species were brought in to replace indigenous ones, which proved to be ineffective and costly.

5.3.2 Incorporation of Climate Change Adaptation into Community plans

Occurance of extreme events is now certain (IPCC, 2007). However, as noted in the findings, adaptation and other activities are not mainstreamed into the local economy. Local governments must ensure that climate change is part and parcel of their development plans and budgets since it directly affects their livelihoods. Key activities include education and awareness programmes, infrastructure building and maintenance particularly access roads, better farming practices like agro forestry among others. The central government should, on the other hand, offer technical, technological and financial support.

5.3.3 Introduction of Incentives

As stated earlier, those that have been affected by impacts of extreme events usually lose part or the all of their livelihoods. And there are no mechanisms whatsoever, offered to them to be able to re-establish themselves, both the local villagers as well as businessmen for instance. The Government should put in place avenues that encourage and strengthen people affected by the impacts. These could include removal of taxes on essential items like food, medicines, temporary shelters and clothing, tax holidays for business men, insurance schemes, loan credits to those affected especially villagers who have lost everything. This can contribute to enhancing resilience of people.

5.3.4 Capacity Building

Climate change impacts affect every individual but the fact that it's the poor who are more affected in the rural areas, therefore it is justifiably necessary to educate them to stand up to vulnerabilities. Education should be in the fields of example building codes, agricultural practices, first aid techniques, bridges among others. Due to low literacy levels, the main capacity building should be done using plays and theatre.

5.3.5 Distributed Economies with emphasis on Agri-buisness

Decongestion of urban centres is crucial in reducing dependence on agriculture. Spreading industrial and service sectors to rural areas will offer opportunities to rural communities by way of getting alternative sources of income. In agreement with communities, one of the most practical ways of doing this would be investements in agro-based industries where locals would grow fruits and vegetables as well as animal products, which can be used by industries as raw materials. The industries would also provide jobs for those that are not engaged in the production of these fruits or vegetables or animal products. Distribution of economies also calls for use of local facilities besides labour and raw materials. Other facilities in use will be the roads, stores, social services centres like schools and hospitals, which therefore, means that distribution carries with it more incentives for added infrastructure.

5.3.6 Farmer Led Regeneration activities

Farmers in rural areas play a key role in adaptation, resilience and mitigation. This is because they are in the sector that provides the basic means of livelihood in terms of food and income and therefore should be the focus of regeneration projects in the community. They are responsible for much of the food production and more often use unsustainable practices to create space for food. So in a bid to reverse desertification and its effects, farmers should be targeted and encouraged to practice afforestation and / or agro forestry techniques. This could be in form of incentives from the government or development partners as was the case in Niger. For those that practice such sustainable activities, rewards like giving their products priority on the market, free agricultural equipment, tools and seeds should be given to them. For those that do not, local by laws should be made and be applied to them.

5.3.7 Women Empowerment

Women must be involved at all stages of the planning process. Women are the majority of all the 70% small land holder farmers in Uganda and are responsible for between 70%-75% of the agricultural production. They constitute an average of 55% of the labour for land preparation, 65% for planting and 90% for weeding. This shows their importance to development of both the local and national economy and should thus, be included in efforts aimed at improving the resilience of local communities. They should be trained and have their capacities built in sustainable farming practices, business skills, and family planning methods, among others.

5.4 Areas for Further Research

This study is by no means complete. Several factors arose that need further reading and research that could be instrumental in achieving highly resilient communities especially in Africa.

5.4.1 Low CDM Investments in Africa: What are the underlying reasons and opportunities for development?

CDM investments in Africa are very low yet CDM could serve as a key to the diversification of rural economies on the continent. Africa accounts for only 3% of the more than 1000 CDM projects approved globally (UNFCCC) as compared to South Korea – 7.28%, Brazil – 9%, and India – 48.9% (UNECA, 2008). Outside South Africa, the rest of the continent combined account for only 1%. The enabling / external environment has been described as the key reason as to why this is the case, more especially due to lack of skilled man power on the continent, poor infrastructure, poor investment climate, instability and more importantly, limited knowledge about CDM at all levels, which also contributes to low political commitment. How have other developing countries like India, Brazil, Mexico and China managed to attract CDM investments, yet according to the UN, Africa has got much more potential? These countries also face the same problems as Africa as they have much more violent drug related crimes and high rates of poverty yet CDM investments are considerably higher. A policy and community based comparative study would unearth some of the underlying causes of low CDM investments in Africa.

5.4.2 Making Foreign Aid and Development Assistance More Effective

Foreign aid and development assistance over the decades has been flowing into Africa from the rich industrialised nations with the sole objective of promoting development in recipient countries (UN General Assembly Resolution 2626 (XXV), para 45-47, 1970). However, there is need to research further on how to make this assistance more effective. There are issues that need to be addressed, for instance, since 1970 when rich countries agreed to give 0.7% of their GNI as aid to developing countries at the UN general assembly, billions of dollars have been spent in aid but it has not been effectively used.

It has not served the main purpose of promoting development, particularly in Africa, where reports indicate that up to 50% of populations in many Sub Saharan African countries still live on less than a dollar a day (A. Parsons, 2008). So what is the underlying problem? Is it the quality or the quantity of the aid that is low? Who should be the most 'appropriate party' to administer development assistance in Africa? Should the money be channeled directly to the poor in rural areas? Are they educated enough to use the resources effectively? Should it be channeled through international organisations like UN agencies or multi-lateral organisations like DFID, DANIDA or SIDA? This has its challenges to especially with African governments citing issues of sovereignty. There are issues of conditionalities, with Western governments placing certain conditions before aid is released and often cutting back or reducing it after governments go against issues to do with press freedoms, pluralism and freedom of expression at the expense of the rural person. Unless these issues are addressed, continued aid to Africa to help in adaptation process will also be ineffective.

Bibliography

Africa and Europe in Partnership (2009) Climate Change – The Challenges for Africa
<http://www.africa-eu-partnership.org/focus/climate-change-%E2%80%93-challenges-africa>
Accessed 4th June 2010.

Africa Partnership Forum (2008) Carbon Finance in Africa: A Paper Presented at the Meeting of the African Partnership Forum in Addis Ababa 17 – 18 November 2008.

A. Brody, J. Demetriades, E. Esplen (2008) Gender and Climate Change: Mapping the Linkages
http://www.unep.org/roa/amcen/Projects_Programme/climate_change/PreCop15/Proceedings/Gender-and-climate-change/DFID_Gender_Climate_Change.pdf Accessed on 15th August 2010.

AIACC (2007) A Stitch in Time: Lessons for Climate Change Adaptation from the AIACC Project, Working Paper No. 48.
http://www.aiaccproject.org/working_papers/Working%20Papers/AIACC_WP48_Leary_et_al.pdf Accessed 14th August 2010.

A. Challinor, T. Wheeler, C. Garforth, C. Craufurd & A. Kassam (2006) Assessing the Vulnerability of Food Crop Systems in Africa to Climate Change.

A. Herro (2006) Uganda in Track to Have the World's Highest Population Growth
<http://www.worldwatch.org/node/4525> Accessed 29th June 2010

A. Parsons (2008) World Bank Poverty Figures: What do they mean?
<http://www.stwr.org/globalization/world-bank-poverty-figures-what-do-they-mean.html>
Accessed 22nd August 2010

A. Salami, A. Kamara, Z. Brixiova (2010) Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities: African Development Bank Group Working Paper Series Number 105
<http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/WORKING%20105%20PDF%20d.pdf> Accessed 31st May 2010

A. Selassie, IMF (2008) Beyond Macro Economic Stability: The Quest for Industrialisation in Uganda. IMF Working Paper WP/08/231

A. Shah (2010) Foreign Aid for Development Assistance
<http://www.globalissues.org/article/35/foreign-aid-development-assistance> Last Accessed 10th September 2010.

Asian Tribune (2007) Uganda Indians in Trouble Again: Retrieved from
<http://www.asiantribune.com/index.php?q=node/5347>. Accessed 3rd July 2010 Accessed 14th June 2010

B. Osman-Elasha (2008) Climate Change Impacts, Adaptation and Links to Sustainable Development in Africa

Buenos Aires Programme of Work on Adaptation and Response Measures (2004)
http://unfccc.int/files/meetings/cop_10/adopted_decisions/application/pdf/01_cp_1_16.pdf Accessed 14th June 2010.

D. Ratcliff (n.d) 15 Methods of Data Analysis in Qualitative Research: Retrieved from
<http://qualitative-research.ratcliffs.net/15methods.pdf> Last Accessed 8th September 2010.

DFID (n.d) Adaptation to Climate Change: Making Development Disaster Proof. <http://webarchive.nationalarchives.gov.uk/+http://www.dfid.gov.uk/documents/publications/climatechange/2propoorgrowth.pdf> Accessed 26th June 2010.

DFID (2008) Climate Change in Uganda: Understanding the Implications and Appraising the Response.

DSoER (2004) Draft District State of Environment Report, Soroti District: Published by the National Environmental Management Authority.

E. Harsch / Africa Recovery / UN (n.d) Africa Braces for El Nino's Impact: Preparing against Drought in Southern Africa. <http://www.un.org/ecosocdev/geninfo/afrec/vol11no3/elnino.htm> Accessed 19th June 2010

E. Levina, D. Tirpak & OECD (2006) Adaptation to Climate Change: Key Terms. <http://www.oecd.org/dataoecd/36/53/36736773.pdf> Accessed 19th May 2010

FAO (2003) A Handbook for Trainers on Participatory Local Development <http://www.fao.org/docrep/006/ad346e/ad346e0f.htm> Accessed 9th June 2009

FAO (1997) Improving Agricultural Extension: A Reference Manual <http://www.fao.org/docrep/w5830e/w5830e08.htm> Accessed 11th July 2010

FAO/WFP (2008) Assessment of the Impact of the 2007 Floods on Food and Agriculture in Eastern and North Eastern Uganda

G. Pfeifer & G. Stiles (n.d) Carbon Finance in Africa: A Policy Paper for the African Partnership Forum.

GoK / UNESCO (2006) Kenya National Water Development Report: Prepared for the 2nd UN World Water Development Report. 'Water: A Shared Responsibility.'

GoU (2010) National Development Plan (2010/11 – 2014/15)

GoU (2002) UNFCCC Report on Uganda

GoU/UNEP/GEF (2007) Climate Change: Uganda National Adaptation Programmes of Action

IFAD (n.d) IFAD's Response to Climate Change through Support to Adaptation and Related Actions: Accessed from the World Food Programme Uganda Country Office and also available from <http://www.ifad.org/climate/resources/adaptation.pdf> accessed 11th August 2010

IIED Briefing (2008) Adaptation in Africa: The Global Failure to Deliver on Funding. <http://www.iied.org/pubs/pdfs/17047IIED.pdf> Accessed 17th June 2010

J. Keane, S. Page, A. Kergna & J. Kennan (2009) Climate Change and Developing Country Agriculture: An Overview of Expected Impacts, Adaptation and Mitigation Challenges, and Funding Requirements. Issue Brief Number 2. Accessed from the World Food Programme Uganda Country Office

J. McNiff, P. Lomax & J. Whitehead (1996) You and Your Action Research Project.

J. Neill (2006) Analysis of Professional Literature Class 6: Qualitative Research. <http://wilderdom.com/OECourses/PROFLIT/Class6Qualitative1.htm> Accessed 11th June 2010

J. Tumushabe (2006) The Politics of HIV/AIDS in Uganda: Social Policy and Development Programme Paper Number 28 Accessed from World Food Programme Uganda Country Office

- J. Twigg, DFiD (2007) Characteristics of a Disaster-resilient Community http://www.proventionconsortium.org/themes/default/pdfs/characteristics/community_characteristics_en_highres.pdf Accessed 26th May 2010
- M. Fleshman / Africa Renewal / UN (n.d) With UN Help, Africa seeks its share of green development cash: Retrieved from <http://www.un.org/ecosocdev/geninfo/afrec/newrels/africa-green.html>. Accessed 25th July 2010
- National Forestry Authority official site: http://www.nfa.org.ug/content.php?submenu_id=12. Last Accessed 13th August 2010
- OXFAM (2008) Turning up the Heat: Climate Change and Poverty in Uganda
- Parliamentary Office of Science and Technology Postnote (2006) Number 269: Adapting to Climate Change in Developing Countries <http://www.parliament.uk/documents/post/postpn269.pdf> Accessed 19th June 2010
- P. Kurukulasuriya, R. Mendelsohn, R. Hassan, J. Benhin, T. Deressa, M. Diop, H. Mohamed, K. Fosu, S. Jain, A. Mahamadou, R. Mano, J. Kabubo, D. Maddison (2006) Will African Agriculture Survive Climate Change?
- R. Bogdan, S. Biklen (1992) Qualitative Research for Education
- R. Musoke (2008) Stopping Uganda's Population Growth: Article posted on Wednesday, 12th November 2008 <http://www.enviroconserve.org/article.php?Article=14&Mag=3&Topic=4&Subtopic=4>. Last accessed 11th July 2010
- Redorbit (2009) Climate Change Threatens Ugandan Livelihood, retrieved from http://www.redorbit.com/news/science/1705538/climate_change_threatens_ugandan_livelihood/. Accessed 3rd August 2010
- Redorbit (2009) Global Warming Splits Ugandan Icecap, retrieved from http://www.redorbit.com/news/science/1859473/global_warming_splits_ugandan_ice_cap/. Accessed 3rd August 2010
- R. Washington, M. Harrison, D. Conway, E. Black, A. Challinor, D. Grimes, R. Jones, A. Morse, G. Kay & M. Todd (2006) African Climate Change: Taking the Shorter Route.
- S. Huq, A. Rahman, M. Konate, Y. Sokona, H. Reid (2003) Mainstreaming Adaptation to Climate Change in Least Developing Countries
- S. Mabikke (2010) Implications of Land Governance on Rural Development in Uganda: A Case Study of Nakasongola District. Master's Thesis - Technische Universitat Munchen, Germany
- Self Help Africa (n.d) Stone Bunds and ZAI <http://www.selfhelpafrica.org/selfhelp/main/US-TECH-zal.htm> Accessed 22nd May 2010
- The Daily Monitor Newspaper (2009) Climate Change takes its Toll in Teso Region: Article posted on Saturday, 29th November 2009. <http://www.monitor.co.ug/News/-/688324/814810/-/c51up9/-/index.html> Accessed 15th May 2010
- T. Downing, L. Ringius, M. Hulme & D. Waughray (1997) Adapting to Climate Change in Africa
- The Economist Intelligence Unit (2006) Business Africa: November 16th – 30th 2006.

The New Vision Newspaper (2009) Uganda's Population Growth Worrying: Article posted on Monday, 3rd August 2009. <http://www.newvision.co.ug/D/8/13/690142> Accessed 21st June 2010

UN General Assembly (1970) Resolutions adopted on the Reports of the Second Committee <http://daccess-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/348/91/IMG/NR034891.pdf?OpenElement>
Last accessed 10th September 2010

UN/GoU (2010) United Nations Joint Programme on Climate Change in Uganda.

UNCCD (2002) National Report to the United Nations Convention to Combat Desertification Tivalu <http://www.unccd.int/cop/reports/asia/national/2002/tuvalu-eng.pdf>
Accessed 19th July 2010

UNDP (1999) Capacity Building for Environmental Management: A Best Practical Guide.

UNDP/UNEP/UNCCD (2009) Climate Change in African Drylands: Adaptive Livelihood Options
http://www.undp.org/drylands/docs/drought/CSD/Climate_Change_in_African_Drylands-Adaptive_Livelihood.pdf. Accessed 11th July 2010

UNECA (2008) Biofuels: What Strategies for Developing the Sector in West Africa?
<http://www.uneca.org/sros/wa/meetings/ICE11/RapportEco-Biocarburants-en%20AfriqueENG.pdf> Accessed 14th August 2010

UNECA (2009) UNECA's African Climate Policy Centre Gets Support from Sweden
<http://climate-l.org/2009/12/01/uneca%E2%80%99s-african-climate-policy-centre-gets-support-from-sweden> Accessed 4th June 2010

UNECA (2010) Science with Africa: Issue No.5, African Scientists to Develop Climate Change Road Map.
http://www.uneca.org/sciencewithafrica/swa1/enewsletter/content_apr_2010/African%20Scientists%20to%20develop%20a%20Climate%20Change%20Roadmap.pdf accessed 22nd July 2010

UNEP, GoK (2000) Environmental Assessments of Year 2000 Drought
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=466&ArticleID=5108&l=en> Accessed 11th June 2010

UNFCCC (n.d) About CDM <http://cdm.unfccc.int/about/index.html> last Accessed 9th September 2010

UNFCCC (n.d) Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries. <http://unfccc.int/resource/docs/publications/impacts.pdf> Accessed 25th May 2010.

UNFCCC (n.d) National Adaptation Programmes of Action: Africa Country Reports
http://unfccc.int/national_reports/napa/items/2719.php. Accessed 28th July 2010

UNFCCC (n.d) The Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change

UNICEF (2006) Girls Education movement in Uganda helps girls and boys stay in school
http://www.unicef.org/infobycountry/uganda_33942.html Accessed 14th August 2010

UNIDO (2009) Independent Evaluation Uganda, UNIDO Integrated Programme: Agro-Processing and Private Sector Development – Phase II

W. Carr, S. Kemmis (1986) Becoming Critical: Education, Knowledge and Action Research

W. Kakuru, C. Okia, J, Okorio (2004) Strategy for Agroforestry Development in Uganda's Drylands. A Paper presented at the Drylands Agroforestry Workshop 1st – 3rd September in 2004 at the ICRAF Headquarters in Nairobi Kenya.

World Bank (2010) World Development Report: Development and Climate Change

WFP (2006) World Hunger Series 2006: Hunger and Learning

WFP (2008) WFP Strategic Plan 2008 - 2011

WFP (2009) Comprehensive Food Security and Vulnerability Analysis Report for Uganda

WFP (2009) Emergency Food Security Assessment Handbook

WFP (2009) Office of Evaluation: Strategic Evaluation of WFP's Contingency Planning 2002-2008

WFP (2010) World Food Programme Frontline Response to Climate Change

6 Appendix

6.1 Map of Niger with its location within the Sahara

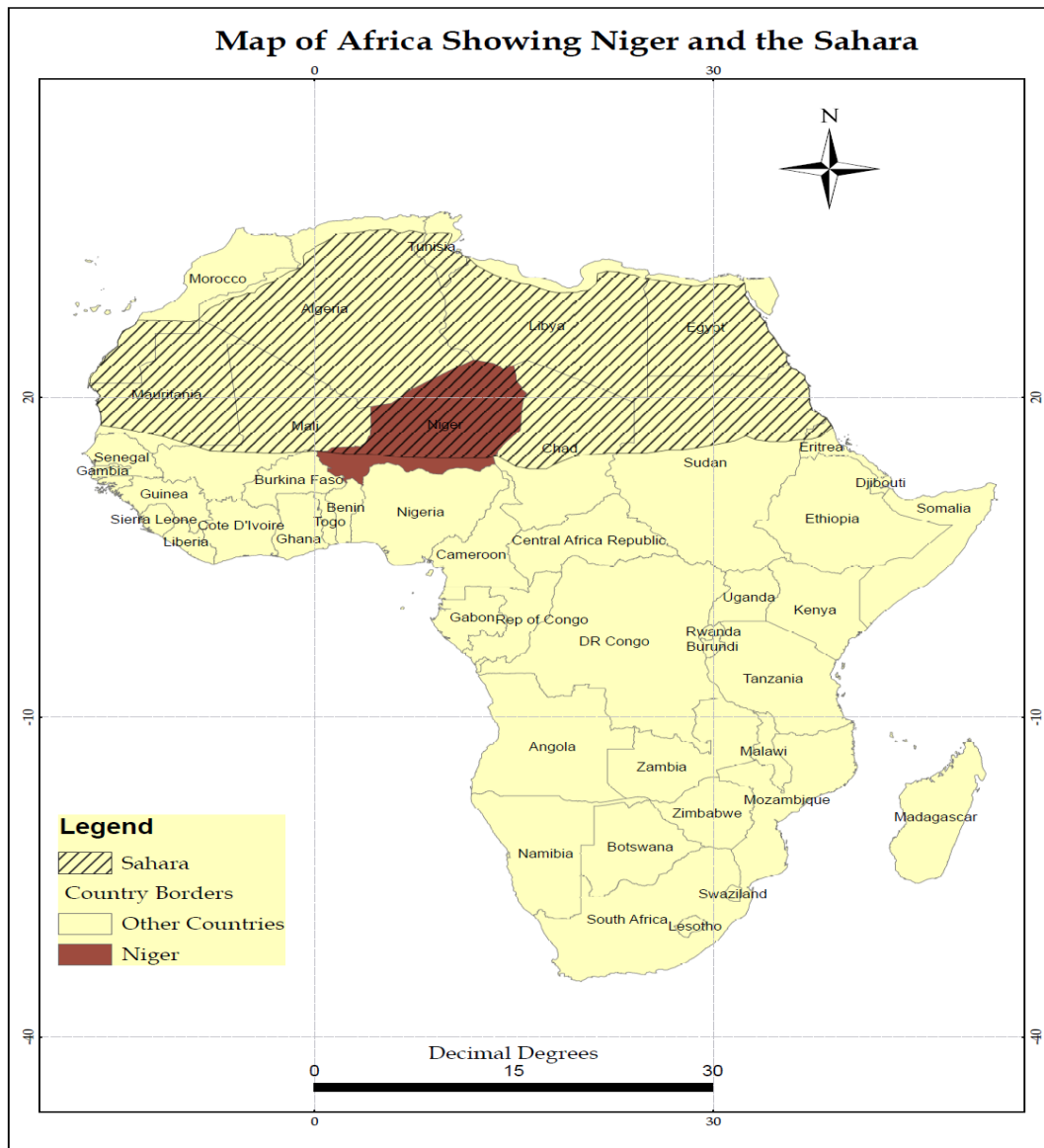


Figure 6-1: Map of Niger showing its Location within the Sahara

Source: Vulnerability Assessment and Mapping Unit - UN World Food Programme Uganda, 2010

6.2 Main discussion points with the professional category of respondents

1. Name:
2. Title:
3. Name of work place:
4. Type of organisation / work place: a) UN agency b) International NGO c) Local NGO d) Private profit making company e) Other

5. Key role you play within the organisation: a) Leadership position b) Policy c) Administration d) Programmes e) Other
6. Main thematic area you are involved in: a) Agriculture and food security b) Climate Change c) Rural development d) Humanitarian and development e) Other
7. Do you have any other business activity you are involved with besides your 'professional' current job? And why?
8. How would you describe the current climate change programmes and activities in Uganda, both at the national and village level?
9. Regarding the formulation of the climate change policy, do you think it would play a big role in supporting some of the programmes and activities you have mentioned above? Is Uganda addressing the issues of climate change adaptation in the right way?
10. How and what are the good points?
11. What are the loopholes and challenges regarding implementation of climate change adaptation in Uganda?
12. From your own professional experience and educational background, what are the 3 main priority areas within the enabling environment applicable to Uganda that would be essential to support communities in rural areas adapt and be more resilient to address the challenges you highlighted above for sustainability purposes?

6.2.1 List Professional respondents

Name	Organisation	Role
Stanlake Samkange	UN World Food Programme (WFP)	Country Director and Representative
Rose Eyoru	WFP	Programme Officer
Emmanuel Odongo	WFP	Programme Officer
Loy Dhikusooka	WFP	Snr. Programme Assistant
Christine Achieng	CARE Uganda	Sector Manager
Martha Mwesiga	UNDP / CCF	Climate Change Forum Coordinator
Lawrence Aribo	Climate Change Unit / NFA	Focal Point Person
Stephen Tanywa	OPM / Meteorological Department	Met Officer
Kenneth Anyanzo	FAO	Vulnerability Assessment and Mapping
Daniel Othieno	OPM	District Disaster Coordinator

Source: Field data, 2010

6.3 Main discussion points at the community level using the PRA method based on case studies of Niger and Kenya and the characteristics of a resilient community (J.Twigg, 2007)

1. Both case studies highlighted the importance of communication and information sharing, particularly when it comes to weather information. This is the key to any community based climate change adaptation and resilience strategies (CSTI, 2009:13, FAOSTAT, 1999).

Key issues for field discussion

Weather conditions of the case study regions / villages – for the last decade or so. (2 drought prone and one flood prone). Will verify this with national meteorological records.

How they used to know / predict their seasons. Do they notice any changes in terms of amount of rainfall, sunshine, duration, early or late rains / sunshine?

What kind of activities are done depending on the weather and how have these activities been affected by the droughts / floods. What coping / adaptation strategies (UNFCCC:29) have they employed so far and are they bearing fruit? General perception of climate change in the villages.

Is there a shared vision of a prepared and resilient community? Do the communities have knowledge of hazards, vulnerability as well as risk reduction actions sufficient for effective action by the communities themselves with collaboration from other stakeholders?

Any community disaster plans and are they publically available and understood? Are communities aware of facilities or services available before, during and after an emergency and how they can access them?

2. Information on weather should be relayed in a meaningful and timely manner. If communities know that there will be delayed rains for instance, it will help them plan what kind of crops to grow or what type of agricultural activity is appropriate then. They can also practice more water efficiency measures. Information on anticipated heavy downpours induces flood protection and water harvesting measures...

Key issue for field discussion

What weather information sharing / communication techniques exist. How is it relayed to villagers / lay people? Who does the communication and how often?

3. Information must also suit relevant stakeholders (Buenos Aires PoW:1)

Key issue for field discussion

Do communities get the right information that is applicable to their situation? Cases of having the right information to the wrong people or the other way round. For example information on expected rains may only reach the urban non farming dwellers instead of the rural based farmers who may not have radios...

4. Community participation at all levels of the project cycle is key. This is justified because it is the rural communities who are most affected by impacts of climate change and therefore must be involved and take lead in most adaptation initiatives. Promotes sense of ownership and sustainability.

Key issue for field discussion

Of the coping strategies they are applying, to what extent are they community led and how deep is their participation at the different stages of the coping / project cycle, e.g., at the programming, identification, appraisal, financing, implementation and evaluation stages? Their participation might range from being consulted at the very least to the actual implementation...

5. Enabling environment. One of the key issues / elements here is the role of development partners. Climate change adaptation in developing countries requires support from the developed nations principally because they lack the financial and technological resources to implement adaptation and resilience programmes on their own (UNFCCC).

Under the Programme of Action for the LDCs for the 2001-2010 decade discussed in the 3rd UN Conference on the LDCs in 2001, there is recognition amongst all parties that adaptation to climate change impacts be handled using the principle of common but differentiated responsibility. LDCs contribute least to green house gas emissions yet they are the most vulnerable. They should identify vulnerabilities within themselves and possible adaptation measures while the developed partners provide the financial and technological support (UN, 2001a).

Key issue for field discussion

Any participatory community risk and vulnerability assessments done to have a clear picture of major hazards and potential future threats and how communities are affected by them? How often are they done?

Are they shared among all stakeholders and incorporated into the community plan?

How much financial / technological resources are available / set aside by the government at the community level for adaptation / disaster reduction attributed to impacts of climate change? Is climate change adaptation a priority?

Who are the main development partners in the region and what are their different priorities and activities as far as disaster risk reduction and climate change adaptation is concerned? What framework are they using for their implementation of activities? Does it address the core threats identified by the communities?

Also as G. Conway argues, if people are better fed, healthy, educated, it increases their ability to adapt and be more resilient....these are characteristics of development within a community. Do they exist?

6. Perhaps the most important similarity in both case studies is the use of small holder farmers to be at the forefront of strengthening resilience at the community levels. More than 80% of people in Sub Saharan Africa are directly involved in agriculture and farming and of these, more than 75% are in rural areas. Majority use unsustainable farming practices including land clearing, bush burning, over stocking and encroachment on both swamps and forests among others, all of which exacerbate climate change.

Key issue for field discussion

Closely look at the present practices. Why are they applying them? What is the role of the non farmers like local leaders, students, etc. Are they aware that their unsustainable practices exacerbate the climate change problem? Are they willing to change to better practices like agro forestry?

7. Simple technologies and practices that suit the local conditions and can easily be replicated.

Key issue for field discussion

Hazard resistant agricultural practices, e.g., soil and water conservation methods, cropping patterns that suit prevailing weather conditions, drought resistant crops / seeds. Any physical mitigation measures like flood diversion channels, water harvesting tanks constructed using local labour, skills, materials and technologies? Building codes?

8. Behavioral change and diversification as a challenge and opportunity

Key issue for field discussion

Diversification of activities, are they willing to engage themselves in carrying out other activities besides subsistence farming? What skills do they have in terms of education? Trading skills? Do they have access to capital? What are the most ideal industry / factories that would suit the local situation to ensure income diversity?

9. Natural resource management

Key issue for field discussion

Do communities understand the characteristics and functioning of the eco system surrounding them as well as the potential risks associated with them and the human interventions which affect them?

Any bio diversity preservation projects like seed banks? How are they run?

Use of indigenous knowledge and appropriate technologies for environmental management

10. Disaster preparedness

In both cases, the farmer led efforts highlighted the need for preparedness and readiness in the event of a disaster.

Key issue for field discussion

Do local community disaster preparedness structures exist? Who forms the structure and are their roles and responsibilities clearly defined? Any community based and people centered early warning system available and is it capable of reaching the whole community via radio or other communication methods available? Are the early warning messages clearly understood and do they take local conditions into account? Is the early warning system based on community knowledge of relevant disasters? Do communities understand the warning signals and their meanings and what actions they are supposed to take when warnings are issued? Emergency infrastructures including shelters including for livestock, communications, emergency supplies