Adaptation Learning Programme

Climate Change Vulnerability and Adaptive Capacity in Dakoro Department, Niger

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List of Acronyms

ACCRA	Africa Climate Change Resilience Alliance
ALP	Adaptation Learning Programme
CAAP	Community Adaptation Action Plan
CBA	Community-Based Adaptation
CBO	Community-Based Organization
CDP	Commune Development Plan
CILSS	Permanent Interstate Committee for Drought Control in the Sahel
CVCA	Climate Vulnerability and Capacity Analysis
DANIDA	Danish International Development Agency
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
IGA	Income Generating Activity
IPCC	Intergovernmental Panel on Climate Change
LAC	Local Adaptive Capacity
NAPA	National Adaptation Plan of Action
NRM	Natural Resource Management
ODI	Overseas Development Institute
PSP	Participatory Scenario Planning
SCAP/RU	Community Early Warning Systems
SSA	Sub-Saharan Africa
WUA	Water Users' Association

Cover page photo; Domestic use of camels within department of Dakoro includes water transportation © 2014 Marie Monimart,

Executive Summary

In the Department of Dakoro in Niger, women and men are accustomed to the harsh and dry Sahelian climate. In a remote area, with difficult access to information and services, these communities have developed a range of strategies for managing climate variability. However, in recent years, they have experienced recurrent droughts, which have overwhelmed their existing coping mechanisms and reduced them to a state of chronic food insecurity. Climate change projections suggest that this trend of uncertainty and extremes will continue, requiring people to build their resilience and adapt to the changes.

The Adaptation Learning Program for Africa (ALP) is working to increase the capacity of vulnerable households to adapt to climate change and variability. As part of its community-based adaptation process, ALP conducted participatory analysis on climate change vulnerability and adaptive capacity in 20 communities in Dakoro in 2010. Drawing on this analysis, this document discusses the impacts of climate change on communities in Dakoro, as well as how they are responding. Detailed profiles of two communities, Maiwassa and Dan Ijaw, provide further insights into the vulnerability and adaptive capacity that exists in this very poor region of the country.

Key recommendations emerging from the analysis include:

Across the spectrum from emergency response to development, there is a need to focus on climate change adaptation and resilience building to enable people to manage shocks in a way that doesn't undermine adaptive capacity over time.

The ALP communities in Dakoro have been subjected to recurrent shocks, leaving them in a situation of chronic poverty and food insecurity. This has undermined their adaptive capacity and therefore increased their vulnerability to climate change. Understanding risks, drivers of vulnerability and existing capacities is a critical first step for effective resilience building, leading towards integration of systems for early warning and emergency response, social protection and support for sustainable livelihoods, informed by climate information.

Addressing immediate needs is a precursor to building adaptive capacity.

The most vulnerable women and men in Dakoro are struggling to meet their basic needs, including food, water and health. In such circumstances, planning for the future seems a luxury. ALP's approach includes 'quick win' activities, which address short term needs in ways that also create a foundation for adaptation actions and adaptive capacity for the longer term.

Adaptation efforts must empower people to make decisions in an informed and forward-looking way.

Adaptive management of livelihoods is already occurring, however decisions are often driven by crisis. By strengthening access to information and facilitating planning for adaptation, for example through community rainfall monitoring systems, ALP is enabling informed and more forward-looking decision-making.

Strengthening of systems and institutions is a good investment towards building community adaptive capacity.

Building adaptive capacity is a long-term process, which will extend far beyond the life of any development project, including ALP. For sustainable increases in adaptive capacity, ALP has worked with partners to strengthen the systems and institutions that surround communities, so that they are able to address community needs and priorities into the future.

Particular actions are needed to redress inequalities that limit adaptive capacity.

ALP's analysis revealed the differential vulnerability that exists within communities, highlighting the particular constraints faced by women in terms of access to information, resources and services and decision-making power. Specific efforts have been made to promote women's empowerment, for example by supporting women's groups for savings and credit and collective small livestock rearing.

A mix of communication methods is required for equitable access to information.

Lack of education and resultant illiteracy represent significant barriers to adaptive capacity development and empowerment of the most vulnerable women and men in Dakoro. To overcome this, ALP is using a range of approaches, including more traditional inclusive audio-visual communication methods as well as new technologies such as mobile phones.

Healthy ecosystems are the basis for resilient livelihoods, and sustainable management of natural resources must therefore be promoted as a fundamental element of adaptation.

The combined effects of human activities and climate-related effects are clearly visible in the Tarka Valley, which is and will remain a critical source of natural resources for communities in Dakoro. ALP is facilitating community action on sustainable Natural Resource Management (NRM), while at the same time working with stakeholders on land use planning in the Tarka Valley.

Introduction

In Sub-Saharan Africa, the impacts of climate change are already affecting people, increasing food and livelihood insecurity and challenging efforts to improve well-being. This is particularly true for the poorest women and men in rural areas, who rely on agriculture, livestock rearing and other natural resource-dependent activities for their livelihoods. Faced with rising temperatures, increasing variability in rainfall and more frequent droughts and floods, people are seeking new ways to use the resources available to them to reduce their vulnerability, manage risks and adapt to their changing environment and climate. They are also raising their voices to demand appropriate action by governments and other actors to support community-based adaptation.

The Adaptation Learning Program (ALP) has a goal of increasing the capacity of vulnerable households in sub-Saharan Africa to adapt to climate change and variability. By working with communities as well as government and civil society organizations, ALP is ensuring that Community-Based Adaptation (CBA) approaches and actions for vulnerable communities are incorporated into development policies and programmes in Ghana, Kenya, Mozambique and Niger. The programme aims to demonstrate innovative models for CBA and to disseminate practical tools and methodologies to enable replication and scale up by other actors. It also aims to influence national and international policy frameworks and financing mechanisms for adaptation to create an enabling environment for CBA. Through this process, the programme is achieving large-scale impact, within the four target countries and beyond, across Sub-Saharan Africa.

The Adaptation Learning Programme (ALP) is a five-year programme that began in 2010. The programme is implemented by CARE International in four countries in sub-Saharan Africa: Kenya, Ghana, Mozambique, and Niger. ALP receives financial support from the UK Government (UK Aid), the Danish International Development Agency (DANIDA), the Government of Finland and the Austrian Development Authority.

In the Sahelian region of Niger, a harsh, dry climate, dependence on natural resources and recurrent shocks leading to food crises have created a state of chronic vulnerability and food insecurity lasting almost thirty years to date. Faced with environmental degradation, political changes and increasing uncertainty about rainfall and other weather patterns, communities in the Department of Dakoro are seeking new ways to manage their livelihoods and ensure food security. This report is based on participatory research and analysis conducted by ALP in Niger in 2010. It discusses the impacts of climate change on communities in Dakoro and the issues that contribute to high vulnerability in the region, using the specific cases of Maiwassa and Dan Ijaw to illustrate the analysis. It also reveals the existing adaptive capacity of communities in the region and provides recommendations for enabling and empowering women and men in Niger and across Sub-Saharan Africa to adapt to the changes.

Climate Change Vulnerability and Adaptive Capacity

The ALP approach

Analysis of climate change vulnerability and adaptive capacity is fundamental to the ALP CBA approach. The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. Through participatory analysis of vulnerability, ALP enhances understanding of communities and other stakeholders of these different dimensions of vulnerability. This process enables local actors to plan and implement adaptation actions that address current climate risks while building adaptive capacity for the future.

In ALP's CBA approach, significant emphasis is placed on strengthening adaptive capacity, building on existing knowledge and capacity. ALP understands adaptive capacity as communities ability to demand, access and use climate information (as well as other types of information) to identify, assess and choose adaptation options; to innovate to respond to evolving challenges and opportunities; and to make forward-looking and flexible decisions that enable them to adapt to a changing climate. The foundation for adaptive capacity is the asset base available to communities to take action to secure their livelihoods and adapt to climate change over time. Adaptive capacity is strongly influenced by the quality of governance and access to entitlements, which enable or constrain appropriate action on adaptation.

Gender inequality means that women and men experience differences in roles, access to information, control over resources and decision-making power. These issues are important determinants of vulnerability to climate change, particularly in the context of Niger, where cultural and social norms often disadvantage women. ALP aims to expose these injustices and to promote action on adaptation that explicitly advances gender equality and women's empowerment.

In Niger, ALP is undertaking analysis and implementing community-based adaptation activities in twenty communities in four communes of the Department of Dakoro, in the northern part of the Maradi region. In addition to working directly with communities, the program engages local stakeholders, including both traditional and governmental institutions. This report is based on participatory analysis of climate change vulnerability and adaptive capacity by the program in 2010, as well as the program baseline study for Niger.

The analysis has served to increase understanding of the dynamics of vulnerability and the necessary conditions to increase adaptive capacity in the targeted communities. This has informed ALP's work in the communities over the last three years and provides a basis for recommendations for policy and practice for CBA in Dakoro and beyond.

Climate Change and Livelihoods in Niger

The climate of Niger can be described as harsh, characterized by low rainfall that is highly variable both spatially and temporally, and high temperatures, leading to high aridity. Niger's territory comprises four climatic zones, defined by the average amount of rainfall received. The Sudano-Sahelian zone in the south of the country receives 600-800 mm of rainfall on average per year, while the Saharan zone in the north receives as little as 150 mm. In the Sahelian zone, where ALP is working, rainfall ranges from 350 to 600 mm per year, falling in a single season.

Rainfall data for 1961-2004, compiled from 59 weather stations across the country, shows a trend of reduced precipitation from the early 1970s onwards, based on analysis of anomalies from the average rainfall. This is consistent with the data for the entire Sahel region, which shows a wet period from 1950 to 1969, followed by a succession of dry years from 1970 to 1993. For temperatures, the national-level data shows a decreasing trend in the minimum and maximum temperatures from 1961 to 1986 and an increasing trend from 1986 to 2001.

Future climate projections suggest that temperatures will continue to rise, by up to 2.6 degrees Celsius by 2050. For rainfall, different climate models yield contradictory projections in terms of the amount of rainfall, however it is expected that rainfall variability will continue to increase and that droughts and heavy rainfall events will happen more frequently. As well, the temperature increase will cause reductions in soil moisture and productivity, which has the potential to offset any positive effects of increased precipitation.

These trends, particularly the changes in rainfall patterns, have important consequences for livelihoods in Niger, where more than 80% of the population is engaged in agriculture, livestock and forestry activities. These activities are highly sensitive to fluctuations in rainfall, in terms of both timing and amount. Late or low rainfall results in reduced crop productivity, in the worst cases leading to droughts and complete agricultural losses.

On the other hand, heavy rainfall events wash away seeds and soil and cause damage to crops, sometimes leading to flooding, which has devastating effects on agricultural production in more fertile areas near rivers. Over the last 50 years, Niger has faced cereal deficits in one out of two years on average, leading to chronic food insecurity for approximately 80% of the population. Low rainfall and drought also affect availability of water and forage for livestock, leading to ill health of animals and starvation in extreme cases. As an important source of food and income security, the loss of livestock is a major blow to the household asset base.

Animal watering in Kouggou Dakoro© 2012 Marie Monimart

Observations of Climate Change in the Department of Dakoro

This report focuses on the Department of Dakoro, where the climate is characterized by high temperatures and very low rainfall. The average temperatures range from 19 to 22 degrees Celsius in the colder season in mid-December to mid-February, and from 29 to 33 degrees in March to May. During the hot and dry season from October to mid-December, temperatures reach up to 35 degrees. Analysis of the minimum and maximum temperatures from the Dakoro weather stations shows a slight upward trend from 2000 to 2008.

There is one rainy season, usually occurring between June and September or October. Over 90% of the annual precipitation falls during this three to four month period, with the region receiving little or no rainfall throughout the remaining months of the year. Rainfall data from Dakoro shows high inter-annual variability, with total annual rainfall varying from approximately 150 mm to over 500 mm between 1978 and 2009. Severe droughts have been experienced in 1984-1985, 1997-1998, 2000-2002 and 2004-2005. From 2007 to 2009, there was a distinct downward trend in annual rainfall. Analysis of rainfall anomalies shows an overall trend of declining rainfall, with recurring low rainfall years between 1982 and 2005. The data also shows changes in the timing of rainfall, with the rains arriving later than usual, and a trend of increased evaporation and evapo-transpiration.

The most important manifestation of climate change from the perspective of communities is the change in rainfall patterns. Community members note that the length of the rainy season has decreased from four to five months to two to three months, with the rains arriving later than they have in the past (in July instead of early June) and ending earlier in September. There is a sense that rainfall is occurring with higher intensity, leading to erosion and, in some areas, flooding. Strong winds, particularly at the beginning of the rainy season, were also cited as a growing concern, as they cause damage to trees and wind erosion, which can bury seeds and causes land degradation. Communities have also observed increasing temperatures in recent years.

There are other indicators of environmental change as well, including the disappearance of certain plant and animal species, however it is recognized that human activities, including deforestation and clearing of land for agriculture, also play a role in this.

The Department of Dakoro: A Snapshot

The Department of Dakoro is located in the northern part of the Maradi Region, in south-central Niger, approximately 700 km east of the capital city, Niamey. It comprises twelve communes covering approximately 16 000 km^2. The area is dry, with vegetative cover consisting of a fairly dense layer of trees and shrubs (mostly prickly acacia), with a layer of annual grasses underneath. Vegetation has been degraded by human activities including deforestation and overgrazing, as well as natural factors such as temperature changes and wind. The area is not rich in terms of wildlife, but it is inhabited by birds, reptiles and a few species of gazelle. A key feature of the Dakoro region is the Tarka Valley, a dried up river valley running roughly west to east across the department. This is a unique ecosystem with more fertile soils and a shallower water table than the surrounding area. It represents a boundary between the agro-pastoral zone to the south and the pastoral zone to the north.

The twenty communities targeted by ALP in Dakoro are located in four communes: Roumbou, Bader Goula, Soly Tagriss and Azagor. The average household size is eight members. In Roumbou, Bader Goula and Soly Tagriss, the majority of communities are of Hausa origins, representing over 60% of the population, with smaller groups of Tuaregs and Fulanis. The Hausa communities are largely comprised of farmers who have migrated from the southern part of Dakoro, searching for arable land and available water and driven by demographic pressures and resource degradation, among other factors. In Azagor, the population is primarily comprised of agro-pastoralist communities of Tuareg and Fulani origins, with a minority of Hausa communities. These communities likely originated from the Tahoua and Agadez regions, having moved in search of pasture for livestock.

Woven mats, source of income generating activity by Dakoro department communities © 2014 Mari Monimart

The population targeted by ALP is estimated at just over 12,000 people in 20 communities, made up of approximately 1770 households. In these communities, most households practice a mix of crop agriculture and livestock rearing. Almost 90% of households rely on crop production as their primary livelihood strategy, with a further 9% primarily dependent on livestock rearing. Livestock rearing is the secondary strategy for approximately one-third of households. All of the households that are engaged in livestock rearing as their main livelihood strategy also practice crop production. A few households rely on petty trade, however this remains mostly informal. The most important markets are the weekly market in Dakoro and the livestock market in Sakabal in Roumbou.

Crop production in Dakoro focuses on millet, sorghum and cowpeas, which are cultivated by almost all households. Over 40% of households cultivate five hectares or less and 18% plant three hectares or less. The vast majority of farmers use local seeds, which are either saved from the previous year's harvest or purchased at the market. Very few are using 'improved' seeds, such as drought-resistant or early maturing varieties. The most common trigger for planting is the beginning of the rains. Most households are growing strictly for their own consumption. The crop most commonly sold for income is cowpeas, but this is only the case for 24% of sampled households.

Soly Tagris woman in her cowpea farm,© 2010 Awaiss Yahaya\ALP

The most commonly owned livestock are poultry, goats and sheep, owned by 60-70% of households. The average number of animals owned is six poultry, six goats and seven sheep. Over half of surveyed households also own donkeys, but numbers owned are fewer, at an average of two animals per household. Camels are owned by only 11% of households. For those that do keep camels, they own an average of seven animals. Cows, sheep and goats are sold for meat and generate income for up to 40% of households. They are also used to produce milk and cheese, however only a handful of households reported earning income from the sale of dairy products.

Water for crops, livestock and domestic use is accessed from permanent and semi-permanent ponds. Some areas have wells, notably along livestock corridors. Access to water is a growing concern. According to community members, thirty years ago the region had several permanent ponds, a dozen semi-permanent ones and wetlands in the Tarka Valley. Now, the permanent ponds exist for only about four months of the year, the semi-permanent ones have disappeared, and the valley has dried into a series of temporary puddles. At the same time, land degradation has reduced the availability of pasture and of fertile agricultural land. Expansion of crop production, notably in the Tarka Valley, has increased pressures on land and water resources, and in some cases has been a source of conflict between farmers and the herders who rely on seasonal water points and access to pasture. Health impacts are also emerging, in terms of both children's malnutrition and the appearance of new diseases, notably respiratory illnesses.

Dakoro is a remote area, creating difficulties in access to information and basic services. Given this, community-based organizations (CBOs) play a critical role in managing village affairs. This includes committees that are organized to manage important communal resources such as wells, grazing lands, cereal banks and schools. Some villages have women's groups and/or youth groups, which provide a platform for sharing experiences and cooperation. Community land commissions are responsible for keeping track of land titles and transferring ownership when there is a loan or sale of land. These organizations provide a solid foundation and a key entry point for building community capacity and initiating collective action at the village level.

With high levels of poverty and chronic food insecurity, heavy reliance on rain-fed agriculture and already very low and variable rainfall, Dakoro is identified as one of the most vulnerable parts of the country in the National Adaptation Plan of Action (NAPA). Communities in the department have been regularly affected by droughts and food crises since the early 1970s. Many households have still not recovered from the famine of 1984-1985, leaving them increasingly vulnerable to further droughts and other related shocks and stresses such as pest infestations and

Community monitor of Baadaré (Soly Tagris Commune) presenting CAAP © 2013 Harouna Hama\ALP

animal disease. In recent years, the trend of drought occurrence has accelerated, causing reduced crop productivity and/or loss of livestock and leading to food crises in 2005, 2009 and 2011. These events have shaped recent life in the communities, leading to crushing debt loads, migration to urban areas, reductions in herd sizes and transitions from livestock rearing to crop agriculture, all of which have important implications for climate change vulnerability and adaptive capacity.

Gender Dynamics in Dakoro

In the context of Dakoro, gender roles have traditionally been clearly defined and responsibilities divided between women and men in households where both are able. Approximately half of the heads of households are married monogomously, approximately 30% are in a polygamous marriage and a further 15% are widowed. Divorce is uncommon, and less than 10% of households are headed by women.

Generally, both women and men believe that domestic tasks such as childcare, maintenance of the house and all things related to food preparation are the domain of women and cannot be undertaken by men. On the other hand, the expectation is that men will provide for all of the household needs, so women don't need to engage in economic activities. However, there is some evidence that this is changing. In some households, men do play a role in some domestic tasks such as collecting firewood and water. At the same time, as the household needs exceed what the man is able to provide, women are increasingly engaging in economic activities, and the vision of the 'ideal' wife is shifting to include entrepreneurship, presenting an opportunity for a change of mindset with respect to women's economic empowerment. There are disadvantages to this as it does not necessarily translate into more decision-making power and may increase the work burden on women and girls. Further, there is still a long way to go for women in this region to realize the rights and freedoms that are enjoyed by their male counterparts.

With girls being taken out of school early, either to help around the house or to marry (which typically occurs at age 14-17), very few girls finish secondary school. They soon find themselves with a large family to care for, which is a significant burden, particularly when food and water are scarce. Due to inheritance practices and power imbalances in the household, women tend to lack secure access to agricultural land. They are also less likely to own livestock. These inequities can limit their possibilities when it comes to engaging in new income generating activities and actions to build resilience of the family livelihoods.

It is important to note that women are not a homogeneous group. Some women have more freedom, mobility and decision-making control than others. For example, there is some evidence that older women have more freedom in terms of mobility than younger married ones, so they are more able to go to market and participate in meetings and other community events. There are also differences between the different communities based on religious and cultural practices. For example, women in Tuareg and Fulani communities in rural areas have less barriers to participation and speaking in public than those in Hausa communities. As well, the above applies to the typical situation of women in male-headed households, while women who are widowed, divorced or single may experience different circumstances.

Gender differences in roles, responsibilities and access to resources and opportunities mean that women and men experience the effects of climate change differently. These differences interact with other factors such as age, ethnicity and marital status to make some community members more vulnerable than others although they are exposed to the same impacts of climate change. In the context of Dakoro, ALP has found that women, particularly those who are widowed, divorced or young and unmarried, often face particular constraints in acting on adaptation because they are at a disadvantage when it comes to control over productive resources, mobility and access to opportunities for education and economic development.

Climate Change Vulnerability and Adaptive Capacity in Azagor Commune

Azagor covers an area of approximately 440 km^2 in the western part of the Department of Dakoro. ALP works in seven of the fifty-five communities in Azagor: Azagor, Maiwassa, Kouggou, Marafa, Na Allah, Yan Sara and Garin Djahadi. The majority of the commune's population of approximately 14,000 is of Tuareg ethnicity and practice Islam. The Tuareg population in Azagor was established in 1904 by a group from the Department of Madaoua, who had left their original territory to find pasture and avoid the colonial land grabs. In the ALP communities, 61% of the population are Tuareg, 19% are Tagamawa Hausa, 8% are Fulani and 7% are Gobirawa Hausa. The different ethnic groups tend to be concentrated in different communities. For example, all sampled households in Azagor and Maiwassa are Tuareg, while in Kouggou they are all of Fulani origins. Where the communities are mixed, such as in Marafa, they generally live together in harmony, however conflicts do occasionally arrise with herders from other areas.

A significant area of Azagor falls within the Tarka Valley. Soils in the southern part of the commune are sandy, with low organic matter. To the north and in the valley, the soils consist of silty sand. Vegetation is mostly prickly shrubs and trees, with a herbaceous layer underneath. Communities observe changes in the vegetative cover in recent years, which they link to climatic changes. Water sources are seasonal, and are increasingly threatened by inundation of sand due to increasingly frequent windstorms and the reduction in tree cover. The area of land used for agriculture is increasing, particularly in the Tarka Valley, where almost 150 hectares were newly cultivated between 1986 and 2005.

In terms of services, Azagor has eight traditional schools and one community school, as well as 110 literacy centres, of which 31 are dedicated specifically for women. There is very poor coverage of health services, with only one operational health clinic for the whole commune. Availability of water is a challenge, with only 56% of the commune's population with access to water. Over thirty cereal banks across the commune provide storage of grains for times of scarcity and for planting in the next season. To support livestock-related activities, there are five fodder banks, as well as a livestock breeding centre and a vaccination centre in the commune headquarters.

Although Tuareg communities are traditionally livestock herders, almost 80% of households in the ALP communities in Azagor are engaged in crop agriculture as their primary livelihood strategy. Most households practice some mix of crop agriculture and livestock rearing to meet their income and dietary needs. Agriculture is overwhelmingly subsistence in nature, with only 3-15% of households reporting income from sale of millet, sorghum or cowpeas. Almost all of the respondents plant local seeds that they have saved from previous years. While 63% do use manure and household waste as fertilizer, the overwhelming majority state that their agricultural production has decreased in the last five years. They observe that inadequate rainfall is the primary cause, along with loss of soil fertility and pest infestations.

More households in Azagor earn income from livestock than from crops. Among sampled households, 52% reported earning income from sale of sheep, 45% from goats and 35% from cows. The numbers of livestock owned in Azagor are slightly higher than the average for the entire ALP area, at six poultry, seven goats and nine sheep. However, access to pasture for livestock is a growing challenge. About half of the households also engage in other income generating activities, including petty trade, sale of firewood and agricultural labour.

Environmental degradation is a critical concern in Azagor. Loss of vegetative cover due to increasing cultivation and demands for firewood, drying or siltation of ponds and encroachment of agriculture on grazing lands are key issues that constrain people's capacity to adapt to climate change. Despite recent efforts, high illiteracy levels and a lack of access to basic services persist, presenting further barriers to sustainable management of Azagor's natural resources, particularly in the Tarka Valley, that are fundamental to enhancing food security and resilience to shocks and stresses.

Women and men watering camel in Niger © 2010 Marie Monimart

Maiwassa

The community of Maiwassa in Azagor Commune is home to approximately 1600 people. The majority of community members are of Tuareg ethnicity, however the population also includes a few Hausa and Fulani families. The settlement at Maiwassa has existed for approximately 60 years. Among the sampled population, 60% are in a monogamous marriage, 20% in a polygamous marriage and the remainder are single, widowed or divorced. There are only a handful of woman-headed households, including a mix of widowed and divorced women. Generally speaking, polygamy is less common in Tuareg and Fulani communities, so household sizes tend to be smaller.

Maiwassa is located approximately 14 km west of Azagor, the commune headquarters. It is situated in the Tarka Valley, which provides access to forest resources such as timber, fuelwood, fodder and wood used for making tools, furniture and other household items. It also provides a source of water, as the water table in the valley is much shallower than in the surrounding area, making well construction easier. The land in the Tarka Valley is fertile and is increasingly cultivated, particularly as the traditional fields in the dunes are becoming inundated with sand. In the last forty years, there has been significant change in the Tarka ecosystem, evidenced by a shift in vegetation from doum palm trees to acacias, which indicates a change in the level of the water table.

There are a number of community-based organizations in Maiwassa. This includes organizations focused on managing different aspects of village life, including a committee that looks after the community's two cement wells, a land commission and a village management committee. There is also a school, a youth group and a women's group. These organizations represent an important asset for the community in terms of managing resources, promoting community development and building social cohesion.

Crop production is the primary occupation of 77% of the households in Maiwassa. A further 23% are primarily reliant on livestock rearing, which also represents an important complementary livelihood strategy for the households focused on crop production. The average cultivated area per household is six hectares, however 35% of households plant three hectares or less. Almost all households plant millet, sorghum and cowpeas, however very few earn any income from these crops. Livestock, particularly sheep and goats, are a much more common source of income. Approximately 40% of households also engage in other income generating activities, including sale of firewood, sale of fodder and making ropes and mats.

Vulnerability levels are high in Maiwassa. The community developed a scale for determining the level of vulnerability of a household, based on the number of livestock and the amount of land owned, the number of months of food deficit experienced, the type of clothing worn and how much disposable cash the household has on hand. The least vulnerable households were described as owning 30 camels, one field, 40 goats, 15 sheep and 20 cows. These households are able to cover their food needs throughout the year and dress in Chadda and Tourkoudi, the traditional Tuareg dress, which is very expensive to buy. They have approximately US$30 in cash available for household spending. In contrast, households described as extremely vulnerable have only one field, one goat and one chicken. They dress in plain fabric, are only able to cover their food needs for three months of the year and must resort to begging to acquire cash. Using this characterization, over 80% of households in Maiwassa are determined to be very or extremely vulnerable.

The key climate-related risks faced by the people of Maiwassa are droughts and wind erosion. Crop pests and livestock diseases are related concerns. The observed changes in climate affect agricultural production, causing lower productivity and bad harvests. From 2005 to 2009, less than 60% of households were able to produce enough crops to cover household needs. In 2009, when a severe drought occurred, none of the sampled households were able to meet their food needs. To address this, people were selling their livestock, labour, straw and firewood for cash to buy food. Some were consuming wild foods and some migrated to other areas. Many people found themselves at a loss and relied on prayer to get them through the difficult periods. Most people (80%) in Maiwassa feel that climate change is also affecting their livestock-related activities. The most commonly cited effects were declining availability of pasture and the appearance of new diseases. Access to water is also an ongoing challenge. This has resulted in a decline in animal health and in production of milk. To address these challenges, households keep reserves of straw and crop residues, buying supplemental feed, getting vaccinations and veterinary care for livestock and selling off their animals when they can no longer maintain their herd. All of these strategies demonstrate elements of foresight and planning to protect their livestock, which is viewed as a critical resource – skills that are critical for adaptation.

Building on these existing strategies, the people of Maiwassa have developed a Community Adaptation Action Plan (CAAP), which identifies a number of actions that they feel will improve their food security and help them to better manage future shocks. Most of the strategies they would like to pursue are focused on improving how resources are managed. This includes tree planting, assisted natural regeneration and sustainable management of grazing and agricultural land, as well as utilization of 'improved' seeds and timely sale of livestock. Alternative income generating activities were also identified as a priority in the CAAP.

To ensure that the community is able to engage in informed decision-making with regard to these activities, ALP has supported the installation of a rainfall gauge in Maiwassa. With the gauge installed and community monitors trained to use it, the program has worked with local stakeholders to establish a communication system to facilitate dissemination of the information on a timely basis for farmer planning. This includes collaboration with the meteorological service and local community radio stations, who work with ALP to gather, analyze and communicate the information. The community monitors are equipped with mobile phones, which allow them to communicate the rain data to the weather service, as well as to other community members. This has provided farmers with concrete information that they use to decide when to plant and harvest.

Climate Change Vulnerability and Adaptive Capacity in Soly Tagriss Commune

Soly Tagriss commune covers the eastern part of Dakoro, further away from the Tarka Valley. The commune has an area of approximately 1285 km^2 and a population of approximately 48 800 in 111 communities. Youth under 15 years of age represent 47.5% of the population. The population is mostly of Hausa, Tuareg and Fulani ethnicity, and Islam is the predominant religion. ALP works in five communities in this commune: Dan Ijaw, Garin Salaou Rabo, Gomozo, Baadaré and Konkorma. These communities are almost 90% Hausa, mostly from the Gobirawa, Tagamawa and Katsinawa groups. The Hausa people are traditionally farmers and traders, with many traditional crafts. The population originated in the south of Niger and the north of Nigeria, where they controlled a large area before colonization occurred. They have since expanded their territory in search of agricultural land, which led them to settle in the area of Soly Tagriss.

The land of the commune comprises two major zones: the dune area in the east, west and south and the valley zone located on the edge of the Tarka Valley, where the soil is made up of sandy clay. The soils are reasonably fertile and suited to both crop production and livestock rearing, however the quality is decreasing due to overexploitation and desertification. The vegetative cover is mostly shrubs and grasses in the southern and eastern parts of the commune, with more trees found in the Tarka Valley. There are a number of temporary ponds, particularly in the southwest, and significant groundwater resources at depth. Expansion of agricultural land from the south to the north is occurring at a rapid rate (400 hectares per year from 1990 to 2005). Combined with other human activities including harvest of timber and firewood, this has significant implications for the quality and availability of water and pasture and for the overall health of the ecosystem.

There is a well-maintained dirt road crossing the commune from west to east. Coverage for basic services is low, at 47% for water and 23% for health services. The commune is served by 39 primary schools and a number of madrasas, however the enrollment rate was only 37% for the 2009-2010 school year. There is a local radio station based in Tagriss that reaches a radius of approximately 20 km. Access to the national radio station is limited to a few areas with high-powered antennas.

Crop production is the primary occupation in Soly Tagriss, practiced by 98% of households. Among survey respondents, growing crops was identified as the only livelihood strategy for 15%, while approximately one-third also raise livestock on their farms as a secondary strategy and 22% are engaged in petty trade. As in Azagor, the most common crops cultivated are millet, sorghum and cowpeas, however in this region sorrel (Rumex acetosa), a leafy green, is also important and planted by over a third of surveyed households. The average area cultivated is almost nine hectares per household with only 7% of surveyed households planting three hectares or less. Despite the fact that households in Soly Tagriss generally speaking have more land to cultivate than those in Azagor, agriculture remains very much at a subsistence level and the surveyed households struggle to cover their food needs throughout the year.

The Commune Development Plan (CDP) for Soly Tagriss identifies a number of important constraints to development that are related to climate change. For the agricultural sector, lack of rain, high temperatures and strong winds are the key concerns, causing damage to and loss of crops. Inadequate rainfall and high temperatures also have negative implications for livestock, leading to forage deficits, reduced productivity of animals and drying up of water points. Responses to these challenges at commune level are hampered by a lack of human, technical and financial capacity, both within the government itself and in community-based organizations found throughout the commune. Women's empowerment is recognized in the plan as an important priority, building on the development of a number of women's groups already in existence.

Women presenting Community Adaptation Action Plan © 2013 Harouna Hama\ALP

Dan Ijaw

Dan Ijaw is located in the western part of Soly Tagriss commune, in the dune zone. It is inhabited by approximately 870 people in 124 households. The people of Dan Ijaw are mostly of Hausa origins (over 80% of the population), from the Gobirawa and Tagamawa groups. At the time of the ALP analysis, many of the men in the community had migrated to urban areas to find work following the 2009 drought. Consequently, a large proportion of the households were headed by women at the time of the survey, however in many cases this was a temporary situation.

The village was established in 1950 by a community that had left its previous location due to collapse of their well. Their new settlement has a cement well, along with two seasonal ponds. It is located in an area covered by dunes, with small pockets dedicated to cultivation of crops. Pasture lands and ponds are freely available to all in the community, while access to the well is controlled by the village chief, who also plays the role of mediator in times of conflict. There are only two community-based organizations in the community: the school management committee and a women's group.

Growing of crops is the primary livelihood strategy in Dan Ijaw, supplemented by livestock rearing and petty trade in some cases. However, crops are not a common source of income. Only 10% of sampled households reported earning income from millet, which is the crop most commonly sold. Most farmers use local seeds saved from the previous year, or in some cases, purchased at the market. There is no evidence of use of 'improved' seeds. Timing of planting is decided primarily based on the arrival of the rains, although some people also use the calendar and other indicators such as wind. Most people use hilaires, a type of hoe, on their farms, but otherwise farming is done mostly by hand without much equipment. The main fertilizers used are manure, household waste and crop residues. While women do work in the fields, the fields are generally owned by men.

The vulnerability profiles developed by community members in Dan Ijaw are focused on the amount of agricultural production, the numbers of animals owned, clothing and available cash. The least vulnerable households are described as producing approximately 120 kg of cowpeas and 140 kg of sorghum and covering their food needs for seven to eight months of the year. They own up to 30 cows, 40 sheep, 30 goats and 20 poultry. They own ten outfits, acquiring two new ones each year and have US$105-125 in cash. The very vulnerable households produce about eight kg of cowpeas and 14 of sorghum, own one donkey and four poultry and only have one outfit and no cash. Extremely vulnerable households are completely reliant on donations, either from the community through solidarity systems or from government and NGO sources. Using this characterization, 68% of households are very vulnerable and 3% are extremely vulnerable. Only 6% fall in the least vulnerable category.

The community has suffered recurrent droughts and rainfall variability in recent years, with severe drought events in 1970, 1984, 1997 and 2009. These major events are interspersed with years of low rainfall and interruptions in the rainy season. They have also experienced infestations of pests, livestock disease and significant wind erosion. Cumulatively, these challenges lead to low crop productivity, insufficient pasture for livestock, land degradation, disappearance of ponds, sand dune formation. The community has experienced repeated famines and significant loss of livestock.

Not surprisingly, all of the survey respondents stated that climate change is affecting their agricultural production. The key issues identified were lack of rainfall, wind erosion and drought, as well as pests (which often arrive when dry spells occur during the rainy season) and desertification. These issues have led to lower crop productivity, meaning that only 10-50% of households were able to meet their food needs in 2005-2009, depending on the year. During the drought of 2009, 70% of households were only able to cover their food needs for three months of the year or less.

The people of Dan Ijaw have a few important strategies for managing these changes. When possible, they keep reserves of straw and crop residues for fodder for animals when pasture isn't available. To get cash, they sell livestock or find salaried work, either within the community or by migrating to urban areas. When food becomes scarce, they eat wild plants. There are limited social safety nets available, in the form of community solidarity systems and relief from external actors. While some of these strategies are effective, there is a recognized need for more proactive management of risks and changes in the future. Strategies identified include pasture regeneration through planting of fodder, tree planting in fields and around the village and the construction of a new well. In addition to supporting the implementation of these longer-term strategies, ALP provided community members with improved millet and cowpea seeds that produced good yields in the 2010 growing season. This was an important step to help community members to recover from the food crisis in the previous year, and to build confidence and engagement in the CBA process going forward.

Reflections and Recommendations

Although climate variability and extremes are not new in the context of Niger, ALP's analysis has demonstrated that the poorest people in the Department of Dakoro are increasingly vulnerable to these recurrent shocks. The 1984 drought and food crisis was particularly devastating in terms of its impact on livestock and other important assets, and many households still have not recovered from this. This has affected their ability to respond to the shocks they have faced in the years since, namely a series of droughts, poor rainfall years, and in some cases, heavy rainfall events. The negative impacts of these events are exacerbated by other changes, including land degradation, population pressure and expansion of agriculture in the Tarka Valley. Combined with late, inappropriate and/or ineffective responses to food crises, people have been left with few options to secure their livelihoods. The cumulative effects are chronic food insecurity, malnutrition and constraints on the resources available to people to build their resilience and adapt to climate change over time.

Forward-looking and risk-oriented decision-making is fundamental to adaptive capacity. For the most vulnerable people in Dakoro, it can be very difficult to think beyond the most immediate priorities: food, water and health of the family and the livestock. Planning for the future seems a luxury and decisions are often driven by crisis. Adaptation to climate change is a long-term process, which will extend far beyond the life of any development project, including ALP. For sustainable increases in adaptive capacity, the systems and institutions that surround communities must be strengthened so that they are able to address community needs and priorities into the future.

Despite these challenges, adaptive management of livelihoods is occurring. Communities in the Department of Dakoro are in a dynamic state, for example with respect to the relative importance of agriculture and livestock rearing for their livelihoods. They are diversifying their livelihoods to include off-farm strategies that are less sensitive to climate-related shocks and stresses. When possible, they are keeping reserves of animal feed and getting veterinary care to sustain their livestock, a critical resource that can provide a buffer during crises. However, all of these efforts are hampered by a lack of information, resources and services in support of effective and sustainable adaptation.

The following recommendations emerge from the analysis:

1. Across the spectrum from emergency response to development, there is a need to focus on climate change adaptation and resilience building to enable people to manage shocks in a way that doesn't undermine adaptive capacity over time.

To effectively build resilience and adaptive capacity, humanitarian and development actors must begin with a comprehensive understanding of current and future risks, the drivers of vulnerability, and of the existing capacity within communities. This includes exploration of underlying causes of vulnerability, notably gender inequality, social and political marginalization and inequitable access to resources. With this understanding, support and processes can be strengthened so that they maximize the impact on resilience, linking together systems for early warning and emergency response, social protection and support for sustainable livelihoods, and ensuring that they respond to projected changes in climate and increasing uncertainty. One example is the development of Community Early Warning and Emergency Response Systems (SCAP/RU), which empower communities in predicting impending crises and determining the most effective response measures.

Bags of harvested crops waiting to be stored at a warrantage site. © 2014 Fiona Percy\ ALP

2. Addressing immediate needs is a precursor to building adaptive capacity.

In order to enable people to engage in longer-term planning and adaptive thinking, immediate household needs must be met, through means which enable people to secure their livelihoods into the future. Recognizing this, ALP has supported 'quick win' activities in each of the targeted communities. Examples include provision of improved seeds, technical assistance on farming methods and support for alternative income generating activities. These actions are designed to address immediate needs while creating a foundation for adaptation actions and adaptive capacity for the longer term.

3. Adaptation efforts must empower people to make decisions in an informed and forward-looking way.

Flexibility in livelihoods is essential for adaptation. However, without access to information and knowledge of the costs, benefits and risks associated with different options, these decisions may ultimately increase vulnerability. This applies to both seasonal decisions, to promote appropriate and efficient investment of people's limited resources, and to decisions around longer-term transitions, to ensure that these shifts are sustainable.
ALP is facilitating informed and forward-looking decision-making in a number of different ways, including the community rainfall gauges, the strengthening of SCAP/RU systems and the CAAP processes.

4. Strengthening of systems and institutions is a good investment towards building community adaptive capacity.

ALP has worked with partners to strengthen systems and institutions at a number of different levels. At the community level, the project has supported a system that involves redistribution of small livestock among female community members, building on a traditional social safety net system. To ensure ongoing and affordable access to improved seeds, ALP has worked to develop a network of seed producers, researchers and market actors across the department. Efforts are being made to link the SCAP/RUs to national-level disaster management and emergency response mechanisms, with a view to improving emergency response systems over the longer term. These systems are crucial components of community adaptive capacity.

5. Particular actions are needed to redress inequalities that limit adaptive capacity.

ALP's analysis identified different degrees of vulnerability within the target communities, largely based on assets such as livestock, land and cash. Exploration of the gender dimensions of vulnerability yields further insights into differential vulnerability, highlighting the particular

Anzagor Mariachage, with produce form her farm
©2013, Awaiss Yahaya\ALP

constraints faced by women in vulnerable households in terms of access to information, resources and services and decision-making power, as well as the means in which ethnicity influences gender dynamics. Initiatives to increase adaptive capacity must include particular actions that respond to the specific gender context of the community. ALP has focused on women's economic empowerment, for example by supporting women's groups for savings and credit and collective small livestock rearing.

6. A mix of communication methods is required for equitable access to information.

New technologies such as mobile phones create new opportunities for communication in remote areas, but they also demand new skills in order for them to be used effectively to send and receive information. ALP is experimenting with these new technologies in the SCAP/RU and the community rainfall monitoring systems, alongside more traditional communication methods such as community radio. The program is making particular efforts to overcome literacy barriers, for example by creating a version of the CAAPs that uses symbols identified and drawn by the community to represent the different activities. This version is posted in the communities where it can be viewed and understood by all, even those who are illiterate.

7. Healthy ecosystems are the basis for resilient livelihoods, and sustainable management of natural resources must therefore be promoted as a fundamental element of adaptation.

There are strong linkages between sustainable natural resource management (NRM) and climate change adaptation in Niger. Poor resource management decisions are often driven by climate-related shocks and stresses, such as cutting of trees to sell as firewood to earn cash when crops fail due to drought. These actions in turn may have an impact on vulnerability to climate change, for example by reducing cover that would protect crops from heavy rain.

At the same time, climate change impacts affect the quality and availability of critical resources such as water and fodder. The combined effects of human activities and climate-related effects are clearly visible in the Tarka Valley, which is and will remain a critical source of natural resources for the communities living within and alongside the valley. ALP is facilitating community action on sustainable NRM, including assisted natural regeneration, fire breaks and protection of existing tree cover. At the same time, the program is working with stakeholders on land use planning in the Tarka Valley, in line with the Pastoral Code, which was adopted in 2010 to guide negotiations related to rights of pastoralists.

Conclusions

ALP's analysis in Dakoro demonstrates the importance of understanding the multitude of factors that influence vulnerability to climate change in poor, rural areas. The results of the analysis have provided a basis for identifying CBA actions that make sense, addressing the most urgent priorities while building adaptive capacity for the future.

The process yielded an approach that values local knowledge and capacity while filling gaps in access to information and services, taking into account gender differences across all activities. It involves actions at multiple levels: from supporting individual households to strengthen and secure their livelihoods, to strengthening monitoring and communication systems at community level to facilitate informed planning and decision-making, to advocacy at national and international levels to create an enabling environment for CBA in Niger.

Initiatives to increase adaptive capacity must include particular actions that respond to the specific gender context of the community.

A village saving and loan group ©2014\CARE-Fiona Percy -ALP

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About this CVCA report

That climate change is threatening rural communities across Africa, through increasingly unpredictable extreme events like floods and more frequent severe droughts, is well known. But how exactly is this affecting their lives and what are the implications? This report explores the vulnerabilities of pastoralist and agro-pastoralist communities to climate change impacts in the department of Dakoro, in the southern central part of Niger. It goes further to discover their inherent and growing capacity to adapt to the changes and uncertainties they are facing. The report draws from a series of vulnerability and capacity and gender analysis studies conducted in 2010 by the Adaptation Learning Programme implemented by CARE International, as well as from ongoing work supporting Community Based Adaptation.

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