



Learning from Experience – Community-based Adaptation to Climate Change in Nigeria



Prepared and Published by the
**Building Nigeria's
Response to Climate
Change (BNRCC)
Project**



Based on pilot projects in fifteen
communities in the Sahel, Savanna and
Coastal/Rainforest regions of Nigeria

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Acronyms

ADPs	Agricultural Development Programs
ATBU	Abubakar Tafawa Balewa University
BNRCC	Building Nigeria's Response to Climate Change
BOT	Board of Trustees
BSADP	Bauchi State Agricultural Development Project
CAFOD	Catholic Agency for Overseas Development
CARUDEP	Catholic Archdiocesan Rural and Urban Development Programme
CBA	Community-based adaptation
CCDC	Community Conservation and Development Committee
CERCOPAN	Centre for Education, Research and Conservation of Primates and Nature
CIDA	Canadian International Development Agency
CLUMP	Community Land-Use Management Plan
CLUP	Community Land Use Plan
CN-CCCDP	Canada-Nigeria Climate Change Capacity Development Project
COLIN	Coastal Life Initiative
DCCA	Daudu Climate Change Association
DIN	Development in Nigeria
DMC	Disaster Management Committee
DRMC	Disaster Risk Management Committee
DRR	Disaster risk reduction
FCCA	Falgore Climate Change Association
FGDs	Focus group discussions
FPIC	Free Prior Informed Consent
IEC	Information, education and communication
LGAs	Local government authorities
M&E	Monitoring and evaluation
NASPA-CCN	National Adaptation Strategy and Plan of Action on Climate Change for Nigeria
NEST	Nigerian Environmental Study/Action Team
NGOs	Non-governmental organizations
NIMET	Nigerian Meteorological Agency
PEs	Peer Educators
PEP	Peer Education Programme
PPAG	Pilot Project Advisory Group
PSC	Project Steering Committee
SAS	Social Analysis Systems
UNFCCC	United Nations Framework Convention on Climate Change
UNIMAID	University of Maiduguri
WWF	World Wildlife Fund

Preface and Acknowledgements

Nigeria's diverse ecological and socioeconomic conditions make this country a classic case in the challenges of climate change confronting humanity. The diverse ecosystems include islands and the southern coastal communities dotted along the low lying coastline. The Coastal region merges into the Rainforest region which transitions into the drier Savanna region- including derived, Guinea and Sudan Savanna – before meeting the arid Sahel region in the far north. These ecosystems are home to equally diverse cultural and socioeconomic systems, with a high proportion of communities depending on rain fed agriculture for livelihoods and survival.

The impacts of changing temperature, rainfall regimes, greater frequency of extreme weather events, rising sea level, coastal erosion and salt water intrusion in the coastal areas are all being felt in Nigeria. In the more arid central and northern regions, the impacts of increasing aridity leading to desertification and sand dune encroachment are also being felt. Climate change impacts are affecting many sectors, including agriculture and food security, health, energy and infrastructure, biodiversity, forest resources and settlement patterns, among others.

The BNRCC project included pilot projects, as one of its four components. The "community-based adaptation" (CBA) pilot projects were conducted in order to understand the impacts of climate change in all ecozones and to test adaptation strategies to address these challenges. The pilot projects were executed in collaboration with seven partner organizations and 15 vulnerable communities. They began with community engagement, which included a participatory needs assessment and the community-based selection of adaptation options based on need as well as feasibility and impact. The projects ranged from alternative livelihoods options to increasing water supply, trials of improved varieties of crops, testing fuel efficient wood stoves, providing tools for weather forecasting and planting trees for sand dune stabilization. During the course of the pilot projects, there were many useful lessons learned which can be extended to other practitioners of CBA in regions with similar conditions and climate change impacts.

In the course of pilot project implementation, BNRCC and NEST benefited greatly from the assistance and relationships with many people and organizations. Most important was the commitment of the communities themselves who were the primary partners in these endeavors. We acknowledge their collaboration from the early stages of the needs assessment which was the starting point for the projects, to the time, labour and land given during project implementation. Women, youth, and men as well as community leaders who lent their support throughout, are all much appreciated. BNRCC's seven partners – DIN, CERCOPAN, COLIN, Greenwatch Initiative, CARUDEP, ATBU and UNIMAID, have all been excellent partners in the implementation of the BNRCC pilot projects and have shown much dedication and commitment to the success of the pilot projects. The local and state governments were also very cooperative and are appreciated.

We acknowledge the contribution of the BNRCC Project Steering Committee (PSC), as well as the Pilot Project Advisory Group (PPAG). Professor Terry Olowu was the first chair of the PPAG, but sadly passed away before the projects were complete. Thanks go to Mr. Edwin Usang who took over leadership of the committee, and other members of the committee: Modupe Benson, Chinedum Nwajiuba, Donatus Onu, Immaculata Nwokoro, and Rahab David. We also acknowledge the Chair of the NEST Board and Co-Director of the BNRCC, Prof. David Okali, and Dr. Emma Nzezbule, the first project Coordinator of the BNRCC. Finally, thanks to NEST staff who worked on these pilot projects: John Ajigo, Ellen Woodley, Hassana Pindar, Sam Ogallah, and Emily Bullock. A special 'thank you' goes to Ellen Woodley for writing this report. We remain very grateful to the numerous participants at the BNRCC workshops from whom we learned invaluable lessons.

Chinedum Nwajiuba,
Project Coordinator, BNRCC and Executive Director, NEST

Foreword

The pilot projects, experiences from which are shared in this document, were one of the two main ideas around which the project, Building Nigeria's Response to Climate Change (BNRCC), was formulated. The other main idea was the decision to address the response to climate change at the policy level. BNRCC was funded by the Canadian International Development Agency (CIDA), and implemented by the Nigerian Environmental Study/Action Team (NEST) along with the Canadian partners, Cuso International (formerly CUSO-VSO) and ICF Marbek. The BNRCC project followed an earlier NEST project, Canada-Nigeria Climate Change Capacity Development Project (CN-CCCDP), also funded by CIDA and implemented with Canadian partners. CN-CCCDP focused on, and largely succeeded in, raising awareness, educating the public, building capacity and strengthening government institutions on climate change, but did not appear to have left much on the ground, literally, as a footprint, for the effort. There was a dire need to demonstrate that climate change was real and impacting on livelihoods and vulnerable communities therefore the progress made on awareness-raising was important. Yet, there was the need also to demonstrate that the problem could be addressed by community action, beginning with small-scale pilot projects from which lessons could be learned, and which could be scaled up to other communities to sustain the response. Hence, when the opportunity came, community-based pilot projects readily formed a major component in the design of the BNRCC project.

The experiences shared in this publication derive from pilot projects implemented in 15 rural communities across Nigeria's three main ecozones – the Sahel, Savanna and Coastal/Rainforest. The experiences shared herein come from all stakeholders involved in implementing the pilot projects: from the implementing organization, NEST; intermediary local partner organizations; Project Implementation Committees formed at the community level; as well as from grassroots community members themselves. Other stakeholders such as local and state governments and supporting institutions such as universities have also contributed their learning to this report. An attempt is made to reflect experiences gained through the various stages of implementation of the pilot projects, from identifying the vulnerabilities and response needs of the communities, to designing, implementing, monitoring, reporting and sharing lessons from the pilot projects. At all stages of implementation, the communities were engaged in a fully participatory way.

The overall aim of this report has been to describe the challenges overcome, opportunities exploited, what worked and what did not work in order for those that wish to embark on community-based adaptation to climate change projects, especially in Nigeria, to benefit and build on from BNRCC's learning. The experiences also have value in informing policy on adaptation to climate change, and were, indeed, largely used in this way in formulating the National Adaptation Strategy and Plan of Action on Climate Change for Nigeria (NASPA-CCN). This was the culmination of the other main idea around which BNRCC was formulated.

We hope that, as a platform for further adaptation interventions and as a resource for the formulation of policy instruments, *Learning from Experience – Community-based Adaptation to Climate Change in Nigeria*, becomes accepted as a veritable contribution towards building Nigeria's response to climate change.

Professor David Okali, *Chairman, NEST Board*

Introduction

Nigeria has a long history of changing weather and environmental conditions because of its many climatic zones, ranging from the long coastal zone in the south and large arid area in the north. As a result, rural women and men, who are directly dependent on natural resources on a daily basis, have a cultural and historical knowledge base of local conditions. 'Climate change' may be a new term, but rural, resource-dependent people are the ones who can see the changes in nature that are taking place around them first hand and know the problems that can occur due to these changes. They also strive to make the necessary adjustments to their lives in order to cope or adapt as best they can.

The main idea of the pilot projects highlighted in this document were to generate critical knowledge on vulnerability to climate change, adaptive capacity, resilience, the effectiveness of various adaptation measures, and the feasibility of scaling up these options. By working with competent local non-governmental organizations (NGOs) as partners, BNRCC facilitated local women's and men's analysis of their own vulnerability to climate change and involved them in identifying and implementing a variety of adaptation measures as pilot projects. Information from these community-based projects was later integrated into a national adaptation strategy developed for Nigeria, which was also supported by the BNRCC project.

From the perspective of countrywide coverage, the number of communities involved might not be a representative sample of all the communities in Nigeria. However, issues discovered and discussed in these pilot projects are similar to other communities across Nigeria. We anticipate the experiences and lessons learned in this document will have relevance to many practitioners who are or who will be working on climate change adaptation in Nigeria. This report is intended to be a record of the BNRCC experiences for development practitioners, adaptation planners and researchers, community-based organizations and non-government organizations that are working on climate change adaptation in Nigeria. It is also hoped that this may be used as a resource by politicians, policy makers and economic planners who may have limited knowledge about climate change to help them formulate pro-adaptation policies and strategies.

John Ajigo, *Programme Officer, NEST*

Chapter 1.

Sharing experiences in community-based adaptation to climate change

The purpose of this document is to encourage and support more community-based adaptation (CBA) efforts throughout the country by sharing the results of CBA to climate change in Nigeria as experienced in the Building Nigeria's Response to Climate Change (BNRCC) project. This includes sharing the experiences of BNRCC's partners: non-governmental organizations (NGOs) and university-based teams who worked closely with participating communities in the three main ecozones of Nigeria. This report is intended to provide a resource for those involved in CBA projects, including practitioners and others at the community level, as well as NGOs, community-based organizations (CBOs), local governments and extension workers. This resource includes the community-level experiences of the BNRCC pilot projects such as what worked, what didn't work and what was learned from these experiences and is shared for the benefit of further work in community-based climate change adaptation.

Since 2007, the Nigerian Environmental Study/Action Team (NEST) together with ICF Marbek and Cuso International (formerly CUSO-VSO) have been implementing the BNRCC project. Pilot projects were one component of the BNRCC project and were designed to test adaptation options on a small scale in communities throughout Nigeria. The way each project worked was that NEST, as the **implementing agency**, worked with seven **partner** organizations and each of those partners selected **communities** to work with in order to test the adaptation options. Each partner organization worked with a **Project Implementation Committee** (PIC), made up of interested stakeholders in each community. NEST was the organization that administered the funding from the BNRCC project, provided resources and conducted monitoring and evaluation (M&E) of each project. The **Pilot Project Advisory Group** (PPAG) met twice yearly in an advisory capacity to NEST and the pilot projects. All partner organizations reported to BNRCC/NEST on a regular basis. The **Project Team** refers to the whole group: BNRCC, NEST, the partners, the PIC and other involved community members and stakeholders.

The pilot projects, which were community-based adaptation (**CBA**) projects, took place in 15 communities spanning Nigeria from the Sahel in the north to the Coastal/Rainforest in the south (see map below). The projects were implemented in order to strengthen the resilience and capacity of communities to adapt to climate change impacts. Examples of the pilot projects include: increasing food security by introducing improved crop varieties; testing alternative livelihood options such as aquaculture in order to provide a means of income and to reduce the reliance on dwindling forest resources; providing fuel efficient wood stoves; improving access to water sources to deal with water scarcity; and tree planting for ecosystem rehabilitation. Full reports of the pilot projects are available at www.nestinteractive.org or at www.nigeriaclimatechange.org.

1.1 What is climate change and community-based adaptation?

Climate change refers to a long term shift in climate due to human activities and natural variability. The indications that climate change is occurring are: trends in warming temperatures, varying rainfall patterns, more frequent extreme weather events (such as storms, high rainfall intensity, floods, droughts, and heat waves), sea-level rise along coastal regions and glacial melt in polar or mountainous regions. Climate change impacts are being felt in most countries around the world and are seriously affecting the most vulnerable communities.

CBA to climate change refers to strategies that help communities adjust to the impacts of climate change so that they can have healthy lives and livelihoods. Adaptation refers to

long term, sustainable solutions that build the resilience of women and men to face the challenges brought about by climate change, while at the same time, protecting and sustaining the ecosystems that women and men depend on for their everyday life and livelihoods. Building 'adaptive capacity' in communities depends on integrating local and traditional knowledge of women and men with new and innovative ideas and strategies. These can include such things as income diversification, improved disaster and risk management, forging links with decision makers for better support for adaptation options, and greater empowerment so that women and men are mobilized to act.

1.2 Sharing experiences: Information for practitioners and involved communities

This document is organized around the learning that occurred at the different stages in the process of CBA: from project analysis and design through to the implementation and knowledge sharing process of CBA.

For each of these stages, the experiences of BNRCC's partners in the field and the communities they work with are discussed and ways to move forward in the adaptation process are suggested, based on what was learned. This can help to:

- Identify communities that are most vulnerable to the impacts of climate change;
- Use the local and traditional knowledge of community members to select adaptation options;
- Engage the communities so that they are involved in directing and monitoring the project;
- Engage local decision makers in local government authorities (LGAs) and State Agencies; and
- Find the resources needed to implement the project.

There are key sources of information that are useful to accompany this report. One is a companion document, called *Gender and Climate Change Adaptation: Tools for Community-led Action in Nigeria* (NEST, 2011). Another key document is a collection of reports on CBA pilot projects that were written by BNRCC's pilot project partners and contain firsthand information on all aspects of the CBA projects. Both of these reports are available at www.nigeriaclimatechange.org or www.nestinteractive.org.

A useful toolkit, developed by CARE (2010), called *Community Based Adaptation*, is a "how to" guide that provides step-by-step procedures on the CBA project cycle. It also provides links to more learning resources on CBA and is useful when more detailed information the steps to conduct projects is needed. The CARE toolkit can be accessed at www.careclimatechange.org/files/toolkit/CARE_CBA_Toolkit.pdf

The BNRCC Pilot CBA projects also made extensive use of Social Analysis Systems (SAS) tools (Chevalier and Buckles, 2008). These participatory tools are designed to engage communities so that they identify their own vulnerabilities and assess the best adaptation options to test in their communities. The tools most commonly used in the CBA projects and mentioned in this report are described briefly in Appendix 2. A complete guide to the whole range of SAS tools can be found at <http://www.sas2.net/>.

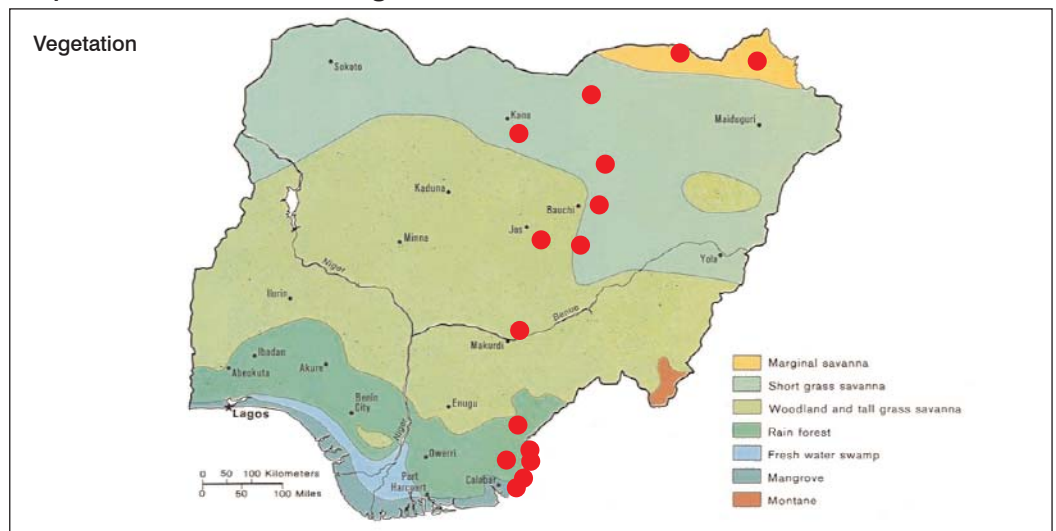
Chapter 2.

Climate change in Nigeria

2.1 How will Nigeria's Climate Change?

Climate change is not going away and its impacts, which are being felt throughout Nigeria, are likely to get worse in the future. Across the country, from the north to the south, millions of women and men are already experiencing, and reacting to, changing seasonal patterns of rainfall, increased temperature and more frequent weather events, leading to drought and flooding and storm surges along the coast. For the purposes of this document, we refer to Nigeria's three broad ecozones when describing different impacts of climate change: The Sahel in the North, the Savanna in the central zone and the Coastal/Rainforest in the south. The map below shows these three main eco-regions in Nigeria with the locations of the pilot project communities.

Map of the Ecozones of Nigeria



(Note: Marginal savanna is also referred to as Sahel and short and tall grass savanna can be referred to as Sudan and Guinea savanna, respectively. The red dots indicate where the BNRCC CBA pilot projects were located) (Source: http://upload.wikimedia.org/wikipedia/commons/3/3d/Nigeria_veg_1979.jpg)

Vulnerability and the impacts of climate change are felt differently in the three ecozones. For example, Nigeria's long coastline to the south in the Coastal/Rainforest region means that the large population in coastal communities is vulnerable to sea level increases and storm surges. Communities to the north, in the Sahel region, which already experiences cyclical drought, are especially vulnerable to increasing aridity due to higher temperatures and reduced rainfall.

Research has been done specifically on expected climate change in Nigeria (Abiodun *et al.*, 2011). For further information, see "*Climate Change Scenarios for Nigeria: Understanding Biophysical Impacts for Adaptation Strategies*", another project of BNRCC (available at www.nigeriaclimatechange.org). In summary:

- The historical record (between 1971 and 2000) shows a trend of rising temperatures in Nigeria which is projected to increase over time;
- Longer rainy seasons are predicted in the south of Nigeria and shorter rainy seasons (i.e. early cessation) are predicted for northern Nigeria;
- Heat waves are likely to occur more often over the entire country in the future;
- More extreme weather events, such as rain and wind storms, will increase in frequency; and
- Sea level rise will occur along the coast.

The above climate change hazards are predicted to have devastating impacts on agriculture in Nigeria, causing lower crop productivity everywhere, and difficulties with

livestock husbandry in the north. The greatest impact will likely occur in the northeast, where a drier and hotter climate is predicted. Climate change is also expected to have a severe impact on the health sector over the entire country, due to increases in the incidence of disease epidemics, such as malaria.

2.2 Why are communities in Nigeria vulnerable?

Vulnerability is generally the result of a combination of ecological, socio-cultural and political conditions. In the north, *ecological* conditions contribute greatly to the vulnerability of communities as water is limited, droughts occur regularly and women and men farmers are mostly dependent on rain fed agriculture and livestock rearing. Across Nigeria, *political* factors play a significant role in vulnerability, as access to education, extension services and other services such as social support and infrastructure are limited. In some areas, *socio-cultural* factors are responsible for high vulnerability, for example, in some communities, women are traditionally not allowed to farm and the men leave the community to work, leaving women with limited means of providing for themselves and their families. In addition, population growth is high in Nigeria, so this puts additional pressure on natural resources such as fertile farm land and clean water.

Most rural communities in Nigeria are vulnerable to the impacts of climate change because of the high dependence on rain fed agriculture for their livelihoods. Women and men farmers count on reliable and sufficient rain for a good growing season and when rains are unpredictable, then crops fail and food becomes scarce. Higher temperatures are also contributing to crop failure.



Preparing land for planting in Benue State

There are a number of other reasons why communities are highly vulnerable: lack of access to education, information and other resources, few opportunities to diversify income as well as high poverty levels and a poor health system, among other things. The poorest women and men often have limited access to the resources they need to help them adapt. Women are often more vulnerable as they have even less access to education, information, resources, services and mobility than men do. For women and men to be mobilized to take action and improve their lives in

the face of change, i.e. to adapt, they need to be able to think and act beyond their day to day needs. Effective governance as well as social support systems for both women men need to be in place to enable people to make the necessary changes in the best interests of their households, their communities and the natural environment.

The box on the next page summarizes reasons for individual and community vulnerability based on information from the 15 pilot project communities. High vulnerability means that people suffer more from the impacts of climate change. Reducing vulnerability is an important approach to helping communities adapt to climate change. More detailed descriptions of vulnerability to climate change impacts are available in the pilot project report available at www.nestinteractive.org.

Reasons for vulnerability as stated by pilot project communities in three eco-regions in Nigeria

Sahel

- Water scarcity which impacts women and children more than men
- Water scarcity means limited water for livestock
- Cyclical droughts have caused increased desertification and movement of sand dunes onto farmlands
- Land degradation due to overgrazing and over cultivation
- Lack of pasture maintenance and fodder storage
- Overexploitation of forest resources for fuel wood leads to increased wind erosion
- Poor soil fertility
- Lack of livelihood diversification: income dependent on rain fed agriculture and livestock rearing only
- Cultural norms prescribe that women are largely unheard in decision-making
- Women have little or no access to land
- Personal insecurity for women going to farmlands
- No access to education and/or limited access to education for women in some communities
- No access to health care and/or limited access to health care for women in many communities
- Few roads of poor quality limit access to markets to sell produce
- Remote locations and poor road conditions mean limited access to state agricultural extension services
- Limited access to common resources
- No voice for rural communities in policy making

Savanna

- Lack of access to land by many men; no access to land for women
- Almost complete dependence on rain fed agriculture with few options for dry season farming
- Traditional grazing lands are being supplanted by crop production leading to conflicts over land and water
- Grazing from migrating livestock herds causing land degradation
- Increased pressure on agricultural lands means shorter fallow periods which reduces soil fertility
- Lack of access to information on improved farming practices and environmental protection
- Lack of watershed protection and total dependence on water table and streams which are drying up
- Widespread local deforestation due to dependence on forests for fuel wood
- Limited health care
- Lack of access to credit, especially for women
- Poor hygiene and sanitation
- Poor road conditions mean poor access to markets and other resources
- High population growth and few jobs leading to high out-migration by youth

Coastal/Rainforest

- Dependence on rain fed and swidden agriculture and lack of alternative livelihood options
- Lack of access to fertilizers so crop yields are very low
- Remote locations and poor road conditions means lack of transport for women to go to markets
- Local deforestation has made region susceptible to windstorms
- Landslides often bury crops
- Farmland susceptible to gulley and coastal erosion
- Lack of access to information on soil conservation practices and other sustainable farming practices
- Lack of access to weather information on extreme events (wind and rain storms)
- Invasion of wild grass species onto farmland leads to competition with crops
- Over reliance on non-timber forest products (medicines, food and saleable items) from declining local forests
- Loss of spawning/nursery habitat and poor fishery due to mangrove deforestation and use of chemicals
- Ecologically valuable mangrove forests being replaced by invasive Nipa palm
- Increased sale of land for development is leading to less land available for agriculture
- Low soil fertility
- Inadequate land use plans that divide indigenous ownership with non-indigenous use of land results in poor land use by non-owners
- Population pressure means that farm plots are getting smaller
- Few health clinics
- Lack of educational opportunities
- Low labour productivity due to high disease rate
- Poor housing construction materials increases chances of structural damage from severe storms
- Lack of veterinary services means loss of livestock to epidemics
- Trampling from migrating livestock herds causing land degradation (soil compaction)

Chapter 3.

Overview of community-based adaptation to climate change

The objectives of the BNRCC's CBA pilot projects were:

- 1) to assist vulnerable communities to assess and document their current livelihood systems, vulnerabilities and adaptive capacity to deal with climate change impacts;
- 2) to assist communities in the identification and promotion of adaptation options to climate change impacts; and
- 3) to enhance local adaptive capacities through participatory CBA projects and information sharing leading to project ownership and sustainability.

CBA is a continuous process that involves a number of key steps. In this report these steps have been organized into four thematic topics:

- Engagement and assessment: Partners and communities working together in CBA
- Getting started: Setting the stage for implementation of CBA
- Doing it: Implementation of adaptation measures for CBA
- Keeping CBA going: Sustainability and knowledge sharing

Engagement and Assessment: Partners and communities working together in CBA

The essential feature of CBA is community engagement. In the analysis and design of the CBA process, communities also need to become knowledgeable about CBA and how they can work towards sustainable adaptation; they need to assess their vulnerability to climate change; and they need to understand the social, environmental, political and economic context in the community, including an analysis of gender equality.

Chapter 4 presents the BNRCC experience with engagement and assessment for community-based adaptation.



Woman farmer in Billeri showing improved cow pea seeds

Getting Started: Setting the stage for implementation of CBA

The "getting started" phase involves the CBA partners working together with the communities in such areas as formation of a Project Implementation Committee (PIC), conducting a community needs assessment, identifying potential adaptation strategies, and undertaking important training activities.

Chapter 5 presents the BNRCC experience in setting the stage for implementation of community-based adaptation.

Doing It: Implementation of adaptation measures for CBA

The implementation of adaptation measures is the ultimate goal of CBA. In this phase the community stakeholders and partners are actively engaged in the planned activities. Implementation is supported by capacity building and efforts to ensure full

community participation characterized by gender equality and involvement of vulnerable groups. During this phase there may be a changing context or the priorities of the community might change, so flexibility in the implementation process is essential.

It is important to note that some adaptation measures have a fixed duration (a construction project for instance), but others are ongoing (a livelihoods initiative for instance). For this reason the implementation phase of CBA is a continuing process, supported by the activities described below in the "keeping CBA going" phase.

Chapter 6 presents the BNRCC experience in the implementation of community-based adaptation measures.

Keeping CBA Going: Sustainability and knowledge sharing

This final phase of CBA is tied to the other three phases, as it involves reporting on the progress of adaptation through M&E, focusing on what has been achieved and whether the objectives have been satisfied. This phase also involves information sharing with all stakeholders, with the wider public (newspapers, radio, etc.), and with government policy makers who can influence decisions on climate change adaptation in the area.

Chapter 7 presents the BNRCC experience relating to sustainability and knowledge sharing for community-based adaptation.

Chapter 4.

Engagement and assessment: Partners and communities working together in CBA

Communities need to be engaged in their own adaptation process and the CBA process must be a fully participatory one; ideally a true partnership exists between the facilitators, in this case BNRCC partners, and the involved communities. Engagement also includes sharing important community-based information in order to assess vulnerability and adaptive capacity of the communities.

Some of the key questions asked in these early stages of the BNRCC CBA process are discussed in this chapter, organized into the following sub-sections:

Section 4.1: Partnerships and community engagement in the design of CBA

Section 4.2: Assessment of key vulnerabilities and action needed

Section 4.3: The context for CBA (environmental, livelihoods, institutional, policy and climate)

Section 4.4: Assessing gender equality in the community

4.1 Partnerships and community engagement in the design of CBA

The CBA team: Developing the partnership

The BNRCC "teams" were variously composed of all stakeholders involved in CBA, from the implementing agency (NEST), the partner organization, and the participating community members. In some cases, the team included other women and men with different skills – such as technical experts from NGOs, universities or government agencies as well as local organizations who understand the area and the community in particular.

The BNRCC implementing agency, NEST, is based in Ibadan. NEST programme officers, through the BNRCC project, were responsible for vetting proposals, reading reports, monitoring and evaluation, offering advice when needed and dispensing funds at pre-determined project milestones. It was the local partner organizations that maintained a close connection and developed a trusting relationship with the communities during the CBA process. The partner organizations also developed links to the LGAs and at times, worked together with them in their jurisdictions.



Collecting water near Kwaikong, Plateau State

Decisions on data collection methods, analysis, and reporting that were used throughout the CBA process were a collaborative effort between NEST and the partner organizations. The BNRCC pilot projects were overseen by the PPAG, Nigerian professionals in the environment field, who met twice a year to discuss any issues arising during the projects. All feedback from the PPAG was sent to the partners so they could address any concerns arising during the CBA process.

List of BNRCC partner organizations and communities selected for CBA projects

Partner	Community	State
Greenwatch Initiative	Daudu Falgore	Benue Kano
Development in Nigeria (DIN)	Bebi IV Wula Ekumpuo	Cross River
Coastal Life Initiative (COLIN)	Esuk Idebe Akwa Esuk Eyamba	Cross River
Centre for Education, Research and Conservation of Primates and Nature (CERCOPAN)	Iko Esai Agoi Ibami	Cross River
University of Maiduguri (UNIMAID)	Sansan Tosha	Borno Yobe
Abubakar Tafawa Balewa University (ATBU)	Gorori Bursali Billeri	Jigawa Bauchi Bauchi
Catholic Archdiocesan Rural and Urban Development Programme (CARUDEP)	Dashe Kwaikong	Plateau

Learning from Experience: Greenwatch Initiative: profile of a partner organization involved in CBA for the BNRCC project

Greenwatch Initiative (www.greenwatchinitiative.org/index.htm) was one of seven partner organizations that worked with NEST to implement the BNRCC pilot projects in communities in Nigeria. Greenwatch, based in Makurdi, Benue State, Nigeria, started in 2001 as an informal forum for members who were lecturers in the University of Agriculture in Makurdi to articulate and advocate on issues affecting human development. By 2005, the forum was re-organized and registered as a non-profit, non-sectarian, non-religious and non-governmental organization to enable members to participate fully in human development programs especially environmental protection, good governance, health information services and poverty alleviation in Nigeria and beyond. The governance structure is a Board of Trustees (BOT) and a Management Team, made up of an Executive Director, Program Officers on Environment and Poverty Alleviation, Health and Gender, Democracy and Good Governance and Monitoring & Evaluation as well as two project accountants and an office assistant. Greenwatch's mission statement is: *to promote environmental security, healthy living and good governance for the benefit of the poor and vulnerable people*. This team worked with two communities to implement CBA – Falgore in Kano State (Sudan savanna) and Daudu in Benue State (Guinea savanna).

Learning from Experience: Lessons learned from setting up a good project team

The partner Abubakar Tafawa Balewa University (ATBU) reported that one of the major things that aided the success of their project was the commitment and team work among the project team members. The support from the University in providing logistics such as transportation, office space and staff time as well as from the Bauchi State Agricultural Development Project (BSADP) in providing an extension officer, contributed a great deal towards the initial success of the CBA process. Added to this was the expertise in the implementing agency, NEST, which provided assistance when needed on gender and agriculture issues. In addition, the enthusiasm shown by many community members greatly added to the success.

Community engagement

Full and meaningful engagement of interested community members was a priority in the BNRCC project's CBA process. Careful planning must be made when first entering a community in order to engage both women and men, to ensure their participation and interest, to ensure fair gender representation, to establish a good working relationship

and common understanding on what the project means for all participants and how it will be carried out in their community. Approval after consultation with the community is generally referred to as Free Prior Informed Consent (FPIC) and is essential if effective partnerships are to develop. One of the key tools for community engagement used in the adaptation process included stakeholder analysis, which is used to determine who is influential in the community and who would be most affected in the course of CBA.

What emerged from the BNRCC CBA process in the initial stages was the importance of ensuring that all of those involved were clear from the outset what the process was

about and how both women and men would benefit, so there are no false or unrealistic expectations. It also had to be made clear that the CBA process involved pilot projects as a way of testing adaptation options. These are by nature small in scale with few beneficiaries to start. Pilot projects are trials, and lessons learned from them can be applied and scaled up to larger projects that affect more people. Genuine community involvement, ownership and good leadership, which are required for project sustainability, required consulting community members from the beginning and ensuring that traditional community leaders were fully involved. This was effective in the majority of the 15 communities but was slower in some communities than others. Suspicion and disinterest can result when both women and men are not engaged and informed while empowerment, energetic participation and learning resulted where communities are fully involved.



Women attend CBA meeting in Kwaikong, Plateau State

Learning from Experience: Community engagement in the Sahel

The first phase in the project for UNIMAID was the mobilization of the two communities, Tosha and Sansan, as well as interested stakeholders for their effective participation in the CBA process. Working through identified existing power structures and communication channels, the communities were initially approached to:

- Establish familiarity and build relationships;
- Create confidence between project staff, lines of authority, major stakeholders, and the general community;
- Create awareness and improve community evaluation and understanding of climate change issues; and
- Establish the need for immediate action among community members.

At the same time as community engagement took place, UNIMAID created linkages with government organizations in order to get their approval of the CBA pilot project and to garner their interest. After the usual protocols within the University of Maiduguri, the UNIMAID team called on the various State Government authorities through their respective Honourable Commissioners for Local Government and Chieftaincy Affairs, to inform them and solicit their support for the BNRCC project. After an excellent reception in both states, the Honourable Commissioners demonstrated their support by introducing and recommending the project to the LGAs for their acceptance and support.

The LGAs, together with the Village Heads, quickly mobilized their respective community members who came out in large numbers to receive and support the CBA process. The introduction of CBA to the communities was followed by lively discussions and familiarization on a wide range of issues relating to both personal and climate change issues. To gain practical experience and to further understand the environmental problems and potentials of the communities, familiarization tours of the villages and their facilities were undertaken before further community sensitization.

Learning from Experience: Communities selected by partner ATBU

The impacts of climate change are slightly different for each of the three communities that the BNRCC partner ATBU worked with, Gorori, Bursali and Billeri. The situation is serious in each area and different facets of poverty were very visible in each community. A common challenge in all three communities was that they were all experiencing extreme climatic variation: the frequency of rainfall is declining, and there is an increasing frequency of storms, flooding and drought. As a result, livelihoods, primarily based on agriculture, are seriously threatened and there is greater food insecurity. In addition to the direct impacts of climatic change, the communities require the most basic of services: for example the communities of Billeri and Gorori lack healthcare and a school. Billeri also lacks adequate road access and a good water supply. Billeri is largely surrounded by forest reserves, which are protected by the state and local authority from exploitation, so collection of fuel wood and other forest products is prohibited. Much of the land around Gorori shows signs of intense soil degradation and erosion, as it has been impacted by overgrazing and deforestation leading to serious soil erosion and biodiversity loss. In the community of Bursali, rain fed agriculture is no longer a viable livelihood option and dry season farming and fishing are no longer practiced in the community due to siltation of the local Katagum River. These are underlying conditions in these communities which make them highly vulnerable to the additional impacts of climate change. Testing climate change adaptation strategies to build resilience in these vulnerable communities addresses some of the communities' needs while key determinants of vulnerability remain (e.g. lack of school and access to water supply).

4.2 Assessment of key vulnerabilities and action needed

As mentioned above, there are many factors that affect the vulnerability of an individual, household or a community to climate change impacts. In Nigerian communities, these especially include access to land and other natural resources, access to education, information, finance, and markets, especially for women, as well as the level of infrastructure and condition of the natural environment, etc. Access to resources such as land and water affects women and men's ability to have control over their lives and to make decisions that would help them adapt to climate change impacts, so it is essential to understand who has access to and control over these resources and how this differs by income levels and gender. For example, if women and men farmers do not have secure land tenure, then they have less incentive to manage the land sustainably, and to invest in good practices such as conservation agriculture and tree planting.



Woman carrying load of fire wood

Women face particular challenges. In many areas of Nigeria, women do not have access to land. They are unable to grow their own food to feed their families and they have no input into decisions affecting land use. In some of the BNRCC adaptation strategies that involved the use of land for planting crop trials or tree nurseries, women were unable to participate. For example, the irrigation boreholes in Falgore only benefitted men directly because women generally do not farm or own land. Similarly only men were given citrus trees to plant on farmland in Daudu and Falgore because women do not own land. In these cases, the women identified other projects that they would benefit from.

Infrastructure, such as roads and access to services, i.e. agriculture extension programmes, also play a role in how well women and men will adapt to climate change. Roads facilitate access to markets and other services which can lead to income security and greater resilience. Road access is difficult for most communities involved in the BNRCC project. There are communities in Cross River State that contend with flooded and impassable roads during the rainy season; there are seasonal sand roads leading to Daudu, that are almost impassable for *okada* (motorcycles) in the dry season; and there are the communities in Bauchi and Jigawa States where the roads are badly eroded and not being re-built, so becoming unsuitable for vehicles. In all cases, improved roads would have assisted women and men in

getting to markets, assisted men in travelling to jobs outside of the communities and improving access to other resources for both women and men.

Good agriculture extension services provide options for improving crop yield and improving soil structure and fertility. Agricultural extension is mostly lacking in Nigeria as there is not enough support to the state run Agricultural Development Programs (ADPs). Information on soil enhancing techniques using local organic fertilizers (i.e. cow dung, household compost) is critical in communities where soil fertility is low.

In many communities, women and young children are more vulnerable than men, because of the division of labour and cultural norms. Women and children are largely responsible for water and fuel wood collection. When both of these become scarce, the labour burden of walking long distances to carry water and wood intensifies. CBA exposes these gender differences in vulnerabilities, tackles the reasons for these differences and addresses them will be most effective. The multiple perspectives from the community that contributed to design of CBA ensured that both women and men benefitted and that the most vulnerable, including children, were assisted in the adaptation process.

Tools used for assessment of vulnerability

Specific tools used to identify stakeholders, climate change events, impacts and community responses, vulnerable groups/features, community structure, resources and most vulnerable groups or resources in the community were community mapping, stakeholder analysis and timeline/force-field (see Appendix 2).

4.3 The context for CBA

Understanding the whole community context ensures that CBA is appropriate for that community, that it addresses the most urgent needs and how it will be most effective in that community. Understanding underlying reasons for determinants of vulnerability such as: environmental degradation, poverty, different social status, and lack of gender equality provide strategic and basic information that adaptation efforts can either address directly or can use to justify a particular strategy. Understanding context overlaps with the vulnerability/needs assessment but is broader in scope and provides baseline and background information to better situate the assessment of vulnerability.



Dry season farming and cattle with drinking water in revived oasis near Tosha

This section discusses, in turn, the environmental, livelihood, institutional and policy, climate, and gender equality contexts, and how these factors can affect community-based adaptation.

Learning from Experience: Local context for Tosha in Yobe State

The context for the community of Tosha, in Yobe State, included many factors. Important environmental factors which affect livelihoods are the cyclical droughts that have occurred historically in the area, chronic water scarcity due to the arid environment of the Sahel, increasing desertification and low soil fertility. Added to these environmental factors are patterns of land use leading to deforestation and overgrazing. Economic factors include the market price for cattle and potash, which are key livelihoods in the region. When prices are low, women and men will have less income for food and school fees, etc. and the men will migrate out from the community to find other means of livelihoods, which puts additional burden on the women and children left behind.

A social factor that should be taken into account is the conflict that occurs in this area with cattle herders from other regions who need land for grazing, so women are often afraid to go to the fields to farm.

It is a number of factors such as these that affect CBA. Given this environmental and social context in Tosha, the community was able to consider adaptation strategies in terms of feasibility and impact. For example, in an increasingly arid region, with prediction of higher temperatures and more variable rainfall, water for agriculture is a primary concern. In order to improve agricultural and livestock-based livelihoods, a key adaptation strategy for Tosha was to improve accessibility of water, which was done by installing two shallow wells in the oases which provided much needed water for crops and livestock.

Environmental context

Initially, the CBA process involved a summary assessment of the kind of ecosystem a community is located in, the history of environmental change in that community, and patterns of land use. The environmental context influences climate risk and vulnerability. For instance, communities in the Sahel in Nigeria are subject to recurring drought and are vulnerable as a result. Other communities in Nigeria have a history of environmentally damaging resource exploitation, from hunting primates in the rainforests of Cross River State, to lighting fires to capture small mammals in Benue State, to cutting scarce forest resources for fuel wood in the north. In many regions, soils have been depleted from overuse and fishery resources have been over-exploited in the coastal regions. Communities with a high flood risk are also vulnerable.

Most of these environmental risks are common throughout Nigeria, and many agricultural settlements in all ecological zones are facing deteriorating environmental conditions with a negative impact on livelihoods. In some cases, people settle in marginal environments and manage their livelihoods with greater risk factors. Documenting such environmental constraints helps understand the overall context the project will be working in and how vulnerable communities are because of local environmental conditions.

Learning from Experience: Local context for the community of Gorori, Jigawa State

The partner ATBU worked with the community of Gorori, located southeast of Mallam-Madori LGA, approximately 30 kms away from the town of Hadejia. The population of Gorori is approximately 3000 women and men, predominantly farmers, who produce mainly millet, benniseed and herd livestock. The community of Gorori experiences frequent storms, flooding, droughts and a generally declining rainfall pattern. Gorori is not close to a river, stream or pond for livestock and human use, but instead relies on boreholes for potable water. As a result of the arid conditions in the area, agricultural activities are becoming more difficult. Moreover, the community lacks amenities such as healthcare and schools. The closest primary school is approximately 10 kms away, consequently members of this community are largely illiterate, both in Islamic and Western education. A large portion of the land has been affected by overgrazing and deforestation, leading to serious soil erosion and biodiversity losses.

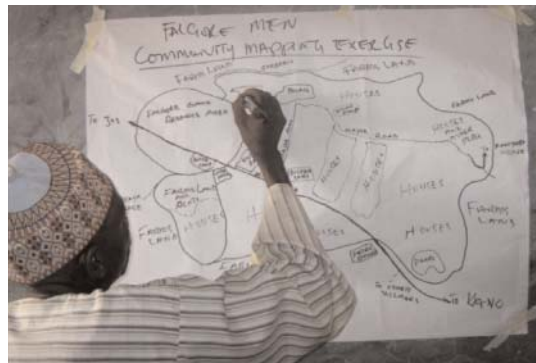
Tools for assessment of environmental context

Effective tools for assessing the underlying environmental conditions include transect walks and community resource mapping (for more information, see Appendix 2).

Learning from Experience: Community mapping in Daudu

The community mapping exercise was done in Daudu to draw out information about the local environment. This was done separately by men, women, and youth. Each group identified the community features, resources, vulnerable areas, and infrastructure that were most important to them and presented these by drawing a map on a flip chart.

In Daudu, the community maps drawn by the men and youth differed from the women's map. The men and youth identified common features such as access roads, a primary school, a church, farmlands, forest areas, streams, residential houses, charcoal and firewood depots, culverts and an earth dam. The women identified spring wells and a dysfunctional borehole in their community map, in addition to the features identified by the men and youth. The difference points to the importance of water sources in the lives of women, who are largely responsible for water collection. All identified features were brought together in a plenary to obtain a common community map of Daudu indicating key socio-economic features, resources, and areas of opportunity for development in the community. Identification of community features in each of the groups in both communities was based on the importance of certain aspects of life and the impacts and vulnerabilities of these. The mapping also exposed certain expectations women and men had of CBA. The mapping exercise helped to determine what kinds of adaptation strategies were needed most. The community map was used as a benchmark in tracking progress in CBA and in locating vulnerable sites and community features for activities in Daudu.



Community mapping exercise by Falgore men (left) and women in Gorori (right)

Livelihoods Context: Assessment of the main livelihoods in the community

Information on the main livelihood activities and the resources that these activities depend upon were compiled to determine what livelihoods are most at risk and who is the most vulnerable. In Nigeria, the majority of rural women and men depend on rain fed agriculture, but there are other supporting sources of income that are important, such as fishing, livestock herding and trades such as selling prepared food, textiles and other crafts. These livelihoods are affected by climate change in many ways: both directly and indirectly. A direct impact is variable rainfall and crop decline, as the communities in Jigawa, Plateau, Yobe and Benue States have experienced. An indirect impact is when, for example, flooding from higher rainfall intensity washes out roads so access to markets for women and men to sell trade goods is reduced – this is the case with communities in Cross River State. Another example of affected livelihoods is when water scarcity threatens livestock health. The local economy is negatively impacted because herders have to sell off their livestock at low prices. Working together with communities in focus groups to discuss how local livelihoods are affected and how resources livelihoods depend on are impacted, helps to begin the process of prioritizing adaptation strategies.

The Institutional and Policy Context: The enabling environment for adaptation

Successful adaptation depends to a large extent on how supportive government and civil society institutions are for rural women's and men's needs in response to climate change impacts. An enabling and supportive environment is when the local, state or national government has policies in place that help both women and men in the community implement adaptation strategies or are willing to listen to community concerns. Another enabling feature is the presence of good local governance such as a trusted and engaged community leaders as well as community-based institutions, such as women's groups, youth groups or farmers' cooperatives, etc. These institutions may be small or informal but they are helpful in uniting women, men and youth in ideas and action and can be a platform for presentation of needs and ideas to the local or state government. In the community of Falgore, Kano State, the chief was especially cooperative which assisted the project and contributed to its success. There is a highly influential farmer cooperative in that community and as agriculture is and will be highly impacted by climate change, a strong farmers' group is in a better position to support women and men farmers who need assistance.

Learning from Experience: Community organizations in pilot project communities in Plateau State

Kwaikong and Dashe in Plateau State have community organizations that are organized along traditional and religious lines. Organizations include the community development association, farmers associations, traders associations, church organizations and women's group, all of which had their leaders in place. The partner (CARUDEP) who facilitated the projects in these communities used the officials of these organizations to mobilize their members towards active participation in all project-related activities including decision making, information dissemination and contributions in kind/cash, among other community inputs. The various youth, women and men, farmers, traders, security, football groups and associations also participated actively in different activities during the community-based project and contributed in terms of sharing of valuable information and responsibilities towards achieving the pilot project objectives. The officials served as intermediaries between the project team and the community members.

The climate context: climate change occurring in the region

The BNRCC partners each researched the scientific data on climate change available for their region. In order to understand the climate context of the communities, local and traditional knowledge was documented to complement scientific data.

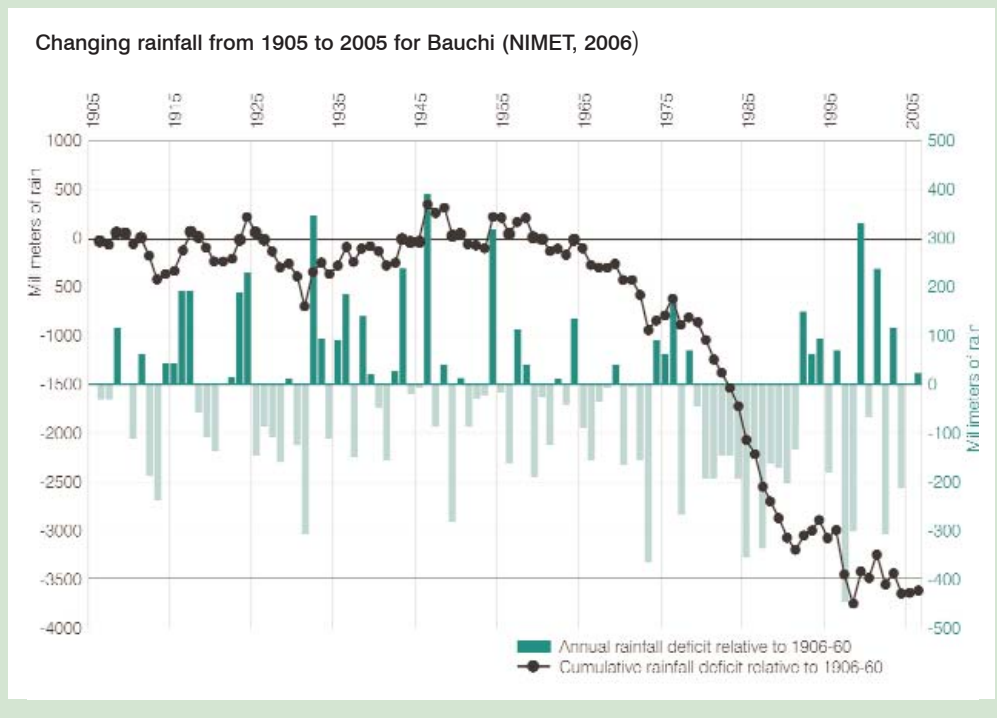
Scientific data on climate trends

Where possible, rainfall and temperature data were collected for the regions where the pilot projects were located. Some data were available from the federal government agency, the Nigerian Meteorological Agency (NIMET), and these data show trends for the last 30-40 years, which is a good time span to understand long term climate patterns. In a companion report to this document, research commissioned by the BNRCC project developed climate change scenarios for 3 different ecological regions in Nigeria. This paper by Abiodun, Salami & Tadross (2011) can be found at the website: www.nigeriaclimatechange.org/projectpublications.php.

Other reports such as those prepared for the United Nations Framework Convention on Climate Change (UNFCCC) (http://unfccc.int/national_reports/items/1408.php) are good sources of information. As well, various government and non-governmental agencies, such as universities and other learning institutions, may have done some work on the downscaling of global climate models to the national context. The Nigerian government's meteorology department, environment department, UN agencies and universities are other potential sources of information.

Climate data from Bauchi meteorological station

Research conducted by ATBU revealed that northern states in Nigeria have experienced major drought episodes causing massive famine in 1882-86, 1913-16, 1942-45, 1971-73, 1983-84, 1987-88 and 1997-98 (Tarhule & Woo, 1998). The most severe drought years were 1973, 1983, 1987 and 1997-98, which coincided with El Niño years (NIMET, 2006). Analysis of rainfall data at Bauchi shown in the graph below, demonstrates that there has been sustained reduction in rainfall from 1955 onwards. Also, there has been more year-to-year variability in rainfall since the 1970s. Trends in climate change are evident in this observed rainfall time series. Changes in rainfall will continue to have a strong impact in the areas of agriculture, land use, water resources, health, energy, and other key sectors. The livelihoods options of the women and men in these ecozones will be adversely affected.



Local knowledge of climate trends

Complementary to the recorded scientific information is the local or traditional knowledge of climate events and trends that have occurred in the community, including how the community has responded to these events. This information can be used together with the scientific information and it can help understand existing coping or adaptation strategies that the community is adopting. The information can provide an important basis for what future adaptation options might work best in the community and it can shed light on the capacity of the women and men in the community to adapt.

The collection of local and traditional knowledge from community members on observed climate changes was done with knowledgeable women and men who use the local natural resources every day and included farmers, fishers and herders – the people who observe changes first hand. These women and men are able to point to changes in the trends in weather over the long term.

Local knowledge used for the purpose of forecasting weather was shared by some communities, including the examples presented below from Bauchi and Jigawa States. This local knowledge was valuable for farmers so they could predict the right time to plant their crops. However, some of these traditional indicators may no longer be reliable given that climate change trends and conditions have not occurred historically and are not yet well understood. Note also that the local knowledge presented below is not necessarily transferable to other parts of Nigeria; each region is likely to have its own unique body of local knowledge.

Learning from Experience: Local knowledge of weather forecasting in Bauchi and Jigawa States

The partner ATBU together with the three communities in Bauchi and Jigawa States merged traditional knowledge with scientific knowledge for weather forecasting. This traditional knowledge is said to have been passed down the generations. Some popular traditional methods of predicting the onset of rainfall and the planting season in the communities are:

- A change in wind direction: a change in wind direction towards the east indicates the possibility of rains within 1-2 weeks. If it rains before the wind changes direction towards the east, then this rain is usually considered a "false" rain, and farmers do not plant their crops.
- Counting from the last effective rains of the previous season: It is assumed that rain will fall after seven months from the last effective rain of the previous year. This timing is used together with the wind change mentioned in the first bullet point.
- The appearance of a bird locally called a *Shamua* (looks like a wild duck) in the community indicates a possibility of rainfall within the next few weeks.
- When birds shift their nests to the lower branches of the Baobab tree, rather than the higher branches, it signifies the onset of rainy season.
- The sprouting of a species of *Allium* (locally called *Gadali*) means that rain may fall within the next two weeks.
- When the fruit of *Tsada* (*Ximenia americana*) starts to ripen along with the presence of rains, it means it is time to start planting.
- When the shrub *Burgali* (*Dactyloctenium aegyptium*) starts to flower, then it will rain within the next three weeks.
- The possibility of a dry spell or drought is predicted if army worms are observed after planting.

This knowledge was valuable when used in conjunction with new methods of weather forecasting introduced by the partner organization in the three pilot project communities.

Gradually changing conditions such as temperature and rainfall patterns that change over years are less dramatic than sudden events such as floods or cyclones, but they can have serious impacts on livelihoods, particularly agriculture-based livelihoods. Being aware of how these climate variables may change in the future can help to identify suitable adaptation strategies that are appropriate to future conditions, or that build in the flexibility needed to deal with uncertainty, recognising that adaptation is a process, not an end.

Tools for documenting local knowledge

Useful tools to draw out local knowledge and coping strategies which community members want to share with the project team, include focus group discussions and interviews, mapping, and the time line with force-field analysis (see Appendix 2 for details). The timeline with force-field analysis was used in every community with good results. In this exercise, women and men in a group are able to think of weather or environmental events in the past and what their response was to them. In this way, local knowledge in terms of coping or adaptation strategies to climate or weather events is revealed.

The table on the next page shows results of the timeline and force-field analysis compiled from some of the CBA participating communities in three states.

Impacts of observed climate change coping and adaptation responses in select pilot project states

Location of community	Observed changes in climate	Coping strategy or adaptation strategy
Plateau State	Increased temperatures	Out-migration from community Use of traditional medicine
	Drought	Walking long distances in search of water Migration to other villages Men out-migrating to find casual labour Using wild fruits to replace failing crops Seeking assistance from more affluent relatives Sale of livestock Use of improved crop varieties Finding alternatives for better water storage
Bauchi State	Increased frequency of windstorms	Prayer
	Flooding	Build temporary shelters Out-migration by men to find alternate income sources
	Drought and drying of local river	Use of early maturing crop varieties Tree planting on river banks
Cross River State	Flooding and heavy rains	Sand bagging Early harvesting of crops
	Invasive species	Continuous weeding of crop lands
	Excessive heat	Use of ointment on skin

It is important to note that when different kinds of information is brought together, the environmental context, livelihoods and resources and the climate context, there will be impacts that are not climate change-related, showing that climate change impacts should not be considered in isolation. It is important to address broad determinants of vulnerability, and to do so the community context needs to be understood. Overcoming the determinants of vulnerability increases the capacity of communities to adapt to the impacts of climate change.

4.4 Assessing gender equality and other marginalized groups in the community

It is widely recognized that women are more vulnerable than men to climate change impacts in Nigeria, for a variety of reasons. As in many countries, women in Nigeria usually have no or limited access to resources, such as land, education, information and income, so they are among the poorest in the community. Women rarely have an equal say in decision-making, at the household, community level or in politics at any level.

In addition to other skills, women in Nigeria are central to maintaining healthy families and communities and play a major role in maintaining healthy ecosystems. BNRCC developed the CBA process in recognition of the fact that, from the outset, women must have a key role in community-based adaptation initiatives and they must participate by being in management roles in community-based organizations working on climate change. Women also must be consulted on the specific local knowledge they have about local ecosystems and climate change impacts.

Other marginalized groups in communities, such as youth, the elderly and the disabled, also need to be recognized and play a role in adaptation initiatives.

Learning from Experience: Women's voices in Falgore



Women plant nutritional *Moringa* tree in their compounds

In Falgore, women reported that they were not treated equally with men for some aspects of the CBA process, since they didn't receive tree seedlings as the men did, to test this as an adaptation option. The women were not consulted on this particular option and the partner, Greenwatch, assumed that the women would not have been able to plant and care for the trees because they did not own land. The women eventually spoke out and gave their opinion on how their communities would benefit if women received trees as the men did. Many women are resourceful and find trees themselves from the wild to transplant in their compounds in order to improve the nutrition of their families. If women were consulted early on instead of the assumptions made, then the women would have benefitted more

and been able to expand their home gardens and validate the work that they already initiated themselves.

4.5 Stakeholder analysis

A stakeholder analysis was done in each community in order to understand who is most impacted by climate change, who holds influence in the community (but may not be impacted as much) and who does not have a voice in the community (the marginalized and most vulnerable). A stakeholder analysis determines who has the most at stake in the project and who would benefit the most. A "stakeholder" is *any individual, group, or institution that has a vested interest in the project area and/or who potentially will be affected by project activities and has something to gain or lose if conditions change or stay the same*" (WWF, 2005).

Determining the main stakeholders in CBA in these terms is essential if all stakeholders are to have fair representation and have their voices heard. Different perspectives are needed to determine needs and how CBA will benefit different people in the community, such as women and men, youth, the elderly and the disabled. It is not effective, for example, for a stakeholder who may not be as impacted by climate change to have the most influence on decisions about the pilot project. Instead, representative stakeholders were identified to include those who have minor roles in decision making but who are impacted the most by climate change and who will benefit the most from adaptation options. Women usually have little to no role in local decision making but their perspective needs to be heard when determining what adaptation options are most appropriate. As stakeholders, women are able to provide guidance on the kinds of options best suited for their needs and the needs of their families and the community as a whole.

Thus, the CBA process of stakeholder analysis aimed to take gender differences into account. The stakeholder analyses conducted in all communities were gender-sensitive so that the different roles, different levels of power, and the differing needs, constraints and opportunities of women and men were understood.

In summary, the outcomes of a stakeholder analysis are: i) to ensure sustainability through equitable participation of all stakeholders; ii) a profiling of stakeholders to develop an understanding of who the stakeholders are, including gender and other socially determined characteristics; iii) the development of criteria for training to ensure that women and men have equal opportunities to progress in their careers or livelihoods.

Learning from Experience: Results of stakeholder analysis and rainbow diagram exercise by women in Esuk Idebe, Cross River State, with the partner, DIN

In this table below, which shows the results of a stakeholder analysis conducted by women in Esuk Idebe, the participants identified six groups with high influence in their community, but none of these were considered highly affected by climate change (in fact this part was blank). Eight groups were considered to have low influence, and of those, the groups most highly affected were identified as women, children, people with disabilities and farmers. The men and youth who also participated in this exercise showed very similar results as the women. This exercise helped to reveal who had influence and who was most impacted by climate change. This information assists in determining who to target in the CBA process: those with high influence can assist and use their leverage to help and those most affected are the most vulnerable and should indeed be the beneficiaries.

	Low Influence	Moderate Influence	High Influence
Least affected	Traders Loggers	Missionaries Boat builders CBOs	Village head Village council Politicians
Moderately affected	Strangers Civil servants	Church Women leaders FMC	Traditional birth attendants Town crier Youth leader
Highly affected	Women Children Disabled people Farmers	Youth forum Men Fishermen	

CBO = community-based organization; FMC = Forest Management Committee.

Tools for stakeholder analysis

There are a number of ways to undertake a stakeholder analysis. Workshops, focus groups and interviews are three common approaches used. Another method often used by the pilot project partners was the "rainbow diagram" used in a focus group (see Appendix 2).

For a stakeholder analysis, the following was determined:

- i) Identification of the key women and men stakeholders and their interests (positive or negative) in the project;
- ii) Assessment of the influence of, importance of, and level of impact upon women and men stakeholders; and
- iii) Identification of the most effective ways to engage both women and men stakeholders and ensure they benefit from the project equally.

When deciding what questions to ask in a stakeholder analysis, the following should be borne in mind: the purpose of the research; the level of awareness among the participants of differences of decision making power in the community; the literacy level of the participants; and time and logistical constraints.

To assess the influence and importance of stakeholder as well as the potential impact of the project upon each stakeholder, the following guiding questions can be used:

- Who is directly responsible for decisions on issues important to the implantation of CBA?
- Who holds positions of responsibility in interested organizations?
- Who will be affected most by the adaptation options?
- Who will promote/support the CBA, provided that they are involved?
- Who will obstruct/hinder the CBA if they are not involved?
- Who has been involved in related community activities in the past?
- Who has not been involved up to now but should have been?

Learning from Experience: Stakeholder analysis in Kano State

The partner, Greenwatch Initiative, facilitated the rainbow exercise with three groups in the community of Falgore, in Kano State. The men's group identified the Village Head, farmers' cooperative, barbers, cattle buyers, the *okada* (motorcycle) union and the kola nut union as highly impacted by climate change and with a high influence in the community. The Women's group identified the housewives, as highly impacted by climate change but had the least influence in the community. They also identified the LGA Chairman and Falgore Ward Councillor as least affected but of high influence in the community. The youth group identified the town crier association and black smith association as highly affected but of low influence in the community. The participatory stakeholder analysis brought out different perceptions of power and influence in the community and was able to point out who was lacking a voice in decision making.

4.6 Summary of lessons learned in CBA engagement and assessment

Check list¹ for CBA engagement and assessment

- Establish a team with expertise in climate change and an understanding of vulnerability in each community
- Ensure meaningful involvement of a range of interested stakeholders, including men and women from target communities, partner organisations, and governments
- Increase the understanding of current and future climate hazards and impacts affecting the target communities
- Understand the impacts of current and future climate hazards on livelihoods of different groups in the community and on the ecosystems upon which they depend
- Document traditional knowledge leading to coping and adaptation strategies, including their effectiveness and sustainability in the context of identifying adaptation options
- Look for existing (local/regional/national) government policies and programmes that may represent opportunities or barriers for adaptation
- Understand differences in vulnerability and adaptive capacity based on gender, marginalisation, age and other social factors which may increase vulnerability
- Identify priority adaptation issues with the target community in terms of urgency, importance and feasibility

Lessons from the field:

The BNRCC pilot projects provide a number of lessons relating to the engagement and assessment process. The lessons presented below were submitted by the partner organizations, and may be useful to future CBA initiatives.

- **Barriers to gender mainstreaming:** Gender policy can be in place and people can be trained in gender mainstreaming, but social and cultural barriers have to be overcome in order to fully achieve gender equality.
- **Community connections:** It is advantageous to have someone familiar with the area to assist in CBA. A person familiar with the local communities in terms of their needs, accessibility, and environmental conditions helps to prioritize those communities who are the most vulnerable and who will benefit the most and also to understand the broader context that CBA is working within.
- **Cultural context:** Understanding the local cultural and social context often requires someone on the team to be from the area, so that subtleties and complexities are understood and that language is not a barrier to good communication.

¹The checklists used in this document (Sections 4.6, 5.5, 6.6, 7.6) are adapted from CARE (2010)

- **Understanding CBA objectives:** During the community engagement process, full disclosure of the goals and objectives of CBA needs to be made so that community members fully understand the nature of the process in their community and so there are no unrealistic expectations. Full disclosure also engenders trust and fosters a good working relationship between the community, the partners and the implementing agency.

Chapter 5.

Getting started: Setting the stage for implementation of CBA

To ensure effective CBA, the priorities generated in the engagement and assessment phase were to make sure:

- that the communities were engaged, willing and informed participants in CBA;
- that the background information for the communities was understood in terms of the environmental, social, cultural and political context;
- that the main stakeholders were identified; and
- a community needs assessment was conducted to determine what adaptation strategies were to be tested,

The next step sets the stage for implementation and involved the partners working together with the communities. This chapter is organized into the following subsections:

Sub-section 5.1 Community needs assessment

Sub-section 5.2 Identification of adaptation strategies

Sub-section 5.3 Formation of the Project Implementation Committee

Sub-section 5.4 Training

5.1 Community needs assessment

The objective of the community needs assessment was to obtain information in order to facilitate the choice of the most feasible and most impactful adaptation option. Community needs assessment complemented the vulnerability assessment, which was done during the community engagement process in the initial stages of the CBA process. Specific activities for community needs assessment included meetings with different stakeholders, focus group discussions using the options domain and rainbow diagram tools that rank the adaptation options under consideration (see Appendix 2).



Water source near Tosha

5.2 Identification of adaptation strategies

The most useful adaptation strategies are those that do not have a negative effect on the local ecosystem or any other detrimental effects. Adaptation is considered a long-term strategy, whereas coping is generally considered short-term and unsustainable. Adaptation involves planning and sustainable management of natural resources. Local or traditional knowledge can be an important foundation for adaptation strategies, so careful and sensitive documentation of the knowledge that communities chose to share may be helpful in the determination of adaptation options.

Learning from Experience: Traditional knowledge in agricultural practices in Wula Ekumpuo

In the community of Wula Ekumpuo in Cross River State, there are some local coping and adaptation strategies that have been taken to deal with climate change. The community has enacted by-laws, including the prohibition of bush burning, to conserve local forests. Many farmers are also aware of the advice from parents and grandparents, advice to plant earlier and to practice more selective cutting to make their farms, not to fell all the trees and burn the forest, the way people do now. *"Before, farms were small, and now they are bigger – unless we go back to observing these things we don't get a good harvest."* This kind of local knowledge that preserves trees on the farm would help in adapting to warmer temperatures and increased rainfall intensity leading to flooding, as trees provide shade for crops and people and their roots hold soil in place and reduce erosion from flooding.

The CBA process involved the community-based identification of adaptation strategies or options. This step in the process occurred after the key vulnerabilities and stakeholders were identified and climate change awareness workshops had taken place.

Tools to identify the priority adaptation options that could be realistically addressed by the project were identified with the participation of stakeholders, the PIC and the BNRCC partner in an exercise called "options domain" that used a ranking system. The priority issues identified by the communities were many but in reality many of the suggested options were not possible given limited resources (financial, human or technical). To ensure a realistic and appropriate project design, the constraints were considered objectively, using established criteria, and the options narrowed down in light of these criteria.

Learning from Experience: Options domain exercise used by partners to help prioritize adaptation options

The partners helped to conduct the options domain exercise in the communities. The needs or community-identified adaptation options were ranked against five criteria which were considered important for projects to address. The five criteria were:

- i) is the option community driven or driven from outside?
- ii) is it gender sensitive or gender blind?
- iii) would the adaptation option give a voice to the vulnerable or a voice to the powerful?
- iv) does the option build capacity in the community or not? and
- v) does the adaptation option lead to sustainable adaptation or is it a coping strategy?

Each adaptation option was ranked from one to five using these criteria. In doing this participatory exercise, community participants were able to narrow down the number of adaptation options to a feasible number.

The BNRCC partner, CARUDEP, facilitated this exercise separately for women, men and youth in the two communities in Plateau State. The table on the next page shows seven identified options that were ranked from 1 to 5 according to five indicators in the left column. It was not surprising to CARUDEP that the rain water tank was ranked as the most favourable (all indicators ranked 1) due to the recent droughts and impact on crops and domestic water consumption that were affecting everyone, especially the most vulnerable, in the community. This exercise acted to generate more discussion with the community and resulted in other priority adaptation options being identified. The exercise helped to narrow down the options to the ones that people wanted to test in their community to help them adapt to the impacts of climate change. The options chosen were to help reduce the vulnerability of the most highly affected stakeholders with low influence, namely the women and children of the community.

The results of the ranking of adaptation options using the Options Domain exercise in Kwaikong with the partner CARUDEP, held with a men's group

	Training on striga control & insecticide use	Rain water harvest tank	Early maturing crops	Water purification	Borehole construction	Well construction	Dam deepening
1 Community driven 5 Driven outside the community	1	1	1	1	2	2	1
1 Gender sensitive 5 Gender blind	1	1	1	1	1	1	1
1 Gives voice to the vulnerable 5 Gives voice to the powerful	1	1	1	1	4	1	1
1 Builds capacity in the community 5 Builds capacity outside the community	1	1	3	3	1	3	3
1 It helps to adapt 5 It helps to cope	2	1	2	4	3	2	2

5.3 Formation of Project Implementation Committee (PIC)

An integral part of the CBA team in each community was the Project Implementation Committee (PIC), made up of women and men in the community who have an active interest in the CBA process and making it work for the benefit of the whole community. The BNRCC partner worked directly with the PIC, who acted as the liaison between the partner and the community members. The PICs were intended to be composed of both women and men in decision-making roles but despite the aim to have equal representation by women and men, it was not always achieved. The reasons were many: in some communities in the north, women are prevented from meeting without husband's consent; in several communities, women are too busy to meet and, in some cases, not enough effort was made by the partner organizations to ensure that women were equally represented on the PIC.

5.4 Training

Decisions on the kind of training needed for BNRCC partners and the PIC in terms of the appropriate tools for vulnerability assessments, stakeholder assessments, project reporting, M&E and knowledge sharing was an important aspect of CBA. In all projects, emphasis was placed on training the PIC and other community members on climate change knowledge and awareness and gender mainstreaming. Other kinds of training were offered on an 'as needed' basis and included record keeping for on-farm trials, market chain analysis, and conservation agriculture (i.e. use of mulch and organic fertilizers).

Training in climate change, awareness of hazards and impacts was done in a workshop setting in all communities. The training on climate change awareness gave community members a basic knowledge of climate change and how it does and will impact their lives and livelihoods. The workshop setting was designed to ensure participants were free to ask questions and contribute their own knowledge. In many cases, the workshops were held separately for women and men to ensure that everyone had the chance to participate and be heard.

Learning from Experience: Climate change awareness in Daudu and Falgore

To facilitate climate change awareness in the two communities, Greenwatch Initiative produced a training manual entitled *Promoting Climate Change Adaptation Best Practices in Daudu and Falgore Communities*. Four hundred copies of the training manual were produced for the two communities. The manual has five modules, each module containing picture codes to enhance understanding by community members. Module 1, "Getting started," sets the stage for knowing one another. Module 2, "Understanding climate change and its causes," provides basic information on climate change. Module 3, "Impacts of climate change," deals with vulnerabilities and hazards associated with climate change. Module 4, "Local coping strategies," dwells on short-term measures undertaken by community members to relieve the impacts of climate change. The final module, Module 5, "Climate change adaptation best practices", discusses livelihood options that can lead to adaptation in each community. To reinforce the concepts introduced in the trainings among community members and stakeholders, information, education and communication (IEC) materials such as posters (1,000 copies), T-shirts (200) and caps (200) with a climate change awareness logo were also produced and distributed to community members and other stakeholders.

Learning from Experience: Training workshop on Disaster Risk Reduction (DRR) for communities

The BNRCC partner, DIN, included training in disaster risk reduction. Disaster risk reduction (DRR) *is reducing disaster risks by reducing vulnerability and exposure to hazards by practicing good land management and improving level of preparation for adverse events* (CARE, 2010). The communities were assisted in forming a Disaster Management Committee (DMC) in each community to help in protecting the natural resource base. DRR is a way to increase adaptive capacity by helping women and men to take precautionary measures to hazards. It also promotes sustainable forest-use practices in order to help prevent hazards. To ensure the effective operation and functioning of the committees, DIN organized a two-day training session for the two communities. At the training workshop, women and men participants were involved in a participatory mapping exercise to determine their vulnerability to hazards and their capacity to adapt. Characteristics of the community were mapped onto a transparent plastic sheet with key features indicated along with the areas that are often affected by climate change hazards. The "hazard map" was then used as a basis for identifying training needs and where the DMC should focus its attention. From the maps, it was observed that women identified most of the hazard sites that affect resource availability. The workshop covered topics on emergency preparedness and response, fire accident and management, the effects of climate change and control measures for gully and sheet erosion. Attendance at the workshop was excellent with good representation from both communities as well as active input from both women and men.

Gender Training

Training on gender mainstreaming was done primarily by NEST, together with the partners, in a workshop setting. It was expected that the partners would use the gender training in their approach to CBA and also to further train the community participants, including the PIC, on the importance of gender integration. Some gender sensitivity training was done during the workshop sessions with the communities, and some was done in the process of learning by doing. This approach taken was "learning through engagement" in CBA, so that the partner organizations and/or the implementing organization led the way by incorporating important elements of gender equality into the CBA process. Training on gender awareness is something that needs to be integrated throughout each stage of CBA, to ensure that everyone involved is continuously made aware of the issues and can consistently accommodate diverse perspectives and differences in gender.

Learning from Experience: Women as equal members of the PIC in Falgore, Kano State

The major challenge that Greenwatch Initiative faced in the communities of Falgore and Daudu was to get the men to agree that the women should have an equal role in decision making and sharing of benefits accrued from CBA. This reluctance by men was eventually overcome through continuous dialogue with the community and opinion leaders by conveying the benefits of gender equality to them and emphasizing that it was a requirement of the BNRCC project. In Falgore, Kano State, the community situation assessment revealed that due to religious beliefs, married women were not allowed to participate in outdoor activities and only men practiced farming and other socio-economic activities. Women never sat in the same meeting hall with men and could not therefore participate in community meetings with men. That meant that whatever was decided by the men stood unchallenged by the women. The project team introduced the concept of gender equality and gender equity to the community, concepts that were initially resisted. After a time, however, the women were finally able to be members of the PIC in equal numbers with the men. The women also sat in project meetings and actively participated in discussion and decision making; activities that wouldn't have been contemplated before the BNRCC project. However, women were still not allowed to own and participate in farming activities as it is considered the responsibility of men to feed the household. Therefore women could not be beneficiaries of improved seeds, citrus seedlings or bee-keeping, all of which take place on the farms. To balance the gender inequality in Falgore, the women decided that they could benefit from spaghetti makers, fuel-efficient woodstoves and water treatment methods, which were then implemented.

5.5 Summary of lessons learned in setting the stage for CBA implementation

Check list for setting the stage for CBA implementation

- Set clear and achievable goals together with the community to increase adaptive capacity and reduce vulnerability of communities to climate change impacts
- Ensure that the approach accounted for differences in vulnerability based on gender and marginalisation, as well as other social and economic differences
- Promote community-identified, climate-resilient livelihoods strategies, disaster risk reduction strategies and strategies to address climate change impacts
- Develop the capacity of communities to plan and implement adaptation actions through the use of tools to help communities participate in the design of the project
- Design specific adaptation options that empowered the most vulnerable social or economic groups, which are mostly women
- Ensure that the project team had the scientific, social and technical support to effectively implement the CBA project
- Ensure that there were clear roles and responsibilities for all project stakeholders during project implementation

Lessons from the field:

In addition to the lessons learned in the engagement and assessment stage, there are some additional lessons to be learned from pilot projects in the early start-up phase prior to implementation. The lessons presented below were submitted by the partner organizations and may be useful to future CBA initiatives.

- **Gender.** A major challenge in some communities was for the men to acknowledge that women should have equal status in decision making and sharing of project benefits. In some cases, this was overcome through continuous dialogue with the community/opinion leaders by expressing the gains of gender equality at the household and community level to them and emphasizing that gender equality was a requirement of CBA.
- **Vulnerability.** Women and children are generally the most vulnerable groups affected by climate change impacts, because they generally have less mobility, access to education, information and land resources and are highly dependent on natural resources for livelihoods.
- **Expectations.** A common mistake is designing an over-ambitious project, which then fails to meet the expectations of the stakeholders. Community participants can become disinterested or disappointed in the process. It is important to make it clear at the outset, during village meetings, what CBA is and intends to do and to have as many people participate as possible.
- **Support.** Good governance is key to CBA. When communities were compared, the one with the engaged and supportive chief had better community participation and better results than the community where the chief was uninterested in CBA and not supportive of the community.
- **Educational Materials.** Locally available educational materials required to bring the message of climate change impact in the Nigerian context were not readily available to project facilitators. The partners and implementing agency should attempt to collect or prepare educational materials.
- **Responsibility.** People often viewed climate change issues as the sole responsibility of government and didn't see the important role that they themselves can play. These attitudes can be changed during community engagement and ownership of the CBA process.
- **Trust.** Establishing trust was a breakthrough that strengthened and sustained confidence between the communities and BNRCC partners. It facilitated communities' ability to willingly make contributions in cash and kind towards the realization of CBA in their communities.
- **Language.** Language barriers exist. Having a translator on the PIC is useful to overcome this barrier.
- **Needs assessment.** Some community members can be inconsistent in stating their needs and change their minds even following discussions of the strengths and weaknesses of identified adaptation options. This can slow down project implementation significantly as people will show reluctance to participate in the project.
- **Participation.** In some communities, people are away from their homes most of the week, cultivating their farms, hunting or undertaking other activities. As a result, in some cases, only market day (one day per week) was suitable for large group meetings as all community members remain in the village on this day. Time constraints such as these, should be accommodated in the design of CBA.
- **Community-based Organizations.** A responsible and reliable CBO that already exists can help to facilitate the formation of the PIC and can provide continuing leadership to carry on with the project.

- **Sensitization.** In communities where there have been projects in the past, there is less need for sensitization of communities to CBA. The most time consuming aspect of CBA is the initial stages of sensitization and mobilisation. Once these phases are complete the implementation phase can progress relatively quickly.
- **Knowledge Sharing.** More sharing of knowledge at the project design stage with other CBA pilot projects in other communities would help design better strategies and approaches to meet the objectives.
- **Local Knowledge.** Community members have local knowledge which has proven valuable for solutions to local challenges.
- **Confidence.** It can take a long time to establish confidence and have a thorough understanding of communities and the particular context for CBA. Authority and gender issues were very sensitive and so attempts to influence the socio-cultural structure in the community had to be very gradual.

Chapter 6.

Doing it: Implementation of adaptation measures for CBA

The implementation phase of the CBA process puts design into action. Generally speaking, a well thought out project design helps to ensure that implementation goes smoothly. All BNRCC partners submitted inception reports to NEST so that program officers could assist in making any changes and modifications where necessary. All inception reports included a work plan, which is the main element of an implementation plan and the first step in managing CBA. The work plan itself is smaller in scale and more focussed on activities to be undertaken to achieve results as well as milestones and financial accounting.

This chapter discusses more about the actual implementation of adaptation and is organized into the following subsections:

Sub-section 6.1 Capacity building for the PIC and CBOs

Sub-section 6.2 Participation in CBA implementation

Sub-section 6.3 Adaptation options implemented

Sub-section 6.4 Budgeting for implementation

Sub-section 6.5 Creating an enabling environment for adaptation

6.1 Capacity building for the PIC and CBOs

Once the PIC was established, capacity building for the PIC occurred through training workshops and learning by doing. Some important and common themes were gender, disaster preparedness/risk management and climate change awareness, as discussed in the previous chapter. Other important elements of capacity building for the PIC (and later the CBOs) included learning more on the full process of CBA, from effective design, implementation and monitoring of CBA, as well as the integration of climate change adaptation into relevant policies and plans. The intention was that capacity building would foster an attitude within the PIC and CBO that encouraged innovation, the airing of different viewpoints, sensitivity to gender issues, how to advocate to the local and state governments and a critical review of CBA as it proceeded.

Learning from Experience: Project Implementation Committee (PIC) and Greenwatch Initiative

At the beginning of the CBA process, a 12-member, gender-balanced PIC comprised of six men and six women, for each community that Greenwatch Initiative worked with, was formed to coordinate the activities of the beneficiaries and participate in key decision making processes via regular project meetings. In both communities, meetings were held with beneficiaries in designated places chosen by the community members where decisions on all issues were taken. Decision-making was reached by consensus, either at PIC meetings or at meetings involving all beneficiaries, in order to ensure effective participation and involvement of vulnerable groups. Greenwatch Initiative decided to focus on building close relationships with the highly influential groups in Daudu (as determined in the stakeholder analysis), which included the traditional heads, special adviser to the Governor, elderly men and community association leaders. Relationships were built by consulting with these groups regularly on CBA goals and implementation issues.

As well, the stakeholder configuration exercise and advocacy visits revealed that the Commissioner for Water Resources and Environment, the Local Government Chairman, and the Ward Councillor are highly influential in ensuring success and scaling up the findings into government policy. They were, therefore, involved in project implementation. The women, men, youth and farmers were identified as highly affected by climate change with low to moderate influence and were targeted as project beneficiaries as well as being involved in the PIC in order to enhance their influence on the process. Greenwatch worked with the PIC to drive the CBA-related activities.

6.2 Participation in CBA implementation

Participation in CBA occurred at different levels: some community members were involved in the design during the initial community engagement and planning exercises, but not involved in implementation or as beneficiaries. How community members chose to participate depended largely on guidance by the partner organization, partially by the needs of the CBA process, the budget and partially by needs of the community.

CBA pilot projects are, by their nature, small scale and can only involve a sample of the population of a community and the number of beneficiaries is often small. The partners had to help select the beneficiaries of the pilot CBA projects with objectivity, care and sensitivity. The partners facilitated the selection of the participants but it was done with full agreement by the stakeholders. Criteria for selection included gender balance, degree of need and approval of the village leadership. Additional ways of selecting beneficiaries included using a ballot system, a vulnerability analysis and approaching the community leaders such as the chairs of the youth, men's and women's groups to assist in the identification of vulnerable groups.



Introduction of fuel efficient stoves to women in Bursali

Ensuring gender participation in CBA implementation

During implementation, sensitivity to gender and diversity issues was continuous with workshops on the importance of gender equality. BNRCC held two gender workshops for partner organizations during the course of the project to create and maintain awareness of gender issues and to provide tools for gender equity in CBA. BNRCC partners were reminded of the need to take into account the time constraints of women and other vulnerable groups to ensure their full and active participation in project activities. All CBA-related activities should be held at times of the day and year when women and other marginalized groups are not engaged in farming, marketing, household or community activities. The location for meetings and training should also take the needs of women and vulnerable groups into account so that they feel comfortable participating. The most

effective way to ensure that CBA implementation activities account for different needs is to ensure that all stakeholders, particularly vulnerable groups, have their say in planning activities (CARE, 2010).

Learning from Experience: Women's participation in Cross River State with CERCOPAN

The partner CERCOPAN had to overcome problems associated with participation in general, and with women's participation in particular. The time that community members actually had available for CBA-related activities was over-estimated by CERCOPAN when designing the CBA process. In both communities, Iko Esai and Agoi, both women and men were away from their homes cultivating their farms, hunting or undertaking other activities for most of the week. As a result, only one day per week, which was market day, was suitable for large group meetings, as all community members remain in the village on this day (Friday in Iko Esai and Thursday in Agoi). Specifically for women, there were a number of constraints to participation which gradually became apparent. The myriad of additional demands on women's time means that any activity that requires time away from the farm or compound is unlikely to work. As a result, most of the options discussed by the women were based around when they are involved in current activities in the household.

6.3 Adaptation options implemented

The communities prioritized adaptation options using a variety of methods. This enabled the communities to decide the most suitable options to implement, based on need, benefit, feasibility and impact. The pilot projects in the 15 CBA communities involved the implementation of a range of adaptation options, including addressing the impacts of climate change directly by improving access to water, and some indirectly by providing alternative livelihoods to increase resilience to climate change impacts. The adaptation options selected included:

- increasing food security by introducing improved crop varieties;
- testing alternative livelihood options such as aquaculture, bee-keeping, cassava processing and snail farming in order to provide a means of income and decrease reliance on dwindling forest resources;
- providing fuel-efficient wood stoves;
- improving access to water sources to deal with water scarcity; and
- tree planting for ecosystem rehabilitation.

The table on the next page is a summary of the adaptation options implemented, the climate change impacts they are meant to address, and expected results. In addition, a synthesized list of adaptation needs, and the adaptation options implemented with the partner organizations, is provided in Appendix 1.

Summary of results of adaptation options implemented

Adaptation option	How adaptation option addresses climate change impacts	Results of adaptation options to date	Lessons learned
ATBU with Gorori, Bursali and Billeri			
Fuel efficient stoves	To reduce pressure on forest resources (healthy forests reduce vulnerability to climate change). To increase resilience by reducing women's labour load	Each of the three communities received 20 fuel efficient stoves, totalling 60	Women should be consulted early on so they have input into stove design
Training on the use of simple weather tools	To continue to plant crops with unpredictable rainy seasons & lower rainfall	100 farmers trained on measurement of rainfall & its implication as well as use of handheld weather forecaster in the three communities	Very successful & farmers were assisted in determining when to plant crops
Drought decision support tools	To continue to plant crops with unpredictable rainy seasons & lower rainfall	Data predicted the best planting times & fertilizer rates for Cowpea (Sampea8), Sorghum (ICSV 400) & Millet (Sosat 88). Increased yield for the three pilot sites were achieved	Very successful & farmers were assisted in determining when to plant crops
Testing improved crop varieties	To address crop failure due to rainfall variability	100 kg seeds each of sorghum & millet & 50 kg cowpea seeds distributed to 75 farmers, 25 in each community (20 men & 5 women)	Crop yields increased when correct applications of fertilizers were applied. There is a need for more awareness on the use of organic fertilizers to reduce dependence on purchased inputs
Planting of <i>Jatropha</i> with water harvesting	To increase resilience by providing alternative income	2500 seedlings provided each to Billeri, Gorori & Bursali for a total of 7500; A 5 x 5 x 4m polythene-lined water harvesting reservoir established in each community	There needs to be commitment to maintain the reservoir & the seedlings, as shown by poor results in one community
UNIMAID with Tosha and Sansan			
Food processing machines	To increase resilience to climate change impacts through alternative livelihoods	3 grinding machines & 60 spaghetti machines were distributed to women	
Boreholes in oases	To provide irrigation in conditions of increasing aridity	Established 5 irrigated arable farms, provided water to surrounding settlements, & also to over 1000 cattle per day	Very successful with high crop yields & good livestock watering
Biogas as alternative energy	To reduce pressure on scarce forest resources	10 biogas units produced & 30 people trained in use	Highly experimental & the units are only being tested so require constant monitoring
Domestication of wood production	To increase resilience by providing access to fuel & fodder resources	Twelve committee members trained & 100 seedlings raised with poor survival rate	
Income generation for women	To increase resilience to climate change impacts through alternative livelihoods	Two milling machines installed for women in Sansan	The women were very grateful for more control over production & no longer had to walk to Damasak to grind their grain
Plantation establishment on sand dunes	Reduces the impacts of increased aridity & wind erosion which is causing dune migration to settlements & farmlands	15,000 seedlings procured & 60ha dunes plantation established. Over 25% of population, including children, women, & men participated	Species of tree used, <i>Prosopis</i> needs to be closely monitored as it can be invasive
Improved fodder production & storage	To address lack of livestock fodder due to increased aridity	18 volunteers given planting material but fodder farms performed poorly	There needs to be more experimental plots with better attending to young plants to see results
Water purification	To improve potable water supply & overall health of community to increase resilience	Over 1500 people (mostly women & youth) benefitted from training & materials	People were very grateful to have an easy method to produce clean water

Adaptation option	How adaptation option addresses climate change impacts	Results of adaptation options to date	Lessons learned
Greenwatch Initiative with Daudu and Falgore			
Improved farming techniques & provision of improved crop varieties	To improve crop yield in conditions of variable rainfall & higher temperatures	50 kg each of improved varieties of rice (Nerica 3), soya beans (Tx1448-2E), maize (TZE COMP 3-white) to 122 beneficiaries (40 women & 72 men) in Daudu & 55 men in Falgore; & 200 bundles of improved varieties of cassava (TMS 98/0581) to 21 women & 50 men in Daudu & 100 bundles to 37 men in Falgore	Crop yields were increased, however there is a need to increase the acceptance & use of organic fertilizers to reduce dependence on purchased & unsustainable fertilizer inputs
Construction of shallow boreholes ("wash wells") for dry season vegetable farming	To increase resilience to climate change impacts through alternative livelihoods	20 boreholes sunk & 20 diesel pumps with pipes for 79 men farmers in Falgore & 3 pumps provided for 12 households in Daudu for dry season vegetable farming	Dry season farming was very successful
Provision of income opportunities for women in Falgore for production of groundnut oil & milling of cereals	To increase resilience to climate change impacts through alternative livelihoods	Spaghetti-making machines provided for 50 women in Falgore	A simple market analysis should have been conducted prior to provision of machines due to subsequent glut of product on local market
Bee-keeping for income generation	To increase resilience to climate change impacts through alternative livelihoods	Provision of 60 beehives to 20 households in Daudu & 88 beehives for 22 males in Falgore	Need to control wildfires that destroyed hives in Daudu; project was successful in Falgore
Deepening of existing earth dam in Daudu for year-round water supply	To provide drinking & irrigation water in conditions of variable & unreliable rainfall causing water scarcity	Earth dam deepened, but part of embankment later broke due to excessive rains & flooding	Need better engineering of dam to ensure it can hold high water loads during rainy season
Construction of rainwater harvesting tank in Daudu	To provide drinking water in conditions of variable & unreliable rainfall causing water scarcity	Rainwater tank holds 38,000 litres & provides water for 30 households in Daudu	
Establishment of citrus farms & nurseries	To increase resilience to climate change impacts through alternative livelihoods	Provision of 2,000 orange seedlings for 3 women & 55 men in Daudu & 1,000 orange seedlings for 25 men in Falgore. Establishment of orange nursery with over 4,000 seedlings of rootstock in Daudu	Citrus seedlings require a lot of care and a commitment by farmers is required. Women should be given seedlings to plant in compounds and not ignored because they do not own land
Establishment of <i>Acacia senegal</i> plantations for gum Arabic production in Falgore	To increase resilience to climate change impacts through alternative livelihoods	Over 5,600 seedlings of <i>Moringa</i> & <i>Jatropha</i> planted as border trees by 79 beneficiaries in Falgore	
Planting of woodlots & windbreaks around streams & households	To rehabilitate degraded land & stream banks to increase resilience to climate change impacts	3,600 seedlings of <i>Gmelina</i> & Teak established along the streambanks in Daudu. However, the seedlings in Daudu were destroyed by fire	Wildfires in Daudu need to be controlled – there needs to be more awareness about hazards of setting fires. Should communicate with DIN on their awareness program

Adaptation option	How adaptation option addresses climate change impacts	Results of adaptation options to date	Lessons learned
CARUDEP with Dashe and Kwaikong			
Demonstration on village- based tree nursery & distribution of seedlings	To increase resilience through alternative livelihoods	56 participants at workshop in Kwaikong (18 men, 12 women & 26 youth) & 12 participants in Dashe (5 men, 3 women & 4 youth). 360 fruit tress seedlings distributed: 60 seedlings were given to each of men, women & youth in each community	
Distribution of improved early- maturing crops	To improve yields in conditions of variable rainfall & reduced crop yields	180 received seeds: 30 youth, women & men from each community shared 1kg each of the following improved seeds: maize, rice, groundnut, cowpea, beniseed & soya bean	Millet was not successfully grown in Dashe due to higher rainfall
Soil improvement & striga control training workshop	To improve yields in conditions of variable rainfall & reduced crop yield	59 participants attended workshop in Kwaikong (22 men, 14 women & 23 youth) & 55 attended Dashe (4 men, 40 women & 11 youth)	
Training & practical implementation of 46,000 litre ferro cement rainwater harvest tanks	To improve water supply in conditions of variable & reduced rainfall which has led to water scarcity	2 surface & 1 underground tanks constructed. 20 youth were trained	The community raised funds & contributed labour which made this successful
Reservoir deepening	To improve water supply in conditions of variable & reduced rainfall which has led to water scarcity	1 earth dam (reservoir) was reconstructed in Kwaikong	
Renovation of borehole in Dashe	Variable & reduced rainfall has led to water scarcity	1 borehole renovated & fully functional	
Training & construction of a household water filtration system	To increase resilience to climate change by ensuring potable water & improved health	31 simple sand filtration units constructed & installed in Kwaikong	
DIN with Wula Ekumpuo and Bebi IV			
Development of CLUP in one community & formation of DRMC & training on DRR	To increase resilience in communities through better environmental management of important forest resources	CLUP developed for Bebi IV, with community by- laws; 2 DRMCs formed, with 10 members each in Wula Ekumpuo & Bebi IV; activities in Wula Ekumpuo CLUP- prioritized	
Fuel efficient stoves	To reduce deforestation from the fuel wood trade	56 community members sensitized, & 30 people in each community were provided with fuel efficient stoves	
Establishment of gari processing facility	To increase resilience though alternative livelihoods & to recognize the need to rely more on cassava which grows on poor soils	2 gari processing factories as well as 20 bundles of improved cassava for Bebi IV women's group for planting	The women requested training on the operation of the grinding machine so this would not be dominated by the men
Domestication of NTFPs	To reduce pressure on forest resources	Alang alang was planted near the communities. Reduced the number of visits by vulnerable girls to the forest & reduced pressure on other forest resources	
Establishment of snail farm	To reduce pressure on forest resources by providing an alternative to bush meat	2 snail farms established as source for household level snail farms	

Adaptation option	How adaptation option addresses climate change impacts	Results of adaptation options to date	Lessons learned
COLIN with Esuk Idebe and Akwa Esuk Eyamba			
Aquaculture	To increase resilience to climate change impacts & to reduce dependence on dwindling supply of wild-capture fish by coastal communities	120 copies of fish farming training manuals. Training for 65 participants (50 men & 15 youth) in Akwa Esuk Eyamba & 59 participants (35 men & 24 youth) in Esuk Idebe	Need for community support to ensure good security for fish once they are mature & marketable
Fuel efficient stoves	To reduce the deforestation of mangroves caused by fuel wood exploitation	305 participants (80 men, 137 women, & 88 youth) in Akwa Esuk Eyamba & 169 participants (45 men, 83 women, & 41 youth) in Esuk Idebe	
CERCOPAN with Iko Esai and Agoi Ibami			
Awareness campaign in both communities to outline importance of improved rainforest management	To increase resilience and protect forest resources as buffer against climate change	Awareness was increased in Iko Esai by 158%; and by 141% in Agoi Ibami. Education boards annually reaching 20,000 visitors	
Training of surveillance team & further development of CLUMP in Iko Esai	To improve the environmental management capacity of communities to provide a natural buffer to climate change	5 members of Iko Esai CCDC trained to maintain CLUMP. 24% of Iko Esai community forest brought under management in time period	
Alternative livelihood options: baking, poultry, piggery, bee-keeping, cocoa production	To reduce dependency upon the natural resource base which is a buffer to climate change	30 cocoa farmers received training in the two villages. Reported income increase of between 100% to 200%. 50 women & 52 men involved in livelihood initiatives (pigs, bee-keeping, baking, chickens). Income improvement: in Iko Esai by 48% and in Agoi Ibami by 260%	Women's other activities often took precedence over project-related activities. Lack of commitment to feeding hens meant egg project was largely unsuccessful. High & unplanned for veterinary bills for pigs needed to be factored in at beginning
Production of fuel efficient wood stoves	To reduce destruction of the natural resource base (forests)	94% of 63 women trained in Iko Esai built or building stoves; 91% of 90 women trained in Agoi Ibami built or building stoves	



Spaghetti-making machine in Falgore



Household water filtration units in Kwaikong



Construction of fuel efficient wood stove by DIN in Wula Ekumpuo

Livelihood strategies

A key focus of the BNRCC CBA projects was the implementation of adaptation options that supported livelihoods strategies as the diversification of livelihoods is a key risk management strategy. When people are engaged in sustainable livelihoods, then they are more resilient to climate change impacts than if their livelihood is failing them. Most of the vulnerable communities in Nigeria depend on rain fed agriculture, so a key element of increasing adaptive capacity was for people to have a range of options available to them so they could to sustain their livelihoods under changing conditions.

In two communities in Cross River State, aquaculture was chosen as an adaptation option for an income-generating strategy to provide income security because of a decline in the traditional fishery. Other activities such as farming pigs and chickens were promoted in two communities in Cross River State, with the poultry project specifically targeting widowed women in the communities. Value-added agricultural activities were tested in several communities and included the gari processing equipment so cassava could be processed and sold (two communities in Cross River State); grinding machines for millet or groundnuts (communities in Benue, Yobe and Borno States) and spaghetti - making machines (Falgore in Kano State).

Impact reduction strategies

The second group of adaptation options targeted climate change impacts directly by addressing:

- food insecurity due to rainfall variability and unpredictability;
- water scarcity; and
- desertification.

To address food insecurity, the most common adaptation option chosen by communities, especially in the northern and central regions, was to test improved crop varieties on the farms where traditional crops were showing reduced yields or complete failure. This option addresses climate change directly by addressing rainfall variability and unpredictability. Water scarcity was addressed by building water storage tanks and installing pumps and shallow boreholes (wash wells) for irrigation. To combat increasing desertification, thousands of trees were planted near the community of Tosha in Yobe State and Sansan in Borno State, to halt the advancement of sand dunes which was impacting settlements and farmlands.

Fuel-efficient stoves were introduced into all but three of the pilot communities. This adaptation option had a dual effect: to reduce pressure on forests (healthy forests reduce vulnerability to climate change) and to reduce the labour loads of women and children whose job it is to gather fire wood which usually involves walking very long distances.

Women's acceptance of fuel efficient stoves

Fuel efficient wood stoves were promoted in 12 of the 15 pilot project communities as an adaptation strategy to reduce women's workload by reducing fuel wood consumption. The stoves are also a strategy to reduce the intense harvesting pressure on forest resources in both northern and southern communities in Nigeria. Despite the advantages of the stoves in reducing fuel wood consumption and labour loads for women, there are some instances where women were reluctant to adopt the new technology on a larger scale. The reason is that in some cases, the women were not consulted on the design of the stove prior to testing and were given stoves that were too small and unstable to support their large pots of maize, called *tuwo*. The stoves would have been adopted by women sooner if they had been consulted initially and identified as key stakeholders in the project, and involved in the design of the stove so that it best suited their cooking needs.

Other strategies

Credit schemes were tested by one partner, CARUDEP, in the communities of Dashe and Kwaikong, as a way to increase household security and increase the adaptive capacity of women and ultimately the household. Accessing credit for projects can assist women and men to diversify their livelihoods. Experience has also shown that households with savings are better able to cope in times of crisis and they are also not forced to sell crucial livelihood resources, such as livestock, to sustain themselves in the short run (CARE, 2010). Therefore, access to financial services such as savings and credit can provide more opportunities to build long-term adaptive capacity.



Sand dunes encroaching on farmland near Tosha, Yobe State

Limitations of implementing adaptation options

Implementing community-identified adaptation options takes time. Time is important to establish good relationships between all CBA participants, including the PIC, the partners, the lead implementing organization and the donor. It also takes time to understand power structures in the community, who the most vulnerable and most powerful groups are, in addition to the actual time it takes to physically build or establish the project and monitor it. In the case of the BNRCC pilot projects, the time line was 18 months, which is short by most community-based project standards. Part of the rationale for the short project time was that they were pilot projects, designed to test adaptation options on a small scale, to be scaled up in the future, based on lessons learned. In order to fully measure the impacts of CBA implementation, there needs to be a longer term commitment to monitoring the project. This involves an extended funding period

or else a plan for participatory monitoring by the community and ongoing communication with the partner organization to convey results.

6.4 Budgeting for implementation

As in most projects, the amount of money for the BNRCC pilot projects was a fixed amount and the implementing agency, NEST, monitored the projects against key milestones to see if the financial statements were in line with project achievements. It is important for the whole CBA project team, including the PIC, to have a good understanding of budgetary requirements and constraints of the project. There were at least two financial officers on the project team. One was with NEST, who administered all funds from the donor organization (CIDA). The other was with the partner organization, who then administered the funds allocated by the BNRCC project for implementation. All financial transactions were transparent and able to be tracked, so that project team members were able to see how funds were used. It was essential to ensure clear and regular reporting to the financial officer at the implementing agency, NEST, to show how the funds were used.

In-kind community contributions

Communities involved in CBA with the BNRCC project were able to contribute either through fundraising or through the donation of time, labour, or other resources such as land and food. In all cases, the pilot project communities contributed time and labour. In one community, the contribution was a large sum of cash to pay for the cost of labour and in another case it was land for the construction of community fish ponds. In most cases, the farmers who were testing improved varieties of crops had to take a risk and allocate some of their farmland to test a new seed variety previously unknown to them. This implies there was a degree of trust in the process, in order for a farmer to give up a portion of arable land for a trial. There was trust in terms of the information and expertise provided by the partner organization and there was, on the part of the farmers, an eagerness to learn and to advance farming practices to increase resilience.

Learning from Experience: Community contributions to projects

The partners found that, in all communities where they worked, people were welcoming, hospitable, accommodating, and ready to make contributions wherever needed. In the communities where CARUDEP worked, for example, households actively participated in decision-making and planning, sourcing for funds to meet the required local contributions and making provision for food and accommodation as well as cash and in-kind contributions when needed. Community members also assisted in the construction of sand water filtration system units, underground /surface tank construction and in the provision of local materials such as stones, gravels, sand, water as well as labour. The communities working with CERCOPAN provided land, an old pig sty, as well as the building materials and labour to start up a piggery. The participating women in the poultry project contributed land, labour and materials for the hen enclosures. Community contributions with COLIN included rented canopies for workshops, the land and labour required for aquaculture ponds, which involved site clearing, pond excavation, stumping, weeding of ponds, and feeding the fish, etc.

For UNIMAID, the two communities willingly and freely contributed their resources such as time, labour, land, local knowledge, tools, and materials to the project, and were also very hospitable, accommodating, and cooperative. For the community of Tosha, the LGA provided additional vehicles and arranged for desert drivers for local activities whenever the project team visited the area. Similarly, the Village Head (*Lawan*) there often arranged accommodation and food for visiting team members, as well as free land whenever there was a need. All the labour related to tree planting as well as local farming tools and personal knowledge, required for successful project implementation, were provided freely by local volunteers.

6.5 Creating an enabling environment for adaptation: linking community adaptation strategies with local and state level government policy

The BNRCC pilot projects were based on the idea that the benefits of CBA would be more sustainable and more widespread if policy makers, such as the LGA and other local institutions (such as the State level ADPs) were included at the beginning and throughout the duration of the process. Including them in aspects of the project would also assist with advocacy for policy development around climate change adaptation which has wide-ranging benefits. The strategy for policy development and "scaling up" projects included finding ways to get the key messages about the project out to target groups. These included short policy briefs, handed out to visiting policy makers, live theatre groups to perform when policy makers were in the community, or community meetings where the policy makers were invited to hear the discussion by the stakeholders. The BNRCC project also hosted two regional meetings at the end of the projects that brought decision-makers together with the project team, including some participating community members and farmers so that meaningful shared learning took place.

Learning from Experience: Links between projects and outside organizations

The partner CARUDEP served as a link between the pilot project communities and external stakeholders such as the media and government agencies at various levels and was able to partner with these organizations. This enabled the project team to access financial support worth N 500,000 from Lantang South LGA, and support from CAFOD (Catholic Agency for Overseas Development) to carry out a climate change sensitization program for schools. This program has led to the establishment of a 'biodiversity garden', production of a climate change awareness DVD for children and the establishment of 'Friends of the Earth' in the School in Jos. In addition, the pilot project communities were part of research on 'Government response to Climate Change' that took place in nine LGAs in Plateau State, which was conducted by the New Environment Magazine, a publication on environmental issues.

6.6 Summary of lessons learned in implementation adaptation measures for CBA

Checklist for implementation of adaptation measures for CBA

- Include a realistic, detailed and flexible implementation plan in line with the CBA design
- Plan for advocacy activities to create an enabling environment for adaptation and sustainability by developing partnerships, linking with governments and supporting community institutions
- Include the review and update of project implementation plans to reflect changes in context, unexpected constraints or new opportunities
- Ensure that the implementation plan was sensitive to the different needs, constraints and capacities of women and other marginalised groups
- Provide for some flexibility in funds and activities to allow for efficient responses to unexpected events so that there is minimal disruption to ongoing CBA-related activities

Lessons from the field:

In addition to the lessons learned in previous stages, there are some additional lessons to be learned from pilot projects in the implementation phase. The lessons presented below were submitted by the partner organizations and may be useful to future CBA initiatives.

- **Gender:** There were some issues concerning the roles that women are restricted to in the village, which led to implementation delays in some cases and women being excluded in other cases. For example, in one community, the tying of particular knots which was required in order to make a chicken coop, is deemed a man's role (despite the women's ability to be able to carry out the task). Many women participants were therefore forced to wait until a male family member was available to assist them and others were restricted from participating in this livelihood by their male family member. In other cases, women did not own land and so could not participate in improved crop trials or planting citrus trees.
- **Time required for participation:** The many demands on women's time mean that any project that requires time away from the farm or compound is unlikely to be successful. As a result, adaptation options to benefit women should be based around their current activities in the household.
- **Diversity of skills:** It was beneficial for the CBA project to be managed by a project team that had a diversity of skills, such as: knowledge of climate change and its impacts; skills in reading climate data and climate models; skills in facilitation and community development; knowledge of agriculture; and links to resources needed for adaptation options to be implemented (such as nursery seedlings, improved crop varieties, cement for water tanks, etc).
- **Development of trust:** Many communities showed a high degree of trust in the process and were willing to take risks. For example, in the communities working with the partner ATBU, farmers ignored early rains and planted when the models suggested that the improved varieties be planted. Taking this risk resulted in success. In some cases, in some early stages of project implementation, there was a lack of trust by community members as well as too much protocol, which slowed down the progress of implementation.
- **Support by village head:** It was important to have the support and commitment of the village head during implementation – these people have the respect and cooperation of the community members and so when the village head encourages the project, it is more likely to succeed. On the other hand, it was evident in some communities, that when the village head had little or no interest in the adaptation options implemented in the community, the project encountered more problems.

- **Dedication to project:** A major factor that contributed to the success of the pilot projects was the commitment and team work among the team members, with support from other sources and with the enthusiasm of participating communities. In the ATBU project, the support from the University as well as the BSADP in providing logistics such as transportation, office space and free time for the staff contributed much towards the success of the project. The enthusiasm shown by many community members especially in Billeri and to some extent Gorori was also another positive contribution.
- **Improved crops:** Improved seed varieties was the most popular adaptation option and many community members indicated that they were aware of improved seeds already but complained of lack of access to them.
- **Need for training:** More training on planting improved varieties according to specifications and gradually phasing in organic fertilizers to replace purchased inorganic ones is important. Increasing dependency on expensive inorganic fertilizers is not sustainable.
- **Importance of record keeping:** More training on record keeping by farmers to compare improved varieties with the local variety would assist in monitoring this intervention.
- **Fuel-efficient stoves:** The use of fuel-efficient stoves has proven to be a good strategy in many communities and one that lends itself well for adoption. The users, mostly women, indicated that they now use much less fuel wood, there is less smoke produced and the food cooks faster. In the northern communities, what was earlier regarded as waste (such as millet husks, wood shavings and saw dust) could be used as fuel, thereby saving the environment and reducing costs as well.
- **Importance of consultation with users:** While fuel-efficient stoves were mostly successful, more work should have been done to ensure that women are consulted on the design of the stove so that it suits their needs and they will actually want to use them.
- **Unexpected costs:** When livelihoods projects involving pigs and chickens were designed in two communities, it was not expected that it would be necessary to provide as much veterinary care as was eventually required during implementation. This came at a considerable cost given the time the veterinarian and assistant spent in the community, the medicines provided and the transport to and from the community.
- **Scale of return:** In the livelihood project involving poultry-raising in two communities, the small number of hens given to each woman proved insufficient to produce eggs on a commercial scale. This caused difficulties in making the scheme profitable enough for people to accept. In addition, egg production was constrained by a lack of specialized feed that had previously been overlooked. The expense of this specialized feed, plus the lack of its availability in the participating villages, made egg production difficult overall.
- **Value chain:** Market research is important in order to assess if an introduced livelihood strategy will have a market outlet and generate the anticipated income for the beneficiaries. In one community, providing a processing machine caused a glut of the product on the market and a good sale price could not be established.
- **Understanding ownership:** Cooperative projects were not as successful as individual projects, in some cases because the sense of ownership was restricted by the shared responsibility that cooperatives depend on.

Chapter 7.

Keeping CBA going: Sustainability and knowledge sharing

CBA generates information that can be shared with other communities in the region and scaled up to be used in policy making. Good project information was obtained through regular monitoring and evaluation and shared through regular reporting by the partners involved in the BNRCC project. Good project visibility, usually through the media, audio visual, and through IEC materials was important so that knowledge was disseminated as widely as possible.

This chapter discusses ways to keep the momentum of the project going and to share the information. It is organized into the following subsections:

Sub-section 7.1 Monitoring and evaluation

Sub-section 7.2 Project documentation

Sub-section 7.3 Knowledge sharing

Sub-section 7.4 Visibility of CBA

Sub-section 7.5 Ensuring sustainability of CBA

7.1 Monitoring and Evaluation (M&E)

The M&E of CBA was focused on tracking project inputs, activities and results. This part of the process is usually required for donor reporting; however M&E can and should include more than this. M&E can facilitate learning while the project is ongoing so that this learning can feed back into the process. Regular follow-up and monitoring of CBA includes checking if the goals are being achieved as outlined in the work plan, the effectiveness of the partnership between the community and other project participants, as well as the effectiveness of the PIC. M&E can also involve reviewing performance and financial reports, performing site visits to evaluate CBA on the ground, convening regular meetings with partners, community members and the PIC and maintaining regular contact as well as keeping the beneficiary community informed. Regular communication between BNRCC/NEST and the partner organizations was also done to ensure that the project reporting, including the financial accounting was done in a timely manner.

M&E assists in the review and adjustment of the implementation plan and approach so that modifications may be made when there are unforeseen constraints or emerging opportunities. For example, an adaptation strategy in a drought-prone area that is increasingly experiencing flooding due to climate change could put more emphasis on water harvesting and water conservation to store surface run off. The stored water would sustain communities over a longer period during the dry season and/or subsequent drought.

Learning from Experience: M&E of fodder production and storage improvement project with UNIMAID

Livestock rearing is one of the most common traditional occupations of the men in the Sahel. Under poor climatic conditions, forage production becomes considerably limited. Annual grasses are completely consumed by livestock, wildlife, and wild fire. The few wild resilient perennials are browsed by livestock and eventually give in to increased pressure. The situation is further exacerbated by lack of proper pasture storage practices that would ensure retention of high quality feed for use during lean periods.

The partner UNIMAID aimed to contribute to the solution for fodder production by empowering men in the communities to improve fodder production on farms, and also to improve their fodder storage methods. The process of searching for improved, fast-growing fodder led to the acquisition of 20 kgs each of the improved seeds of *Stylosanthes sp.*, *Andropogon gayanus* and *Chloris sp.* from A.U. Suwaid Management Consultants in Kano. The seeds were then distributed to ten women and men farmers in each of the two communities for trial.

Monitoring revealed that the trial results were not encouraging as the productivity and drought-resistance of the introduced species were less than the local species of fodder. Of the three species, only *A. gayanus* survived the two weeks of drought that followed the first rains and grew to the end of the wet season albeit with low yield. Unlike the wild species, the introduced species needed management attention, which was difficult considering that farmers' labour was directed to their food and cash crops. The second approach for the improvement of farmers' knowledge of fodder preservation/storage was accomplished through practical training, participatory actions, and demonstrations. One of the major problems was lack of sufficient natural fodder to harvest several times before the end of the rainy season. Even at the end of the rainy season, the popular feed species were still too small for easy harvest. That is likely one of the reasons farmers usually wait to rake the grasses at the end of the wet season.

The summary of experiences gained through monitoring of the fodder improvement project is that livestock production is one of the major industries in the area, and that more work needs to be done on the introduction of improved feed species as well as improvement of the production, harvesting, and storage of local fodder species. It is hoped that the new ideas introduced into the communities will continue for further improvements in fodder production and storage.

The key steps in M&E are the development of performance indicators, establishing the baseline, monitoring progress, and evaluation of progress and achievements. Each of these steps is discussed below.

Project performance indicators for M&E

Evaluating the progress and results of CBA required measuring certain aspects of the pilot projects. These indicators measured aspects of achievements based on objectives, such as improvements in climate-resilient livelihoods, disaster risk reduction, local capacity development, reduction of the underlying causes of vulnerability and changes in policy that assist communities in adaptation.

Indicators can be quantitative or qualitative or a mixture of both. The indicators must clearly track progress towards achievement of the expected results and should be "SMART", which is Simple, Measurable, Achievable, Realistic and Time-bound (CARE, 2010). Separate measurements should be made for women and men, so the results show differences in outcomes by gender. The indicators used in the CBA pilot projects were, in general, measurements of the stated objectives. Other indicators used were level of knowledge of climate change, vulnerability, gender sensitivity, adaptation practices, and if the project is community driven.

Examples of performance indicators used by CERCOPAN

Objective: To create awareness for responsible resource utilization and protection.

Indicator 1: The number of women and men taught about the links between climate change and responsible resource utilisation

Indicator 2: Number of women and men participants in adaptation programmes from key interest groups

Objective: To raise standards of living through the implementation of sustainable alternative livelihoods projects in 2 target communities by project year 2.

Indicator 1: Income of women and men before project onset compared to income after implementation

Indicator 2: Cocoa farming yield before onset of project compared to after training

Indicator 3: Women's and men's income survey in community from 2009 to 2010

Objective: To demonstrate the use of fuel efficient wood-stoves in communities to reduce destruction of the local forests

Indicator 1: Number of women and men participating in fuel wood stove training

Indicator 2: Number of stoves produced

Indicator 3: Number of women and men intending to produce wood stoves in the near future

Establish baseline and monitor progress

To monitor indicators, certain steps were followed. For example, crop yield was used as an indicator. The baseline was the measure of how things are at the start of the project. For crop yield, the baseline measurement was how much yield the farmer was getting at the start of the project. Then yield was monitored over the next growing season(s) to evaluate how much the new variety is yielding.

It should be noted that participatory systems of monitoring are best as they ensure that all perspectives are heard. Crop yields from two different farms testing the same improved variety may be different, depending if one has less time to tend the farm or has less money for required inputs to ensure a good yield. Therefore, measuring yield from as many farms as possible, representing different groups (women, marginalized groups, etc.) is the best approach.

Evaluation of progress and achievements

Evaluations are usually conducted at different points during the CBA process to determine whether project objectives were met. Evaluations take into account any unexpected results of project activities. It is important to keep in mind that since adaptation is a process rather than an end state, it can be difficult to evaluate. Since adaptation projects are often long term, it is difficult to evaluate conditions within the timeframe of the project itself. Flexibility is good and when possible, the monitoring results should form a basis for evaluation, which then provides solid information that can help the project along. In the case of the BNRCC pilot projects, there was not enough time for impact evaluation, as mentioned previously. Instead only initial outcomes could be assessed.

Learning from Experience: M&E in Falgore, Kano State

Greenwatch used the Socratic planning wheel exercise (see Appendix 2) as a tool to establish and monitor indicators based on project objectives. The monitoring provided benchmarks to track project progress and evaluation of outcomes. The performance indicators used were:

- increased knowledge of climate change;
- reduced vulnerability;
- gender sensitivity;
- adaptation practices; and
- community-driven.

Each indicator was rated between 0 to 10, with 0 indicating that objectives were not met and 10 indicating full attainment of desired project objectives. Participants in each target group rated each of the indicators based on the present situation in the community and where they wanted to be at the end of the project. The rating was based on individual responses from women, men and youth and were calculated as a percentage of the total number of participants in each focus group. Results of the exercise for Falgore are shown in the table below.

Monitoring of Indicators in Falgore

	Number of participants	Climate change awareness	Gender sensitivity	Community-driven	Vulnerability reduction	Adaptation practices	Average score
At the beginning of the project							
Men	493	3	5	1	4	1	3
Women	1092	1	1	1	1	1	1
Youth	153	1	1	2	1	1	1
Average		2	2	1	2	1	2
At the end of the project							
Men	493	9	8	8	8	9	8
Women	1092	9	9	9	9	9	9
Youth	153	9	7	8	7	8	8
Average		9	8	8	8	9	8

*Note: The highest score per focus group is in **bold**. Average scores were rounded up to the next whole number with 10 as the maximum.

7.2 Project Documentation

Effective and regular reporting is an important component of the overall CBA process and should be done in such a way that the information contained in the report is made available to all stakeholders, including community members. Keeping this in mind and recognizing that there will be a variety of different audiences, with different knowledge and information needs, reporting can take different forms to ensure that the most appropriate methods of communication are used. These include reports, journal articles, presentations and audio-visual materials, such as posters and drama.

All BNRCC partners were required to submit an inception report, which outlined the CBA analysis and design, containing the objectives, methodology and the work plan including the timeline, major milestones and budget. A mid-project progress report including financial statements was also submitted to NEST for review which was also reviewed by the PPAG during one of their meetings. The PPAG met two times a year with NEST programme officers to discuss any issues arising from the projects and to review any project related material. All feedback was given to the project partners to incorporate into the project cycle. Finally, the partners were required to submit the final report and all financial accounting to NEST at the end of the project cycle. All final reports are in a compendium, available on the BNRCC website at www.nigeriaclimatechange.org or at www.nestinteractive.org.

7.3 Knowledge Sharing

In addition to building knowledge within the project team and stakeholders, it is necessary to share project knowledge with the wider community. This includes other neighbouring communities, other CBA practitioners, policy makers and the wider public. In some cases, there are opportunities to share the knowledge more broadly both within Nigeria and internationally, where appropriate. Methods for sharing information and knowledge to local users and the public is through written documents, such as case studies which summarize projects, through local workshops, and through drama, radio, video/documentary and newspapers. Using the BNRCC project website to share project results is a way to reach a broader audience, such as the national and international community.

The BNRCC project emphasized the importance of knowledge sharing. Funding was available for regional workshops that brought together policy makers, partners and representative community members. This was truly an effective way for farmers to share their experiences directly with policy makers, who may not have other opportunities to learn firsthand what climate change impacts most communities face. One partner, ATBU, also took advantage of knowledge sharing with the three communities they worked with by providing transport for the PIC members to travel to the community that had the most success, so that the PIC could learn from the more successful projects.

Peer Education Programme (PEP)

The PEP model was used by the partner, Greenwatch Initiative, to mainstream climate change communication in CBA. The model uses different strategies for climate change communication to convey messages to community members in an easy to understand form. It builds on networks and structures that exist in the communities and encourages women and men to listen and accept information from their peers. Also, it is regarded as a method that is particularly valuable for reaching members of the community who are mobile and are difficult to reach through conventional education methods. The intended outcomes of the PEP model are to achieve and maintain climate change adaptation best practices, increase knowledge about climate change and to enhance peer communication and community support to climate change programmes. The method is simple and depends on a "stepping down" training. It begins with training women and men as Peer Educators (PEs) on climate change awareness. The PEs then chose a peer group to share the information with. The complete PEP model involves peer education along with other special events such as drama, quiz competitions, games, rallies, road/talk shows and distribution of educational materials in order to reinforce the training information. Incentives were also given to peers for each session they attended and the PEs were given monthly stipends. The principle of the PEP methodology is that peer to peer education is most effective as information is more effectively shared among groups with similar characteristics.



Drama group performing as a part of the Peer Education Program in Daudu

7.4 Visibility of community-based adaptation

Enhancing the visibility of CBA increases awareness of climate change impacts with the wider public and shares information on what is currently being done in communities to deal with climate change. All of the BNRCC's partners made effective use of the local media to share project news and a number of local newspapers as well as state broadcasting corporations and the National Television Authority reported on the pilot projects. Other partners printed leaflets on the projects for distribution to other communities, one partner wrote a policy brief for local and state government agencies, and some partners have their own websites where project information is posted. Two partners used some of the project funding to produce posters, stickers and t-shirts to promote the CBA projects and all partners placed signboards near the participating communities.

Learning from Experience: Project visibility for CERCOPAN

There were several ways in which the CBA projects in Iko Esai and Agoi Ibami were publicised. There were reports prepared on the land use management plan report and monthly reports were submitted to Cross River State Forestry Commission and his Excellency, the Governor, on all of the BNRCC project's work. There were numerous articles written or broadcast about the project, including 11 articles for CERCONEWS, which is CERCOPAN's monthly newsletter. The articles were about the all aspects of CBA, including climate change action in communities (needs assessments and awareness), the Chief spearheads the push for action on climate change, about a number of different adaptation options tested (piggery, cocoa training, bee-keeping, fuel efficient stoves). Multiple articles on the BNRCC project were published in the April 2010 and January 2011 editions of the Community newsletter, *Duyin Ehumu*. This newsletter is distributed in a large number of rainforest communities, including Iko Esai and Agoi. The newsletters are available for download at <http://www.cercopan.org/downloads.htm>. There were an additional nine articles written by participants and CERCOPAN staff. BNRCC project news was also on Facebook fan page entries (duplicated on Twitter and LinkedIn) (<http://www.facebook.com/cercopan>), as well as on the "Wildlife Direct" blog and the National Wildlife Humane Society newsletter.

There was also broader public education: the CERCOPAN office in Calabar and Rhoko base camp are visited by numerous students, tourists, and researchers, both from within Nigeria and internationally. Many of the visitors to Rhoko stopped by Iko Esai en route and visited the alternative livelihood strategies that had been put in place with the BNRCC project. Guided by a CERCOPAN staff member, visitors were taught about the benefits of the adaptation to climate change projects, and also of their benefits for biodiversity conservation and maintenance of ecosystem function.

7.5 Ensuring sustainability of CBA

Ideally, the design phase lays out a framework so that the CBA process can incorporate the new experiences and learning gained during the M&E process. This involves creating opportunities for reflection and learning among the project team, partners and other stakeholders. The reflection and learning should emerge from discussion of any changes to the context, and evaluation of lessons learned from implementation. Where necessary, the approach may be modified to incorporate what has been learned from these important discussions. Within the BNRCC project, much of this reflection and learning took place at a workshop that brought together BNRCC partners in Abuja to share experiences.

All partners had an "exit" strategy to ensure that the benefits of the CBA process in the pilot projects they administered would continue and be sustained long after the financial and human support from the partner organizations was finished. To do this, the formation

of a Community-based Organization, or CBO, was initiated in each community. This was considered an essential component for sustainability. The CBO was to take on the responsibility of carrying on the CBA activities. The CBO was also set up to provide an important link between the community and policy makers, such that community members are in a better position to forward their issues regarding climate change related or other issues to the local authorities concerned as future needs arise. Having a CBO in place provides an opportunity for collective action with respect to climate change challenges. As an example, the partner, ATBU, helped to set up a trust fund that the new CBO would manage. Funds were to be generated through the use of a cassava grinding machine, with all proceeds to be managed by the CBO and designated towards a loan scheme for the communities.

Another strategy to build sustainability was to assist the community to develop partnerships so that the CBA project had a marketing or supply outlet. For example, DIN linked one community to a commercial cassava company in the area for a supply of improved cassava cuttings to community members for cultivation. There is also the possibility of community members selling their excess produce to the company at a better price. In the case of UNIMAID, committees were established at the beginning of the project to manage each of the small projects in the two communities. Similarly, a committee was established in each of the two communities with which COLIN worked. The committees had the responsibility to manage the ponds. Committee members were given additional training to take on these additional responsibilities for the community.

Learning from Experience: CBOs in Benue State

As part of the sustainability plan towards climate change adaptation, Greenwatch Initiative assisted in the formation of CBOs in the communities of Daudu and Falgore with the express purpose to sustain the CBA project activities. In Daudu, the CBO is known as Daudu Climate Change Association (DCCA) with seven executive members (4 men and 3 women) while in Falgore, it is known as Falgore Climate Change Association (FCCA) with five executive members (3 men and 2 women). The FCCA has already received a certificate of registration from Doguwa Local Government while the DCCA has yet to be registered. Greenwatch Initiative intends to continue to mentor the two new CBOs for organizational management and financial acquisition, to help equip them for sustainability.

7.6 Summary of lessons learned in sustainability and knowledge sharing

Checklist for sustainability and knowledge sharing

- Ensure that the partners and the PIC have a good understanding of the importance of good information and knowledge management practices, including regular M&E
- Put into place a good information and knowledge management system that meets the information needs of the project and all stakeholders and is sensitive to women and other marginalised groups
- Track both intended and unintended impacts of CBA activities and report on both
- Allow for the participation of CBA project stakeholders in M&E and information sharing, including, data collection, analysis and processing
- Provide opportunities for learning and reflection on adaptation among all project participants in order that the project could benefit from this learning
- Develop indicators that assess progress in areas of climate-resilient livelihoods, disaster risk reduction, local capacity development, and addressing underlying causes of vulnerability. Include indicators that track changes in climate variables, such as temperature and rainfall, and identify climate hazards. Include indicators that monitor changes in key livelihood resources, such as crop yields, forest product collection or fish catches.

- Ensure that the indicators are measured separately by gender
- Document experiences and lessons learned
- Share lessons and best practices on CBA with other projects and partners, and through relevant networks, workshops and websites

Lessons from the field:

In addition to the lessons learned in previous stages, there are some additional lessons to be learned from pilot projects in the sustainability and knowledge sharing phase. The lessons presented below were submitted by the partner organizations and may be useful to future CBA initiatives.

- **Importance of the PIC:** The formation of a PIC to monitor projects helped to keep the projects in focus, and was preferable to monitoring being done exclusively from outside the community.
- **Commitment of policy makers:** Despite efforts to include councillors early on in the CBA process, it was difficult later to meet with them, so it cannot be said that any knowledge sharing with respect to the councillors occurred in some communities. When decision makers from outside the community make a commitment, they should honour it.
- **Informing policy:** There are opportunities to influence policies through collaboration with various government officials as well as the media.
- **Sharing results:** Outcomes from the pilot projects are a useful and relevant instrument to other researchers and policy makers. This was evident at the regional knowledge sharing workshops that were organized by the BNRCC project.
- **Include gender perspective:** Knowledge sharing should also emphasize different impacts of climate change on women, children and men and the impacts of adaptation strategies to increase the resilience of the most vulnerable.
- **Scaling up:** The replication of similar CBA activities in other communities is very feasible as many other communities have indicated interest in similar projects.
- **Forming linkages:** Existing infrastructure and publicity venues can greatly facilitate operations and communications involved in CBA (for example, availability of reliable internet for research on climate change material, education centres for display of awareness materials, community and international newsletter for dissemination of results).
- **Project visibility:** Local schools, visitors from other communities and the general population have learned from publicity materials and talks given during visits to some sites.
- **Time is essential:** For community-based projects, time is required to build good working relationships built on trust and openness. This was generally achieved for the BNRCC pilot projects. However the time allocated to the pilot projects was too short to measure impacts and only early outcomes could be documented.

Chapter 8.

Challenges and successes: Summary of lessons learned

This report on "Learning from Experience" is intended to provide practitioners and policy-makers who are actively involved in climate change adaptation efforts, including those working with and within vulnerable communities, some of the lessons learned from BNRCC's pilot projects in 15 vulnerable communities in Nigeria.

As in most community-based projects, there are both challenges and successes, but both can be used as building blocks for further work in community-based adaptation. The learning that occurred in the process of designing and implementing each of the adaptation projects is summarized here as lessons learned, including both what went well and what needed to be revisited or changed.

From these lessons learned, it is hoped that other CBA projects in Nigeria will have a foundation to build upon to help people adapt to the impacts of global climate change.

Time

An overarching key lesson learned in the BNRCC CBA process is the importance of taking the necessary time to work well with communities: to engage communities and understand how they apply their knowledge and skills at coping and adapting; then building on these local efforts so that communities move forward in adapting to climate change. Community engagement is necessary so that people collectively understand what factors make them vulnerable to climate change impacts and what resources they have to make the necessary adaptations.

It takes time to develop good, strong working relationships based on transparency and accountability, so that there is mutual understanding and trust to move CBA forward.

It is also important to provide enough time so that learning from the CBA process takes place: impacts of CBA can only be measured after the process of adaptation has had time to develop and be embraced by communities. Understanding the impacts of CBA will help ensure that other initiatives can benefit from the learning that occurs.

In essence, time is needed to promote learning and action with full community participation, to enhance local adaptive capacities and strengthen the resilience of communities, and to learn from these actions.

Vulnerability

Climate change impacts are being experienced in most communities throughout Nigeria, with vulnerable communities being the most seriously affected. It is essential that more people become aware of the threats and more resources are allocated towards community-based adaptation to reduce vulnerability and increase resilience. Adaptive capacity in a community is increased when women and men recognize their own existing strengths and understand how they can use these to take action.

A key lesson learned from the BNRCC projects is that women and children are usually the most vulnerable groups and the most affected by climate change impacts. Women generally have less mobility and fewer chances to move to other areas to earn income; they also have less access to education, information and land resources and are highly dependent on natural resources for their livelihoods. Children are vulnerable because they are tied to the family home and are often the ones who have to collect water and other resources, such as firewood, which are increasingly time consuming activities that take away valuable time for education.

Community participation

Enhancing local adaptive capacities with the full participation of a range of community stakeholders strengthens the resilience of communities. Community-led initiatives are essential if ownership of adaptation efforts is to occur, helping ensure that efforts are sustained after the funding period is over. Full community participation also relies on the strengths and knowledge that exists in communities, based on generations of working hard with the resources and capabilities that they have. The inherent resilience in communities in Nigeria must be built upon to enable local people to have a greater voice in determining their future and what options they have to face climate change impacts.

A key BNRCC lesson learned is that it is essential for the success of the CBA process to ensure awareness and sensitization to the issues. It is important that all community members, both women and men, agree on and are clear about the process. This includes issues related to who is the most vulnerable and how they would benefit, so there are no unrealistic expectations. Success in CBA is dependent on active involvement and ownership by the community of the entire process.

Gender

It is widely recognized that the voices of women and children are not heard to the same extent as men's in decision-making. Gender equality in CBA is essential and the perspectives of both women and men enrich the process. All community participants must make significant efforts to ensure that both women and men are involved in project decision-making roles and that the benefits of CBA are distributed equally.

A key BNRCC lesson learned is that much more work needs to be done to overcome the social and cultural barriers in Nigeria for communities to fully embrace gender equality. It is important that women are consulted early on in CBA so their knowledge contributes to the process, so they benefit from the adaptation options being tested, and so that the work they are already doing to sustain their families is recognized and validated.

Implementation

The many dimensions of CBA implementation require a free flow of information through good communication. The implementation process depends on ensuring that different areas of expertise and experience come into play, to minimize the risk of failure. CBA results and lessons learned can then be scaled up and replicated in other communities.

The vulnerability assessments, identification of adaptation options and the implementation of those options often depend on different areas of expertise and experience in order to minimize the risk of failure. During implementation, in particular, there is often a tremendous need for technical expertise to help support the sound implementation of adaptation options, so there may be a role to play for additional technical assistance, beyond what skills are available in the community. For example, when engineering requirements are beyond the scope of local skills and expertise, or when certain materials needed are not locally available, then good communication ensures that expertise is found and utilized and the most suitable materials are sourced.

Sustainability and multi-stakeholder governance

The BNRCC projects also demonstrated that good governance is key to CBA. In communities where there was an engaged and supportive village head or chief, there was greater community participation and better results than in the communities where the village head was uninterested in CBA and not supportive of the community.

Also when stakeholders such as the LGAs are meaningfully involved, there is greater visibility of the CBA process and the efforts the community is making to ensure successful CBA are more likely to be recognized. There is evidence that community-based organizations have more opportunities to dialogue with decision makers at the local and state levels when government leaders are involved from the beginning.

Project achievements derive largely from the strength and dedication of the entire project team – including the partner organizations and the participating community members with the support of their village heads. The high level of commitment and the diversity of skills of those involved in CBA contribute greatly to success, especially

when complemented with commitment, cultural understanding, the desire to learn and the wish to advance the core knowledge of community-based adaptation to a new level.

In order to address the gaps and the need for further work in the area of community-based adaptation, **there is the need for the local, state and national governments to commit the much-needed resources to assist vulnerable communities to increase their adaptive capacity.** Communities already have knowledge, strength, resilience and the capacity to learn. Providing much needed funding will act as a catalyst for these attributes to work in tandem with CBA efforts to help the most vulnerable communities across Nigeria adapt to climate change.

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Appendix 1. Community needs and adaptation options in the pilot project communities with implementing partner organizations

Adaptation Needs	Adaptation Options	Local Implementing Partners
Water availability & use	<ul style="list-style-type: none"> ■ Rainwater harvesting ■ Tapping of shallow aquifers (wash wells) for small scale irrigation ■ Rehabilitation of boreholes ■ Building of dykes to retain & store water 	Catholic Rural/Urban Development Programme (CARUDEP) Greenwatch Initiative University of Maiduguri (UNIMAID)
Food security	<ul style="list-style-type: none"> ■ Drought resistant & /or early maturing crops ■ Adoption of conservation farming methods, e.g. use of organic manure, mulching & cover crops ■ Natural pest control methods ■ Food preservation & drying to provide increased security & varieties of food ■ Poultry production ■ Snail production ■ Fish production 	CARUDEP UNIMAID Greenwatch Initiative Abubakar Tafawa Balewa University (ATBU) Coastal live in Nigeria (COLIN) Development in Nigeria (DIN)
Ecosystem rehabilitation	<ul style="list-style-type: none"> ■ Tree planting (using local varieties of fruit & forest trees) ■ Sand dune rehabilitation ■ Domestication of non-timber forest products to reduce over exploitation of forest ■ Switching from hunting to animal husbandry 	CARUDEP UNIMAID Greenwatch Initiative ATBU COLIN DIN
Health	<ul style="list-style-type: none"> ■ Simple sand filtration system to improve the quality of drinking water & reduce incidences of water borne diseases ■ Cloth filters on well water to reduce water borne disease 	CARUDEP UNIMAID
Energy	<ul style="list-style-type: none"> ■ Use of alternative types of energy such as livestock dung (biogas) & crop residue ■ Increasing energy efficiency by using fuel efficient wood stoves & reducing negative health impacts 	UNIMAID Greenwatch Initiative ATBU COLIN DIN CERCOPAN
Income	<ul style="list-style-type: none"> ■ Bee-keeping ■ Snail farming ■ Poultry production ■ Aquaculture ■ Gari processing ■ Spaghetti production ■ Millet grinding ■ Dry season farming 	Greenwatch Initiative DIN CERCOPAN COLIN DIN UNIMAID
Early warning systems	<ul style="list-style-type: none"> ■ Drought decision support tool ■ Simple weather forecasting tools ■ Formation of disaster risk management committees 	ATBU DIN
Institutional development/ strengthening	<ul style="list-style-type: none"> ■ Formation of project implementation committees in all project sites ■ Inclusion of women in decision making at management levels of committees ■ Establishment of linkages between committees & local councils, relevant ministries & parastatals ■ Employing the peer learning tools to share information & build capacities of local population 	All partners

Appendix 2.

Social Analysis Systems (SAS) tools commonly used in BNRCC CBA

Social Analysis Systems (SAS) tools were used extensively in the early stages of the CBA process. The tools were most useful for community engagement, to ensure the inclusion of all stakeholders and to determine the adaptation strategies for testing that were the most feasible and would have the most impact. SAS is based on concepts of collaborative inquiry and social engagement. The tools are thus participatory and ensure that the community and facilitators learn together and that the community is fully engaged in the process.

These tools were used with people in focus groups, usually groups of 5 to 10 people (when there are more it becomes difficult to hear all ideas), and attempts were made to ensure that women, men and youth were all engaged, either in separate groups or together. The step-by-step guide for some of the tools discussed below was written by Chevalier & Buckles (2008) and is available at www.sas2.net/. The most commonly used community-based tools are listed below with a short description of what the tool can be used for.

Focus group discussions

Focus group discussions (FGDs) are an interactive way of collecting in-depth information on concepts, perceptions, and ideas from a group of approximately 5 to 10 people guided by a facilitator. The participants are chosen based on their ability to provide specialized knowledge or insight into the issue of climate change impacts and adaptation. FGDs are often carried out with other participatory tools described below (community historical timeline, stakeholder analysis, etc). Ideally, at least two stand-alone FGDs should be held in every community: one with women and one with men. More groups will be decided upon as appropriate and may include elders and youth, for example. Preferably, the groups will be composed of both older and younger representatives of the community and include people who have lived in the village long enough to talk about the changes over time. It is important to be sensitive to literacy levels and to ensure that clearly identifiable symbols are agreed upon with the participants in the discussion and used instead of text whenever needed. A FGD can take about two to three hours depending on the tools used.

Historical timeline and force-field

The timeline is used to identify particular events in the past that have created a problem or a situation that has had a widespread or significant impact in the community – for example, a cyclone, drought, flood or earthquake. The timeline allows people to explore their views of past events and their knowledge of a problem or situation and how it impacted the community.

The timeline visually reconstructs and tells a story of changes over time using these significant events of the past.

The force-field is an additional method added once the timeline is established. The force-field is used to understand people's views about the events listed in the timeline and what has been done to counteract it and stop it from becoming worse. Events listed on the timeline can be listed as negative or positive and each one can be rated using a scale of 1 to 5. This can be done visually by making columns for each factor on the timeline, and then showing the score by varying the height of the columns. The height of the columns associated with each event gives an indication of the extent of the negative or positive impact.

When conducting these exercises, it may help the participants if a few historical milestones are identified in a participatory way (important events in the history of the region, historic climatic events, or a major natural disaster). These milestones often help people remember other major changes and events experienced in the past. It is

important to make sure that the majority of participants have been living in the community for at least the span of the historical timeline.

Community mapping

This exercise is done with a focus group, which could be made up of elders, men, women or youth for example. The group is asked to draw the most important natural resources, cultural features or other things or areas of most importance to their lives and livelihoods on a piece of paper or else on the ground using available materials to show the items of most interest and importance to them. The assumption is that different people will emphasize different things that are of most significance to their lives. Differences usually occur between gender, age and status. This exercise allows the participants to share their local knowledge and show what may be most vulnerable to climate change impacts and provides an interesting comparison of different perspectives.

Stakeholder identification using the Rainbow Diagram

Stakeholder identification helps to identify the key actors or stakeholders involved in the proposed project and allows people to visualize the differences between stakeholders who may affect a situation or course of action and stakeholders who may be affected by it. The exercise is done by creating a rainbow diagram (a horizontal line with half a circle around it with two semicircles inside the chart) and cards with stakeholders written on them are placed in the semi circle showing their influence and how much they are affected.

Options domain

The Options Domain exercise examines how people view the different adaptation options using a range of criteria and then ranking each criteria from 1-5. The technique was used to determine the most suitable adaptation option from a list of options.

Transect walk

A transect walk is an observation tool for understanding the location and distribution of resources, features, landscape, and major land uses along a given transect "line". The line is simply a route or path that transects the community or larger landscape. The research team walks with selected community members along a previously defined route, observing and listening to their explanations and asking questions. A transect walk can take up to two to three hours, but could also be much shorter, depending on the route and the line of questioning. This tool is often used at the beginning of the CBA work to gain an overview of the community and its surroundings. It is advisable to do two transect walks, one with women and one with men, learn about their daily activities, mobility, use of resources, land, and so forth.

Socratic Wheel

The Wheel is used to help visualize and compare multiple ratings of a goal or objective. The technique is useful when something is assessed at different points in time or used to identify priorities or expectations, and evaluate the process of learning over time. It is a useful way to monitor and evaluate progress in achieving project objectives. For example, if there are 5 objectives, each one forms a spoke on the wheel and each one is ranked from 1-5 as to how much has been achieved.