Integrating disaster risk reduction and adaptation to climate change:
Community-based early warning systems in Dakoro, Niger

PRACTITIONER BRIEF 2

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Cover image: Dela Jari Community Early Warning Volunteer reading the rain gauge in Aman Bader village, Niger Credit: Agnes Otzelberger/ALP 2015

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1. INTRODUCTION

Farmers use seasonal forecasts to decide when to plant in Niger. Credit: ALP Niger

Rural communities in Africa are increasingly confronted with the realities of climate change. Women, men and children living in poverty in these communities experience increased vulnerability, uncertainty and risk, bringing new challenges that are worsening the existing challenges to securing their livelihoods and moving out of poverty. Community-based adaptation (CBA) supports such communities to understand the changes they face and take informed and appropriate actions that result in climate resilient development on an on-going basis. The ALP Practitioner Briefs document a range of practical approaches to community-based adaptation based on the learning and experiences of the Adaptation Learning Programme (ALP) in Ghana, Niger and Kenya.

This brief describes ALP's climate-integrated Community-based Early Warning System implemented in Dakoro, Niger, in which community-based adaptation and disaster risk reduction (DRR) come together in a context of chronic vulnerability, recurring emergencies and increasingly unpredictable and extreme weather events associated with climate change. It provides a rationale for the approach, including an overview of the associated benefits and challenges, as well as the key practical elements and lessons learned through implementation.

The purpose of this Practitioner Brief is not to provide a blueprint for integrating community-based adaptation and disaster risk reduction, but to invite expansion and modification – based on lessons learned by ALP about its strengths and gaps, as well as different experiences and innovations in other contexts. It also aims to provide organisations implementing community-based early warning and action in Niger and elsewhere in Africa with greater clarity and practical insights on the importance and key aspects of integrating a climate perspective. It is designed for CBA practitioners, including local government representatives, civil society organisations (CSOs) and other actors working on climate change and DRR issues at the local level. It will also be useful for policy makers and donors engaged in planning and allocation of resources for adaptation action.

The insights and examples provided in this brief emerged primarily from a set of interviews and focus group discussions with community and district level actors involved in ALP's initiatives in Dakoro, but also practitioners based in the regional capital of Maradi and the capital Niamey, who are working on implementing early warning and action in different contexts. It is important to note that perspectives and needs of governmental agencies and platforms at higher levels – above the local government level, such as the national level in particular, may therefore be underrepresented in this analysis.

2. How community-based early warning systems can address climate change and chronic vulnerability

CLIMATE CHANGE AND CHRONIC VULNERABILITY IN THE SAHEL

Communities worldwide are facing increasingly unpredictable and extreme weather conditions as a consequence of climate change caused by human activities. Significant changes in the climate are already being observed in West Africa, with shorter and delayed rainfall seasons, unpredictable changes in the distribution and duration of rains, high winds and more severe droughts in the Sahel, and unexpected floods in the savannah zones, all of which are challenging traditional mechanisms for maintaining resilient livelihoods. In the ecologically fragile, drought prone areas of the Sahel, the changes in climate have undermined the resilience of pastoralists and farmers. The negative impacts of this are anticipated to increase in future as climatic conditions become more uncertain, temperatures continue to rise and extreme events become more frequent, severe and unpredictable. For example, increases in crop failures, livestock losses, pest and disease outbreaks and the degradation of land and water resources are likely.[1]

Chronic vulnerability is undermining development in the Sahel. People living in poverty in the Sahel are less and less able to cope with the changes and growing number and intensity of climate shocks, which interact with other factors behind food and nutrition insecurity, ranging from economic volatility to conflict. In 2014, poor rains, observed from the delayed start and mid-season rainfall deficits, among other things, triggered an emergency whereby over 24 million people were in need of acute and long term assistance – an increase by 6 million people in relation to similar events in 2012. Millions are struggling to get back on their feet after repeated food and nutrition crises in 2005, 2008, 2010, 2012, and 2014.[2] It is becoming clear that, despite huge increases in funding, humanitarian assistance alone cannot address the structural roots of vulnerability that are pushing ever more desperate people over the edge.[3] For people to be better equipped to deal with a range of recurring shocks in this context of climatic, economic and social volatility, business as usual needs to change. Inadequate integration of climate change adaptation and disaster risk reduction in development initiatives is one of the most pressing gaps identified by the regional resilience initiative AGIR.[4]

Many pastoralists in Niger lost their livestock during the drought of 2014. Credit: Sanoussi Ababale/ALP Niger 2014

THE CASE FOR INTEGRATING EARLY WARNING AND EARLY ACTION, DISASTER RISK REDUCTION AND COMMUNITY-BASED ADAPTATION TO CLIMATE CHANGE

Building resilience in the face of these changes and challenges requires better integration of disaster risk reduction and community-based adaptation. Disaster risk reduction, and early warning, early action in particular, are essential in areas where periodic shocks threaten people's lives and livelihood security, as they have occurred throughout history in the Sahel. Climate change, in turn, challenges all community systems to deal with on-going change and find new ways of working together and making decisions in the context of increased uncertainty and risk.

Both are components of building resilience, which thus requires working beyond traditional siloes. The joining together of disaster risk reduction and adaptation to climate change needs to draw "on all sectors, contexts, levels and actors, from government officials to climate scientists, to vulnerable people themselves, recognising the contribution of the different knowledge, capacities and experiences of each".[5]

Community-based adaptation is a dynamic interplay between early warning and action, risk reduction and development actions. Emergency responses, disaster risk reduction and development are frequently planned in isolation. CBA, in turn, is a holistic approach which recognizes that all three components are interlinked. It demands for planning at multiple levels along a continuum of support for short, medium, and longer-term needs and risks that maintains local strategies for development and resilience to recurrent extreme events and natural hazards. This involves understanding and finding

innovative ways to respond to new uncertainties and change. One key element of this is finding new ways to produce and use climate information – both historical records and forecasts, from scientific sources and local knowledge – to support better informed, more flexible and forward-looking decisions. Another is ensuring people have the options they need for such flexible and forward-looking decisions: new skills, access to different services and technologies, and control over key assets.

Early warning and early action need to be 'not just earlier, but also different'. Integration of early warning, appropriate information, and access to different actions supports vulnerable people in making decisions which enable their resilience in the longer term to more unpredictable future shocks and stresses. They become more able to move on from a battle against the continued erosion of assets from season to season, to a more stable situation where options chosen in response to, or in anticipation of, events in the short term help build assets and skills for the future. In that sense, early action is not about traditional humanitarian activities, although, as the International Red Cross (IRC) puts it, 'they need to be undertaken with a humanitarian sense of urgency. Indeed, any "humanitarian" response to a slow-onset disaster [such as drought] is a late response."[6]
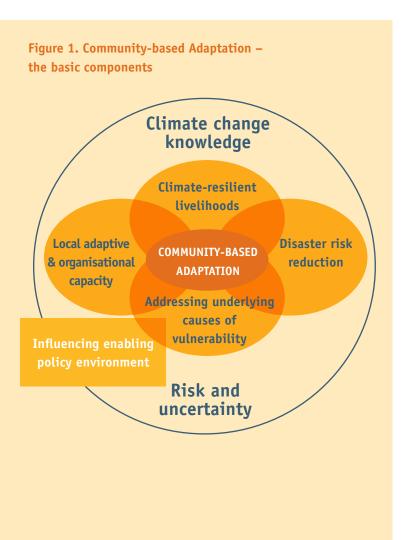
Linked with community-based adaptation, early warning and action should also be "a means to continually understand the evolving nature of hazards and vulnerabilities".[7] With new and changing hazards causing previously unseen situations in the Sahel, building this understanding is essential for vulnerable communities and the region.

INTEGRATION IN PRACTICE: COMMUNITY-BASED ADAPTATION AND EARLY WARNING SYSTEMS IN DAKORO, NIGER

The Adaptation Learning Programme (ALP) for Africa in Niger has been working with residents of 20 villages and with local government and civil society in four communes in the department of Dakoro – an extremely poor and vulnerable part of what is one of the poorest and most climate vulnerable countries in the world – to bring a climate lens to community-based disaster risk reduction (DRR). This forms part of ALP's wider approach to community-based adaptation to climate change (see box 1), of which DRR-related activities form one core pillar – linked with other activities and approaches on building climate-resilient livelihoods, addressing underlying causes of vulnerability and building organisational capacity (see figure 1).

Box 1. ALP's approach to Community-based Adaptation (CBA)

CBA is a holistic approach that is concerned with strengthening vulnerable groups to become climate resilient so they are able to adapt to climate changes and climate variability, including extremes such as drought and floods, while continuing on a positive development path. This involves gaining the ability to anticipate, absorb, adapt and ultimately transform their lives in response to both short-term shocks and stresses and long-term impacts as these change over time[8]. "Community-based" adaptation is by no means limited to actions at the local level but depends on processes from the local to the national level and beyond. Also, CBA is not merely about a set of technical strategies (e.g. certain livelihood activities, agricultural practices or new choices of seeds and breeds) to suit the new climatic patterns. More importantly, it is about strengthening processes, skills and behaviours that enable people and institutions to continuously plan, decide and evolve in response to their changing environments, i.e. developing their adaptive capacity.[9]

Figure 1. Community-based Adaptation – the basic components

Climate change knowledge

Climate-resilient livelihoods

Local adaptive & organisational capacity

COMMUNITY-BASED ADAPTATION

Disaster risk reduction

Addressing underlying causes of vulnerability

Influencing enabling policy environment

Risk and uncertainty

In Dakoro, as well as many other departments across Niger, civil society and local government are supporting the implementation of community-based early warning systems and emergency response (known locally as SCAP/RU – Systèmes communautaires d'alerte précoce et de réponse aux urgences). A SCAP/RU is essentially a bottom-up vulnerability monitoring and emergency early warning system with an element of emergency preparedness and an overall focus on community knowledge and ownership. Overall, the aim is to strengthen capacities at all levels to predict and manage emergencies – in particular food crises.

The Adaptation Learning Programme, in building the community-based early warning systems approach into its community-based adaptation work in Dakoro, has made a few significant changes to the original set-up. As explained in more detail below, ALP in collaboration with the district meteorological services, built into the existing system community weather recording and communication, links with collective adaptation planning processes at the community and local government level, as well as links with national weather recording and reporting systems.

Box 2. Niger's Système communautaire d'alerte précoce et de réponse aux urgences (SCAP/RU): A short history

The SCAP/RU idea first came to life in CARE in the late 1990s, and was later adopted and elaborated on by several other organisations working in Niger, such as Oxfam and AREN (Association pour la rédynamisation de l'élévage au Niger). Noting gaps in the management of the 2005 food crisis, CARE initiated a project to consolidate, test and scale up the approach in the regions of Maradi, Tillabéri and Zinder. Today, SCAP/RU clusters are in place in over 30% of the 265 districts in the country, and the overall process, by and large, looks the same across different places and organisations. The government now recognises information generated by this system and utilises it for national vulnerability monitoring. It also feeds into international monitoring systems such as the Integrated Phase Classification System (IPC). Since 2010, ALP has been working on adding to the SCAP/RU approach by linking it with community-based adaptation to climate change and with climate information systems in Dakoro.

The introduction of this approach by local and international NGOs in collaboration with government, in different areas of Niger, has meant a significant improvement to national vulnerability monitoring. Previously, Niger's national monitoring system did not incorporate information coming directly from local communities. Local government officials were mandated with the onerous job of surveying the situation, which led to an imprecise and politicised process and, consequently, the local population placed little trust in the national crisis management system to generate an accurate picture. One of the key ways the SCAP/ RU system has added value is by strengthening the bottom-up transmission of vulnerability information and, therefore, capacity at all levels to recognise an approaching emergency and call for necessary action.

Using mobile phones for timely communication of weather information. Credit: Marie Mornimart

3. Community-based early warning systems in climate change adaptation: the concepts

THE PURPOSE:

As the International Red Cross has noted, "people-centred early warning suggests that rather than being vulnerable, people can be capable, resilient and able to protect themselves. Three basic requirements are that individuals and institutions have the knowledge about what is a threat, that people are able to communicate a change in threat, and that they are in a position to respond." [10]

A community-based early warning system that forms part of community-based adaptation contributes to adaptive decision-making at the individual/household, community and local government level. Overall, the aim is to strengthen capacities at all levels to predict and manage emergencies – in particular food crises – and support adaptive capacity building to deal with the uncertainties and risks of a changing, unpredictable climate.

SUMMARY: THE PURPOSE OF COMMUNITY-BASED EARLY WARNING SYSTEMS

- **Predict** crises by tracking and analysing information on the condition of humans, animals, markets, ecosystems and the climate

- **Respond** to an impending crisis by determining and implementing, in advance of a likely emergency, the most appropriate actions

- **Build adaptive capacity** by strengthening the capacity of vulnerable men and women to predict and take proactive decisions and actions in the face of shocks and dynamic changes

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WHAT THE SYSTEM IS:

The Community-based Early Warning System, commonly known as *Système d'alerte précoce et de réponse aux urgences – SCAP/RU*, as supported by ALP is a bottom-up vulnerability monitoring system with an element of emergency preparedness and an overall focus on community knowledge and ownership. Information on vulnerability – food security, nutrition and health of humans and animals, market prices, climate and environment – is regularly recorded and interpreted by a dedicated team of local people. The information is then aggregated, analysed and communicated in various ways by a number of platforms at local, subnational and national level, where it helps produce a more accurate overview of the situation. Thus the information can support more timely and adequate responses which should help prevent a crisis rather than provide relief afterwards.

At the community and local government level, the information directly helps people to make informed and pro-active decisions in the face of an approaching shock. This is aided, in great parts, by an ensemble of different activities also forming part of a community-based adaptation approach – such as different adaptive livelihood options, and collective adaptation decision-making processes in communities and local government (see Box 1).

The institutional set-up of a community-based early warning system, applied elsewhere, may change according to the governance context and institutional mechanisms for emergencies, disaster risk management and climate change adaptation in place. In the case of Dakoro, a dedicated group of volunteers representing a cluster of four to five villages form the core unit at the local level. The information they record is then passed on to district level, where it is analysed by a so-called Vulnerability Monitoring Observatory (Observatoire du suivi de vulnerabilité – OSV) – a group of representatives of local government and traditional authorities, extension services and civil society. From here, it is passed on and aggregated at the sub-regional and regional level, ultimately reaching the national level where it feeds into Niger's overall vulnerability monitoring and crisis management system.

As such, the community-based early warning system helps to:

1. **Organize the generation of and access to information for and by the communities themselves,** by i) raising awareness of the need for such a system, ii) identifying indicators, alert levels, and types of responses, iii) collecting and analyzing information on a regular basis.

2. **Define a series of actions to be taken** depending on the alert level of the emergency, by using the information to identify responses that reduce the impacts of a hazard or a series of hazards.

3. **Identify, establish and develop institutional alliances and relationships** at all possible levels from the community to the subnational, national and even global level.

4. **Develop appropriate capacities**, within and beyond the community, to put into practice the best possible responses.

5. **Create and maintain a relationship of trust** between the formal and community systems through exchange of information.

HOW THE COMMUNITY-BASED EARLY WARNING SYSTEM ADDRESSES CLIMATE CHANGE

> **"A major challenge for assessing climate risks, opportunities and impacts is the poor or lack of access to and understanding of climate information. When it is available, climate information from meteorological services is often viewed as overly scientific and uncertain, whereas information from local knowledge is not widely appreciated. [...] Yet uncertainty is not a problem to be solved; it can be understood, managed and used to inform decisions and plans."** [11]

Weather data recording and rain gauges: Climate information and indicators form part of the vulnerability monitoring work of the community-based early warning system. Each group of volunteers follow and report on the weather – especially rainfall, but also wind, temperatures, etc. To assist with more accurate and localised rainfall recording, rain gauges are installed in communities.

Using the information to inform adaptive decision-making: The rain gauge records and other vulnerability information feed into immediate decisions on crop farming (when and what to plant, depending on amount of rainfall recorded within a season) and into medium-term adaptive planning processes in communities and with government (such as Community Adaptation Action Plans and Participatory Scenario Planning, see box 9).

Linkages with national weather reporting and records: Through mobile phone communication to the radio station, the rainfall records from the villages very quickly reach the national level and are announced, often on the same day, on the national radio – the only radio system available in the absence of local stations. The rainfall information also contributes to building a much-needed historical record of accurate local data that will help downscale national forecasts to local levels.

Climate information is key to understanding climate as a major influence on lives, livelihoods, resources, ecosystems and development. It provides a way of analysing the nature and scale of impacts due to past and current climate and the potential future impacts, risks and uncertainties as the climate continues to vary and change. Actors use the information and a better anticipation of the risks to make informed and appropriate decisions and plans to deal with climate-related impacts through adaptation, risk reduction and development actions.

A sand storm in Kouggou village, Niger. Credit: Marie Mornimart

Box 3. What is happening to the climate in Dakoro?

April is supposed to be hot and sunny, just before the rainy season starts. But April 2015 was relatively cool and very windy and dusty in Dakoro. For the most part, the sun was invisible behind a thick layer of sand in the air. The people of Marafa, one of the villages involved in ALP's activities in the area around Dakoro, were getting worried:

"What is happening right now is not normal, we have never seen this before. April has never been a cool season, and this back and forth between hot and cold makes no more sense. Since a week ago, we don't understand the weather any more at all. [...] This wind and dust make the animals sick and they don't have enough to eat. The weather has been so strange we don't know where to take them to graze any more. The wind brings sand onto our fields, and sweeps away fertile soil. We are worried because we have no idea what is going to happen [...] there is a star constellation called "the Hen" and normally, when you stop seeing that, it's because the rain is coming. But right now, we can see neither the Hen nor the rains. We're powerless!"

In 2014, the first rain happened around this time, in April, but then it took a whole two months for the next rain to arrive. The 2015 rainy season is expected to be a difficult one, and the soils are already in poor condition, so topsoil was brought along from elsewhere to put on the fields awaiting the rains. But the wind has been blowing that away, too, and covering the remaining, hardened soil in sand.

Climate trends have important consequences for livelihoods in Niger, where more than 80% of the population is engaged in agriculture, livestock and forestry activities. Their activities are highly sensitive to fluctuations in rainfall, in terms of both timing and amount. Late or low rainfall results in reduced crop productivity and in the worst cases to failed harvests and starvation of animals. As an important source of food and income security, the loss of livestock is a major blow to the household asset base. Heavy rainfall events on the other hand 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.

Weather records for Niger show a trend of reduced precipitation from the early 1970s, followed by increasingly variable amounts and a lack of a clear trend, and an increase in temperature since the mid 1980s. Future climate projections suggest an increase in temperature by up to 2.6 degrees Celsius by 2050, and continued increases in rainfall variability, implying that droughts and heavy rainfall events will happen more frequently. Temperature increases will cause reductions in soil moisture and productivity, which has the potential to offset any positive effects of any increases precipitation.[12]

4. Building community-based early warning systems: practical elements

INSTITUTIONAL ARRANGEMENTS AND SET UP

As explained above, the exact set-up of a Community-based Early Warning System will look different in each case – depending on existing disaster management and related structures. For example, the levels of decentralisation vary from context to context, and so too do the type of institutions linked with them. In principle, the idea is for platforms at each level to work together to identify and analyse risks and vulnerabilities, and plan a response. Local level platforms in particular are key and the focus of this approach, as they "increase the sense of ownership of the warnings, the analysis and the plans, and should strengthen the sustainability of the system as a whole. 13 Groups of local volunteers, directly representing the communities affected by crises, work together to generate and feed information into a multi-level vulnerability monitoring system from local to national level, with information being processed by dedicated committees at each level from the district to national level. The creation of feedback loops back to the communities – both in terms of information and resources – is key.

Beyond community level: The Community-based Early Warning System is linked up with the formal emergency or disaster management response mechanisms, so that community information is taken into account at all the levels from local to national, and emergency responses like food distribution, vaccines, or for example cash for work initiatives are better tailored to reach households in need. In the context of a decentralised political system like Niger's, the municipal authorities respond if possible, and what they cannot do is referred to the level above, and so on.

The success of this multi-level set-up is dependent on strong stakeholder engagement and relationships, and has been the most challenging piece of the process. Feedback and responses from the higher levels are important for the volunteers driving the Community-based Early Warning System to remain motivated and active over time, and for communities to get the needed support for effective actions.

Touareg and Fulani agro-pastoralists from Marafa village in Dakoro Niger. Credit: Agnes Otzelberger/ALP, 2015.

Figure 2. Actors at different levels and their roles

Level	Roles
community	• Community members form community early warning clusters and volunteers are elected to represent 4-5 villages per cluster. Community volunteers participate in training on risk and vulnerability; engage in the selection of early warning indicators and alert levels, take the lead on monitoring, recording and communicating vulnerability information, and meet on a monthly (in emergencies bi-weekly) basis to compile, interpret and report the information to the municipality.
municipality	• A municipality level vulnerability monitoring observatory is the primary focal point for information and support for Early Warning Clusters. Its role is also to strengthen local capacities to ensure more effective early warning, to act on emergencies reported by communities, transmit information upwards and mobilise support. • Municipal (or other sub-national) meteorological offices supply rain gauges and assist the recording and upward transmission of weather data from Early Warning Clusters.
local area	• Extension service workers, civil society organisations or particular programmes/ initiatives active in a local area (county, department, or similar) engage in: 1) supporting the set-up of community early warning clusters to collect and analyse data; 2) facilitating relationships (sharing of information and escalation of emergencies) with other levels; 3) facilitating continuous feedback of information on the large scale emergency situtation back to communities; and 4) supporting the mobiliation of external resources.
regional	• Regional and, in Niger's case, sub-regional committees on food crisis prevention and management, pass on information and ensure the mobilisation of actors, resources and emergency response at the national level.
national	• The national early warning and crisis management system records the additional data and provides support in emergencies by making appropriate assistance available to the population, especially by decentralising emergency funds. • The national meteorological department stores weather records; national radio broadcasts the recorded rainfall levels

GETTING STARTED: KEY PREPARATORY STEPS

1. Information and awareness-raising: This is an important stage, whereby those in charge of setting up the system need to ensure all relevant actors are informed in a timely and appropriate manner. This includes local authorities, both those working in government and traditional leaders, those in charge of extension services and local civil society. As their collaboration will be necessary for the implementation of the system, inclusiveness and flexibility is key from the early stages.

2. Forming vulnerability monitoring observatories: In Niger's case, these are called "Observatoires de suivi de vulnérabilité" (OSV) – Vulnerability Monitoring Observatories. OSVs operate at municipal level and are composed of representatives of extension services, NGOs and local elected representatives. The role of this dedicated committee is to aggregate and analyse the information received from the different early warning clusters, on a regular basis, and pass on data and analysis to the next level up.

It is important to encourage the formation of a representative and inclusive committee, including from a gender perspective – although in Niger, this has proved difficult because, with a few exceptions, women are still vastly underrepresented in the public sphere.

3. Identifying villages: A participatory exercise with the local representatives, guided by a multi-disciplinary team, takes place to decide on selection criteria for early warning clusters. These criteria should help with the identification of agro-ecologically and socio-economically representative villages in a given area, which together will form such a cluster.

To guide the group in identifying local site selection criteria, a list of national categories of vulnerability criteria can be helpful. In Niger's case, the categories by the national Early Warning System (SAP – Système d'alerte précoce) include:

- food and pasture deficits over the past five years

- food availability on the market

- food access

- situation of food and livestock market

- capacity of people's local adjustment *

- non-agricultural revenue sources

- NGO interventions and projects

* capacity of people's local adjustment is measured through: level of financial activities, availability of adaptation strategies, and community safety nets.

4. Forming early warning clusters: four-five villages (on average) make up one early warning cluster. Villages with similar socio-economic and agro-ecological characteristics are normally combined in one cluster; usually there is one central village whose chief presides over the cluster, or a rotational presidency. Each month, the members of a cluster will meet in the agreed village location to collate all the information collected and pass it up to a dedicated committee at the next higher level, which in Niger's case is the municipality.

5. Designating early warning volunteers: Local volunteers who record and pass on vulnerability information are the centerpiece of the community-based early warning system. Each village has 10-12 volunteers in its early warning system committee. The volunteers record vulnerability-related information based on a set of key themes (see box 4) – with two volunteers usually covering one theme. They generate the information from their own households, the surrounding fields and pastures, at social gatherings and ceremonies, at the market– and also from a rain gauge to be installed in each village. Two to four members (both men and women) per village are then chosen by a village general assembly to bring the recorded vulnerability related information to the cluster meeting of up to 20 volunteers from all the cluster villages.

6. Training: The early warning volunteers receive training from the lead implementers – in this case ALP – on issues relating to early warning, risk, vulnerability, and how to collect vulnerability data – normally mostly qualitative data but also quantitative e.g. in the case of rainfall. Training on vulnerability and risk (including risks and shocks faced by communities in the relevant territory) is also conducted at district and sub-regional level.

7. Inclusiveness: gender, diversity and differential vulnerability: It is important to make the training and data monitoring tools as accessible as possible and find creative ways to involve people with low literacy skills. Literacy and numeracy can be an important barrier to inclusiveness. Also, unequal levels of mobility, education and labour burdens, as well as social roles form barriers to more gender-balanced participation in these activities.

Women participating in community-based early warning are mostly assigned issues related to health and nutrition. These domains are traditionally linked with their roles in families and communities, so it is common to find two women in each early warning cluster looking after these. The lack of representation of women among the volunteers tracking the remaining issues is mostly a reflection not only of barriers to women's participation in the public sphere but also of gendered labour division in the household – and therefore a deeper challenge.

MONITORING AND REPORTING VULNERABILITY INFORMATION

Setting local indicators: The volunteers forming a community early warning cluster work together on identifying and agreeing indicators of vulnerability for five key themes:
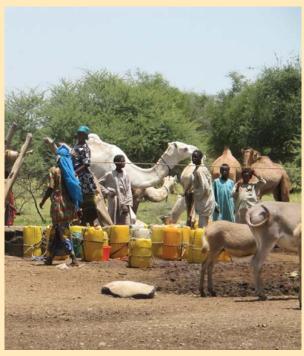
1. Food security (of humans and animals)
2. Health and nutrition (of humans and animals)
3. Social relations
4. Natural environment
5. Climate

While all the different early warning clusters collect data on these same broader categories, their local interpretation – and therefore the local indicators – vary not only from location to location but also depending on social group. The indicators are often proxies, based on local knowledge or practices (see box 4).

Box 4. Context-specific early warning indicators: What information is collected in Dakoro?

There are various ways to measure vulnerability, and various systems – such as the Integrated Food Security Phase Classification System (IPC) have been tried and tested in the world. In Niger, where most people live directly off their animals and crops, the health of people, livestock, farmland and pastures, as well as social cohesion are important across the board.

But the ways people perceive their surroundings to detect whether things are going well or not are highly variable and dependent on people's practices and knowledge. While climatic variables such as rainfall or temperatures are measured in the same way, indicators for food security, health, social cohesion and the natural environment vary across places. Oftentimes, certain behaviours of people, animals, plants and insects indicate that something is occurring.

Collecting water from the communal well in Maigochi, Niger. Credit: Agnes Otzelberger/ALP, 2015.

In Dan Maza Idi village, for example, "when babies cry a lot at night it is a warning sign because their mothers cannot give them enough milk", a health and nutrition problem is evident. In Aman Bader, when fewer people than usual turn up at weddings and naming ceremonies, or social gatherings stop happening altogether, social cohesion is poor. And across different places, market prices of food and livestock at different times of the year are used as benchmarks for events to come. In Marafa, for example, when the price of one mésure (approx. 2.5kg) of millet overtakes roughly one US dollar, it is time to take action in preparation for hungry times.

Rainfall is measured in the same way across the different villages in Dakoro (by taking readings from a rain gauge each time it rains), but the trigger levels for different actions differ, too – depending on the soil type, overall land use system and people's capacity. The minimum threshold of rainfall required for successful sowing ranges from 15mm to 30mm; those sowing prematurely risk losing their seeds to heat, evaporation and winds. Farmers have learnt what works for their own environment.

Monitoring and reporting by volunteers: Typically, a Community Based Early Warning system in each community has two volunteers in charge of following the situation and keeping records under each of the five categories. Those monitoring the climate are equipped with a rain gauge installed in their village and trained to record local rainfall. Once a month (or twice a month, when necessary in times of crisis), the volunteers in each village hold a meeting to analyse the data collected in the five categories and agree the information to be communicated at this cluster meeting. Following that, the early warning cluster – comprised of two to four volunteers from each village – meets to compile a report based on the data collected. The information is categorised in four levels of alert (normal, warning, alarm and emergency), depending on the severity of the information received and the effectiveness of current coping strategies. A report is then transmitted to the district vulnerability monitoring commitee. The volunteers' meetings often happen in conjunction with other events e.g. market days.

A local level committee analyses the early warning data on a monthly basis: The local vulnerability monitoring committee – in Niger this is the Vulnerability Monitoring Observatory (OSV) at municipal level, collects and analyses the information on human and animal food security and health, social relations, environmental conditions and climate coming from all the Community Early Warning Clusters. The committee synthesises the information and determines which aggregated alert levels from 1 (normal) to 4 (emergency) apply, overall, for each theme. One way to organise and analyse the data is shown in figure 3. The information from various municipalities is then further aggregated and analysed by the next level up – in Niger, that is the Sub-regional Committee for Disaster and Food Crisis Prevention and Management – from where it proceeds to a regional and then a national body.

Issa Sakola holding Maigochi's rain gauge. Credit: Agnes Otzelberger/ALP 2015

Box 5. Community-based early warning is helping improve trust in vulnerability monitoring in Niger

Before the community-based early warning system came into being in Niger, district authorities had to produce such assessments single handedly, and as a result they were often improvised, replacing real monitoring with second-hand and often unreliable information. Now the work of recording such data, in many areas in Niger, is distributed across local volunteers. District authorities no longer have to venture out on their own missions to gather data on the condition of pastures, herds and child nutrition – the information comes to them. It remains a challenge to get the updates with the same regularity from all the different Early Warning Clusters, but overall, they are helping produce a more accurate and more trusted picture of the local situation than before.

"The data [from the rain gauges] teaches us how much the amount of rainfall differs between the different villages. Before the Early Warning and Response System was installed, we had only one rain gauge, here in Bader Goula" says Issa Sakola, the local mayor and president of the vulnerability monitoring committee in Bader Goula district. "Thanks to the new rain gauges, we now know that our own gauge here tells us nothing about the villages around. It's possible to get 60 mm of rainfall here in Bader Gaula and 0 mm in the village just down the road. …. The information [from the community-based early warning system] helps with our decisions on how we act – we distribute improved seeds or warn the health center of impending diseases. Sometimes the national government intervenes on the prices of food and fodder, and they also sent help for the 2012 floods."

Figure 3. Organizing and analyzing early warning information: An example from Marafa and Kouggou, Dakoro, Niger

Early warning data recording sheet			
Municipality	Azagor	**Date**	17 March 2014
Cluster	Marafa - Kouggou	**Name**	[not indicated]

Issue	Alert level	Indicators of current situation	Strategies
Climate	normal alert ✓ alarm emergency	It is very hot and a dry wind is blowing from east to west. Dusty wind (which causes respiratory sickness in children and even animals)	People are seeking refuge and protection under trees during the day and sleeping outdoors during the night. Production of thatch roofs (in secco and banco local styles) on huts for refuge and protection Self-medication based on local knowledge (infusions of medicinal plants for nose congestions and asthma), some community members visit medical centers for appropriate care
Food Security (human)	normal alert ✓ alarm emergency	The price of grains is relatively high compared to the same period in other years. (one tia [a traditionally used bowl] of millet is 450 FCFA; one tia of cow pea is 850 FCFA) The availability of cereal in households is relatively limited; on the market, there is availability but accessibility is selective.	Community members are meticulously managing their stocks during this lean period by reducing their daily consumption and by making use of certain complementary foods
Food Security (livestock)	normal alert ✓ alarm emergency	Livestock feed is available at selling points and the stocks of hay are relatively stable; there is likely enough to last until the first rains expected in two and a half months. The price of wheat meal is elevated – 8000 FCFA for a bag of 50kg. Animal health is compromised by harmful sandstorms; the heat is drying up even the most consistent of water points which is making it difficult to keep animals hydrated during this time of the year.	Particular attention is being paid to managing stocks of livestock feed, pastoralists and agro-pastoralists are rationing livestock feed while awaiting the first rains. Animals are being vaccinated and wells are being taken over to water livestock.

Issue	Alert level	Indicators of current situation	Strategies
Health (human)	Normal ✓ alert alarm emergency	Apart from some minor diseases linked to sandstorms, human health is relatively stable.	Populations are continuing to protect themselves from heat and sand.
Health (livestock)	Normal ✓ alert alarm emergency	The same is the case for livestock health.	Pastoralists are continuing to vaccinate livestock.
Natural resources	normal ✓ alert alarm emergency	There is no major concern about natural resources. The appearance of trees is relatively stable during this time of the year.	Populations are continuing to practice and introduce others to reforestation practices and land management.
Social relations and conflict	Normal ✓ alert alarm emergency	Social relations are stable; people are visiting each other, are entertaining friendly relationships, and participating in each others' ceremonies (marriages, baptisms, funerals etc.)	Collective prayer for peace and quiet in all communities and in the country.
Observation by the committee	The situation is relatively stable in all aspects; communities are working to maintain this status quo.		
Opinion of the community General Assembly	We certify the correctness of all information given and pray to God for continued improvement of the situation.		

Sandstorm are a common hazard that communities have to contend with in Niger. Credit: Marie Monimart, 2012.

Dela Jari, Early Warning Volunteer from Aman Bader showing the rain gauge record. Credit: Agnes Otzelberger/ALP, 2015.

Box 6. The story of Dela Jari – community-based early warning volunteer of Aman Bader

Dakoro in Maradi Region, is one of Niger's poorest and most vulnerable areas, due to its demographic, socio-economic and agro-ecological characteristics, as well as the local climate. In an area that gets just one rainfall season a year – averaging only 330mm – and which communities depend on to sustain their livelihoods, a local record and timeliness of rainfall information is especially critical for farmers.

Dela is a 65 year old resident of Aman Bader village in Dakoro. Half of the year, she grows millet, sorghum and cow peas; the rest of the year, she sells "boules de mil" -doughnuts made of millet. Thanks to improved, early maturing seeds and her doughnuts, she just about gets by despite the increasingly difficult climatic conditions in Aman Bader. This is also because she and other farmers in Aman Bader now have the community emergency early warning and response system, which, among other things, helps to make decisions on planting a lot easier and more efficient.

Dela was chosen by her village's general assembly to be in charge of the rain gauge in Aman Bader. She cannot read or write, but she has learned how to take readings from the rain gauge. There are many other women involved in the community early warning teams as volunteers, but most of them are responsible for collecting information that falls under women's more traditional roles – such as child nutrition and health. Gender gaps in literacy and mobility, among other things, are huge barriers to women's involvement in community vulnerability monitoring.

Every time it rains, which normally happens between June and early September, Dela and all the other volunteers in charge of rain gauges across Dakoro immediately head to the rain gauge in their village and read the amount of rainfall. They have learned to do so during the night or first thing in the morning, so heat and evaporation do not distort the reading. Using a dedicated phone, which she keeps charged up using solar power (see box 8), Dela passes on the information to a colleague at the chief's office, who then records it in a book and passes it on to the district meteorological services. Thanks to mobile communication, the rainfall recordings from Aman Bader and the other villages travel to Niamey fast, and the information is soon shared on the national radio, often by mid-day on the same day.

COMMUNICATING THE INFORMATION

"A community-led approach to early warning aims to support people in anticipating and understanding threats to their livelihoods and wellbeing. In order to be relevant and lead to timely and appropriate early action, early warning information needs to be 'received, understood and communicated by those who need to act." [14]

Zennou Boukari runs a solar powered mobile phone recharging business in Aman Bader village in Dakoro, Niger. Credit: Agnes Otzelberger/ALP, 2015.

Effective communication of the early warning information is a crucial component of a community-based early warning system, and also important for making climate information useable in different contexts. It must include two-way communications between the different levels to build trust, ensure accountability, enable effective decision-making and provide validation for those volunteering to record information.

Volunteers share early warning information within and beyond the community, using multiple means of communication. Information on food security and health is spread among other community members verbally, at water wells, at social gatherings, at village meetings, on market days – and shared at the monthly early warning cluster meetings, where it is recorded in a written report to be forwarded on to the vulnerability monitoring committee.
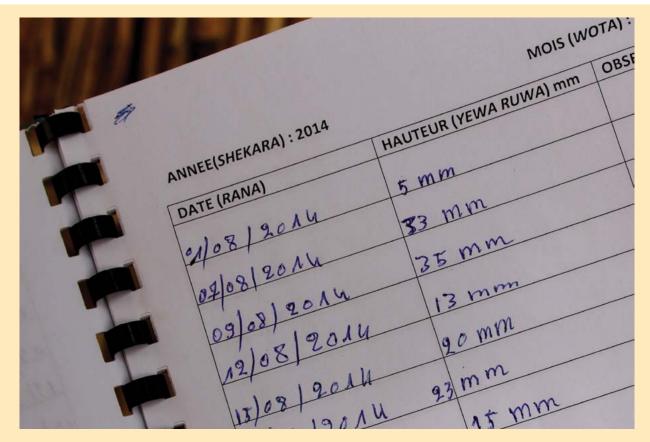
Real time information on rainfall and market prices is passed on rapidly. A lot of the information – on health and nutrition for example – tends to be qualitative in nature and, given high levels of illiteracy in the case of Dakoro, is only recorded in writing once a month. Information on up-to-date market prices, on the other hand, can be shared fast, thanks especially to mobile phone communication. Information on rainfall is recorded in a book first thing in the morning after it rains, and also immediately shared via various channels: via mobile phones with other community members, the district vulnerability monitoring committee, the district meteorological office. In this way the rainfall information quickly gets passed on and reaches the national level (meteorology department and national radio broadcast).

Rainfall levels are broadcast nationally. Broadcasting the specific rainfall levels recorded in different locations, a few hours after the recording, hugely increases the number of people who can use the information to make farming decisions. In countries like Niger, where seasonal migration to cities within or beyond the borders of the country during the lean season is a key part of poor people's livelihoods, this information can even help migrants decide when it is time to return home to their villages.

Mobile communication can be supported by solar technology. Mobile communication is crucial for the timely sharing of real time information. In remote, rural locations where access to the electricity grid is extremely limited – as is the case in Dakoro – solar panels are helping keep mobile phones charged, while also generating additional income for vulnerable groups (see box 7). Costs of using mobile phones are also kept low by subscribing to a 'flotte' (group) system where calls can be made free of charge to designated numbers up to a certain agreed maximum. All the rainfall monitors, met service and radio staff numbers are included. This is particularly helpful in a context where readers are illiterate and unable to send information by text.

Rainfall record from the community rain gauge in Aman Bader village, Dakoro, Niger. Credit: Agnes Otzelberger/ALP, 2015.

Box 7. Receiving real time information on rainfall amounts saves farmers precious time and seeds
Whenever it rains, Dela Jari of Aman Bader village immediately receives calls and visits from people in her village wanting to know, right away, how much rain has fallen. There is also a crieur ("shouter") who goes around the village announcing the news. Getting this information fast helps people decide whether they should go and plant seeds, and whether to plant their normal or shorter maturing varieties. "In the training, I learned that it only makes sense to plant when at least 20 to 25 mm of rain have fallen in our village", says Dela. "And when conditions are drier, we plant the early maturing seeds."

The information saves time and seeds, both of which are precious resources for the people of Dakoro. Before the rain gauges, they had to venture out to their fields after the rains and guess, based on the soil conditions, whether enough rain had fallen to plant. Without certainty on the amount of rain, bad or reluctant decisions were common: the guess was often inaccurate and cost people up to 50% of their seeds, Dela reports.

The rainfall data collected by the volunteers is not only used for premeditating planting decisions ahead of the rainy season, but also to alert authorities to emerging problems: "When we get two or three rains of less than three millimeters in a row, we get alarmed and we pass the information up. We need help, because our own options for action are limited. Running out of time, people plant prematurely despite the insufficient rains, hoping more rain will fall on top of that – but they risk losing their seeds to the heat and the wind."

Zennou Boukari shows a solar panel she uses to recharge mobile phones in Aman Bader village, Dakoro, Niger. Credit: Agnes Otzelberger/ALP, 2015.

Box 8. The sun – a new source of income, powering the dissemination of climate information

Disconnected from the grid, and challenged with long distances to towns and neighbouring villages, people living in Aman Bader and other villages engaging in community-based adaptation with ALP, now have a reliable source of power for their mobile phones.

"In 2012, we were given a solar kit"– a set of equipment to charge mobile devices with solar power. "The women at the general assembly chose me to be in charge of it, because they trusted me with managing the revenues this would generate," says Zennou Boukari, who lives in Aman Bader, and has been in business for a long time selling peanut oil and palm oil.

Mobile phone communication is relatively recent in Niger. It started in 2002 and, initially, only involved affluent residents of Niamey and Maradi. It has spread "like a wildfire" since and is available everywhere in Niger. Where ALP works, the majority of men have "cellules", and probably between 20 to 40 or 50% of women, depending on locations. This is evolving fast and represents a real social revolution, especially for people in cut-off, remote areas.[15]

But charging the phones especially for women has been difficult and costly, usually through purchasing charging from a power stall at the local market or town some distance away, or from a passing motor bike willing to share from their battery. Small solar panels are easy and relatively inexpensive to install everywhere.

Each time a phone is charged with Zennou Boukari's solar power kit, which happens all the time according to Zennou, a communal fund set up by her and the other women in the village makes 75 Francs CFA (12 cents US$). Sunshine, of course, is available in abundance

in the Sahel, so the solar kit generates a reliable and continuous income for the women's fund. But the group decided to take it even further and manage their income in smart ways, as a source of credit and investment.

"We use the money to give the women of the village access to credit, normally between 10 and 20,000 Francs CFA (approximately 16 - 33 US$) at a time, which is usually paid back within a month or two at an interest rate of 10%. The loans are used for ceremonies usually, or to buy livestock, but they also help families buy food during the lean season." The profit made by charging interest on the loans does not belong to Zennou – it is collective property and it gets reinvested in a community inventory credit system: "We buy cereals – millet mostly – for the women in the village, when it's cheap, and stock it, for sale when the prices go up. Just recently, for example, we made 122,740 CFA back from around 100,000 CFA paid out in loans. We used that to buy 45 kilos of millet, just when the price was very low. We will sell it when the stocks elsewhere run low and the prices go up – this way the value of our stock can double or even triple." The time when the prices go up is also when people are hungriest, so the extra income will be particularly useful.

"This system generates resources for dealing with crisis. It makes us more resilient" Zennou explains. Without the chance to borrow and invest, people often have no choice other than to consume wild foods, ration their food intake, or leave the area when a crisis strikes.

But income, savings and credit are not the only way the solar kits help the people of Aman Bader and the other villages ALP works with become more resilient. They also play a crucial role in the villages' community early warning and response mechanisms. Not only can people keep in touch with their relatives and friends more easily, but they also share the weather information they generate and receive a lot more quickly. When it has rained, first thing in the morning, local volunteers use a dedicated mobile phone to pass on a rain gauge reading to the district authorities. Hours later, they hear their village's name and corresponding amount of rainfall on the national radio. This news is followed even by relatives who have migrated to neighbouring countries in search of seasonal labour. When they hear how much rain has fallen in their home, they know exactly when it is a good time to return to work in the fields.

The rainfall records inform seasonal Participatory Scenario Planning. Better farming decisions are not only enabled through records of past and ongoing rainfall, but also through better use of seasonal forecasts. The rainfall records created through the Community-based Early Warning System feed into Participatory Scenario Planning workshops, where by representatives from institutions and communities in a given area come together each year in advance of the rainy season to discuss both the meteorological and traditional forecast. These meetings provide opportunity to reflect on what happened in the previous year, and discuss appropriate strategies in response to the forecast for the rainy season ahead. Based on this, advisories for the coming season are prepared and communicated.

> **Box 9. Combining early warning and scenario planning can help avert crises**
> Participatory Scenario Planning (PSP) was introduced in Dakoro in early 2013, and has since been linked with the Community-based Early Warning System. According to the chief of Aman Bader, Ada Issoufou, PSP has already helped avert a crisis. When, in 2014, experience and forecasts signaled that the rains were likely to be late and extended, guidance was issued to the population accordingly: If this happened it would be best to plant the traditional, longer maturing seeds, and to pile additional top soil, transported from elsewhere, on to the wind swept fields. "Once the first rains fell, with this guidance, people reacted fast. The rainy season was not good, but thanks to PSP, at least we managed to secure an average harvest."

STRENGTHENING ADAPTIVE CAPACITY

Adaptation is a continuous process of adjustment and decision-making in response to uncertainty and dynamic changes. Uncertainty can be managed through more flexible and innovative strategies, more forward-looking decisions, more stable assets, and more equitable access to institutions and resources. Through the interplay between adaptation strategies and planning processes, and ensuring these inform and reinforce one another, flexible and forward-looking decision making and innovation (which are aspects of adaptive capacity) can be strengthened.

Community members learn to record and make use of new types of information that helps select better strategies in response to uncertainty, change and shocks – individually and through collaboration and collective decision-making processes.

The information generated by the Community-based Early Warning System not only informs acute emergency response but, crucially, also makes an important contribution to adaptation planning and decision-making for livelihoods and economic development in communities and by local government and other actors. Early warning information influences both the day-to-day choices of strategies by livestock keepers and farmers, and collective decision-making processes such as annual Community Adaptation Action Planning (CAAP)[16] processes and Participatory Scenario Planning (PSP) (see box 9 and Further Reading on page 30).

The early warning system is linked to adaptation strategies, risk sharing mechanisms and planning processes that help build adaptive capacity. Using the information generated by the Community-based Early Warning system, and other experiences and observations, community members need access to a basket of community-based adaptation strategies that help them manage climate risks and avoid negative coping strategies that have harmful impacts and erode people's capacity to manage shocks – such as reducing the number and size of meals and the selling of key assets. What these strategies look like depends on context. In Dakoro, they range from the use of short-maturing seed varieties, to livestock health measures and destocking, the inventory credit system described by Zennuo Boukari (in Box 8) and new income generating activities beyond livestock and farming.

Community-owned risk management and resource sharing mechanisms are also a key element of these adaptation strategies – offering more flexibility and opportunities to proactively deal with unpredictable climatic, environmental and economic events. Various mechanisms can help pool resources and spread risk in such ways; in Dakoro, they include Village Savings and Loans Associations and the community inventory credit system (known as warrantage in Niger; see box 10).

Bags of millet in a community grain store waiting to be sold when the price is higher. Credit: ALP/CARE Niger, 2015. Credit: ALP/CARE Niger, 2015.

Box 10. Community inventory credit systems and Village Savings and Loans Associations explained
In community inventory credit systems, people are loaned an advance payment for part of their harvest, which is stored in a community grain store. This loan provides temporary credit, which is repaid after the stored grain is sold later, when the prices are higher. Through Village Savings and Loans Associations, small savings are accumulated by groups – especially of economically disadvantaged women - to provide credit for new income generating activities, and emergency funds. Additional income – as well as local access to electricity for mobile phones – is generated through solar powered phone charging stations operated by VSLA groups.

Collective planning processes: The use of the different adaptation strategies is revisited every year in a planning process whereby community members revise and adjust their Community Adaptation Action Plan (CAAP) (see Further Reading section on page 30) specifying what farming, livestock and business strategies community members want to engage in for the year to come. The CAAP can also make use of the results of Participatory Scenario Planning (PSP), which takes place ahead of each rainy season. PSP, in turn, builds on the rainfall data gathered by the emergency early warning clusters. The rainfall records and other vulnerability-related information form an important part of the information and experiences reviewed.

Box 11. In Niger, the speed of emergency response depends on the type of crisis
Early Warning Clusters report that emergency early warning, has rarely led to a timely or sufficient assistance in the face of a crisis, with pest and disease outbreaks far more likely to mobilise a swift response than crises linked to drought. Locally, it appears that the integration of the SCAP/RU system has led to more empowering changes for local residents involved in the community-based adaptation approach than for those not engaging in CBA. The latter often find themselves trapped with the knowledge of an oncoming crisis and no options other than negative coping strategies such as reducing the number of meals per day to save food.

In 2012, pest outbreaks in Niger threatened crop harvests, but thanks to information reported by the SCAP/ RU community early warning clusters, the government had enough time to take action to control the outbreaks and minimise losses. It takes a lot longer, however, for a concerted response to a creeping food crisis to kick in: up to eight months can go by from the moment a failed harvest is noted locally to the point where the information has passed all the different levels and institutions and reaches the national early warning system SAP (Système d'alerte précoce) in form of a completed report identifying particularly vulnerable zones.

5. Benefits of the community-based early warning system in Dakoro

As ALP has learned over the years, no single practice or strategy is likely to achieve the types of changes that would make resilient and sustainable development under a changing climate more likely. As such, the CBA framework advocates for a combination of approaches – building climate-resilient livelihoods, reducing disaster risk, addressing the underlying causes of vulnerability and building organizational capacity – in such a way that a combination of institutional, behavioural and technological changes can take place.

Given the ensemble of different processes and strategies involved in ALP's community-based adaptation approach, and the number of drivers of change at work (such as e.g. migration dynamics, the evolution of decentralized governance in Niger, as well as the constantly evolving security situation), it is impossible to single out Community-based Early Warning Systems as a standalone determinant of changes in adaptive capacities and resilience across the communities involved in the ALP programme in Dakoro.

That being said, a significant contribution of ALP's climate-sensitive Community-based Early Warning approach to a set of behaviours, relationships and skills is plausible, making this system a good approach to build on in efforts to integrate disaster risk reduction and climate change adaptation. Most of the benefits presented in this section are situated at the very local level – in part because this is where most of the work on early warning and action undertaken by ALP and partners has been concentrated, but also because the inquiry behind this brief focused predominantly on this level.

Setting up a Community-based Early Warning System at multiple levels, in a challenging context such as Niger, where institutions tasked with emergency response act within very limited means, and decentralisation is a recent process, has also meant a significant challenge. Strengthening linkages with and feedback loops from higher levels will be part of recommended improvements laid out in the final section.

CHANGES AT THE COMMUNITY LEVEL:

- The Community-based Early Warning system forms part of a combination of "soft" (process-oriented) and "hard" (tangible, asset-focused) activities which together lead to improved capacity to adapt to shocks and stresses.

- Crises can be foreseen and better prepared for: making informed and forward-looking decisions has become automatic – a "reflex" – for many; people are actively following the evolution of their situation and alert authorities of problems. Before the Early Warning Clusters were formed, this did not happen in a regular, organised manner.

- People are improving their analytic skills by following different indicators, recognising linkages between different phenomena, identifying and acting on risks.

- Less passive, more proactive behaviours are becoming more common: people take preventive action to protect their fields, save food and cash resources, or destock livestock, rather than waiting until a crisis occurs, compromising their resources for response actions and limiting their ability to remain resilient.

- In some places, such autonomous, community-driven responses had been weakened or eroded by external intervention. The focus on local ownership in the Community-based Early Warning System appears to be bringing back people's readiness to be proactive and autonomously develop strategies best suited to their context.

- There are more regular and better exchanges within and between the villages about on-going problems. For example, when it has rained, there is a very rapid exchange of information on rainfall amounts. There is improved collaboration within and between communities, for example on vaccination, planting activities etc.

- The new information exchange and collective activities form part of a broader process of social change and empowerment whereby women are becoming more active members of public life and more autonomous decision-makers. Many women are also making more regular visits to markets and health centres.

- Members of Early Warning Clusters have developed better relationships with relevant extension agents. In particular the links between agro-pastoralists, pastoralists and local civil servants have been strengthened.

This is how a group of women in Aman Bader, Dakoro, some of whom are volunteers in their local early warning cluster, and most of whom form part of the Village Savings and Loans Association, describe why they benefit from the combined community-based adaptation activities.

Because of community-based early warning, health problems are now being recognised earlier and information travels more quickly; mothers seek medical assistance to prevent rather than just react to illnesses. When the signals suggest a bad rainy season ahead, people destock their herds, selling some animals before it is too late and using the income to buy food and medical supplies for the rest of the animals. Many stock up on complimentary animal feed, such as millet bran, to make up for the likely shortage of pastures.

There are also changes at the local government and national level resulting from the set-up of the Community-based Early Warning System across different areas of Niger, by CARE and other actors such as AREN and Oxfam (note that the latter two did not include a climate component):

CHANGES AT LOCAL GOVERNMENT LEVEL:

- The Vulnerability Monitoring Observatories have better capacity to respond within their limited means, and are in a better position to understand and articulate the local situation. This helps them develop more concrete proposals to raise funds with.

- The generation of rainfall records that are more accurate and cover more local areas have improved the understanding by local government of the distribution – over time and space – of rainfall, in a context where previously, large areas were covered by only one single rain gauge or weather station.

- Vulnerability monitoring has become a less cumbersome task – where it used to be necessary for district authorities to make their own inquiries, data from the communities now reaches the authorities on a regular basis.

- This has also helped increase the transparency of and trust in the local governments' vulnerability diagnostics. They are now more likely to accurately represent the situation.

NATIONAL LEVEL:

- Emergency early warning information from the local level is now recognized as part of the national emergency management mechanism (which was not the case before), complementing the national vulnerability monitoring system.

- The Community-based Early Warning System is helping correct many inaccuracies in national vulnerability monitoring through providing detailed and up to date local information.

- Rainfall data generated by community volunteers is helping to make up for the lack of historical, local records, generating new opportunities for better climate modelling and downscaling forecasts to smaller areas.

Water collection at the communal well in Maigochi, Dakoro, Niger. Credit: Agnes Otzelberger/ALP, 2015.

6. Lessons learned and recommendations for scaling up the approach

ALP is a learning programme with the aim to pilot, test and improve approaches to community-based adaptation. The Community-based Early Warning System is a system with potential for modification and expansion in the context of community-based adaptation and risk reduction initiatives. This system can benefit not only from adapting ALP's successful practices to new contexts but also from building on gaps identified and opportunities not yet taken in Niger.

BUILDING ON THE STRENGTHS

A Community-based Early Warning System embedded in community-based adaptation, as implemented by ALP in Niger, can benefit local communities in building adaptive capacity and improve responses to emergencies. It appears that the integration of the Community-based Early Warning System has led to more empowering changes for local residents involved in the community-based adaptation approach than for those not engaging in CBA. The latter often find themselves trapped with the knowledge of an oncoming crisis and no options other than negative coping strategies such as reducing the number of meals per day to save food. Most significantly, therefore, this integrated approach of early warning and early action with community-based adaptation supports local communities in taking control not only of their own vulnerability monitoring and livelihood decisions, but also their own risk management and pro-active responses using the early warning information – rather than waiting to be helped by government and other institutions at higher levels.

The Community-based Early Warning System approach linked to broader community-based adaptation can also strengthen the capacities of institutions involved in emergency response– their vulnerability monitoring practices, their understanding of the local population and environment and, therefore, result in more adequate targeting and strategies of response. As such the approach provides opportunities to address the 'inadequate integration of disaster risk reduction and climate change adaptation within development initiatives' identified by the Global Resilience Alliance AGIR (Alliance Globale pour l'Initiative Resilience) as one of the most important gaps in the dominant development paradigm at work in the Sahel.[17]

To ensure sustainability of the approach, direct benefits for communities are key. Something that has tangible value is more likely to be continued without direct support from a programme such as ALP – the rain gauges are a good example. Unlike the other elements of the early warning system, the rain gauges yield an immediate, tangible benefit by providing information for decision making on whether and what to plant – and thus saving time and resources. Community members recognise the value this new information brings with or without feedback from higher levels, and are likely to continue the practice of monitoring rainfall with or without continued external support.

Also, the Community-based Early Warning System in Dakoro would not have achieved its impacts without its direct links with the community adaptation planning process and strategies supported by ALP – especially those yielding direct, tangible benefit to community members such as the inventory credit (warrantage) system, improved short maturing seeds or Village Savings and Loans Associations. These strategies, and the planning mindset behind them, give people options to act on a predicted shock or stress. Negative coping strategies such as reducing the number of meals per day can be avoided. All in all, this combination of generating information, decision-making processes and generating directly tangible outcomes is key for the uptake and continuity of community-led early warning.

OPPORTUNITIES TO CLOSE GAPS AND STRENGTHEN THE SYSTEM

While the Community-based Early Warning system is intended to be an early warning and response system, it has, to date, achieved a lot more with regard to early warning than response. Changes and crises can now be better foreseen by communities but, by and large, are only acted upon within the communities' extremely limited means. Ensuring timely and adequate response to crisis requires not only correct information but also resources that can be mobilized quickly enough. With a few exceptions, especially in situations requiring pest and disease control, ringing an alarm bell does not translate into timely support. Drought and hunger in particular have very slow response times.
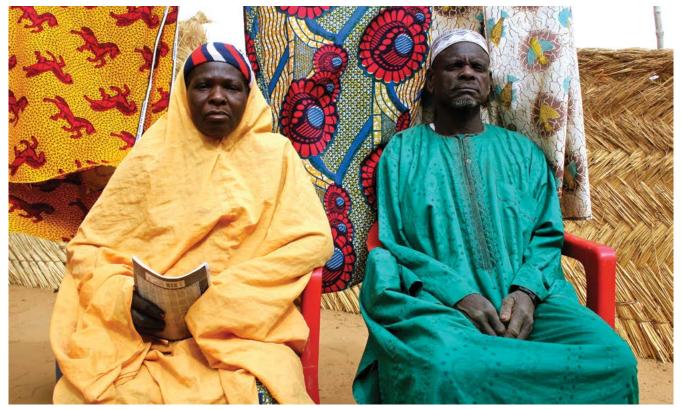
In 2012, pest outbreaks in Niger threatened crop harvests, but thanks to information reported by the community early warning clusters, the government had enough time to take action to control the outbreaks and minimise losses. It takes a lot longer, however, for a concerted response to a creeping food crisis to kick in: from the moment a failed harvest is noted locally to the point where the information has passed through all the different levels and institutions and reaches the national early warning system SAP (Système d'alerte précoce) in form of a completed report identifying particularly vulnerable zones, up to eight months can go by.

The limited and slow response to early warning information has had demotivating effects on the communities involved in the community-based early warning system, whose efforts to monitor and communicate information on vulnerability lead to very little reaction – both in terms of analyses of the situation, and assistance when alert levels go up. Community volunteers are aware that their efforts to generate and communicate data have improved their own knowledge and capacity to make better informed, more forward-looking decisions, but without more tangible rewards for their efforts from higher levels, many question the value of the time spent recording information and attending meetings, often at a great distance.

There are also a number of untapped opportunities at the national level to take advantage of the successes of ALP's Community-based Early Warning approach in recording and quickly communicating rainfall data. Considering Sub-Saharan Africa has fewer rainfall monitoring stations than any other region in the world, there is much unused potential for the use of historical and daily rainfall data. Several initiatives in Africa are aiming to improve the accuracy and utility of forecasts for end users, for example through using historical rainfall data for early recognition of seasonal patterns, which allows accurate prediction of season failure much earlier in the season than has previously been possible.[18] The Community-based Early Warning System's success in reaching national radio could also be utilised to promote more and better communication around sector advice or emergency response. Niger is an active participant in the Africa Risk Capacity (ARC) drought risk finance scheme, providing vulnerability, food security and other information to augment the climate models and satellite data produced by the accompanying Africa Risk View data analysis which inform triggers for drought responses.

RECOMMENDATIONS FOR IMPROVEMENT AND GOING TO SCALE

1. **Ensure effective feedback loops.** It is crucial to ensure a flow of information in both directions - not only upward from the community to higher levels but also downward back to the communities. This has been challenging in Niger where resources for emergency response are rarely readily available. Again, the rain gauges have been an exception – the information is broadcasted on the national radio, often on the same day. This is not only of practical use to local communities in many ways, but gives early warning volunteers recognition for their efforts.

2. **Reduce the burden on volunteers.** Volunteer work is easier for those who can afford the time and resources it takes to be involved. As such, members of the poorest households and women, too, face additional barriers in making a contribution – for example, it can be very difficult for them to attend meetings in other villages, a fair distance away. Improved feedback of the overall system, community compensation for transport, meals and other rewards, as well as rotation of responsibilities could help not only retain volunteer motivation over time, but also make the approach more inclusive toward people who could otherwise not afford to be part of it.

3. **Build on existing community structures.** Strengthening local adaptive capacity can be more effective and sustainable when strengthening existing community mechanisms rather than setting up additional structures. One idea for an improved approach is for Community Early Warning Clusters to be embedded in existing groups rather than set up separately.

4. **Ensure equitable benefits from adaptation strategies.** As a focus group in Marafa put it, "everyone can adapt only as much as their means will allow" – implying that improved early warning alone does not automatically translate into adaptation or risk reduction strategies when people simply lack the means to do anything about the problem they see coming. Despite a number of pro-poor, low cost adaptation strategies introduced across different villages in Dakoro, Marafa's village leaders estimate that seven out of ten people do not have the means to adapt, and regularly have to resort to coping strategies that are more likely to erode than sustain their assets.

5. **Challenge gender roles.** This is a sensitive issue that requires time and tact – but without challenging rigid gender norms and expectations in some way, little changes. Community action such as this early warning approach can be a catalyst for empowerment – for example when a woman like Dela Jari in Dakoro takes up an "a-typical" role monitoring rainfall data instead of child nutrition and health.

Caption: Zennou Boukari, from Aman Bader village who runs a solar powered mobile phone recharging business with her husband. Credit: Agnes Otzelberger/ALP, 2015.

6. **Ensure representation of Emergency Early Warning Clusters at higher levels.** One way to address the lack of downward information flow is to secure representation of the Community Early Warning Clusters in the committee at the next higher level in charge of collecting and analyzing the information – in Niger, this is the district level Vulnerability Monitoring Observatory. Presently, community members feel cut off from what happens there; they do not know what happens to the information they send to the district authorities, what conclusions are drawn from it and how it is processed further up in the system.

7. **Make use of the evolving record of weather data to help improve localised forecasts and support innovation in climate science.** Continuous real-time climate monitoring, coupled with effective communication, can help communities identify changes in climate and weather patterns, timing and magnitudes of high impact weather-related events, and provides information on which to base their adaptation strategies. The broadcasting of rainfall amounts on national news is not only useful to local farmers, but also those who have migrated away to cities for seasonal labour and need to know when is a good time to return home to work on the fields.

    Over the long term, such rainfall information can also create a historical record that helps downscale national forecasts to local levels, in places where, given high spatial variability in rainfall and the absence of detailed records, generating local forecasts has been extremely difficult. Linkages to the above mentioned climate information based drought prediction models will help to strengthen both the value of the community-based early warning system and support for early responses when needed.

8. **Accelerate communication in case of emergencies.** In Niger, response times are much slower for a creeping, drought-related hunger crisis than for pests or floods for example. Food crises can take a long time to be registered at the national level, where the resources for emergency response are concentrated. It appears that early warning information, however alarming, still needs to pass through several levels – with exception of rain gauge readings. District level Vulnerability Monitoring Observatories have to wait for all the data to come in before holding a meeting, analyzing and passing on the data – and there are a lot of delays. The Community-based Early Warning approach, in fact, foresees a direct communication channel from the local to the national level in case of maximum alert levels, whereby local entities can formally link up with the national Early Warning System – e.g. the SAP in Niger – to declare an emergency and request direct assistance. The system could also be linked up more directly with, e.g., the Integrated Phase Classification System (IPC) which is internationally recognized and could help strengthen the mobilization of international resources.

9. **Decentralisation of emergency stocks.** Another way of increasing responsiveness may be to ensure a certain amount of emergency stocks are available at sub-national level - a plan that is already underway in some departments. Through the Community Early Warning System as well as devolution, vulnerability monitoring has been getting increasingly decentralised – but resources and competencies to respond to emerging problems have not.

10. **Ensure government ownership:** Community-based Early Warning systems, while often assisted by non-governmental agencies in their set-up, need to be embedded in the existing governance system, rather than in a separated parallel world of finite NGO projects. Previous to the Nigerien "SCAP/RU", the disaster management system of Niger only reached down to the departmental level only; the Community-based Early Warning System complements it from the bottom up and thus links in the district and community level.

11. **"Community-based" is not "community-limited".** Finally, it is important to note that all efforts to achieve adaptive capacity and resilience at the community level, in community-led and empowering ways, remain very limited in their real outcomes as long as deep, structural causes of poverty at all levels remain unresolved. After all, robust economic growth has taken place in all Sahelian countries since 2000, while the number of people needing emergency assistance has risen dramatically (from 6 million in 2000 to 24 million in 2015). Tackling the food and nutrition challenge in the Sahel, in the context of climate change, demographic changes and economic volatility, will not be possible "without major changes in how development is done, in how existing development resources are allocated, and without changes in development policies, institutions and strategies.[19]"

    The community-based early warning system in Niger provides a good foundation on which to build a more robust, vertically and horizontally linked response system to climate related impacts and extremes which operates nation-wide. It is essential that as adaptation finance becomes available, priority is given to adaptation approaches which link early warning with climate information and integrate decisions for risk management and productive livelihood strategies.

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The Adaptation Learning Program (ALP) for Africa aims to increase the capacity of vulnerable households in sub-Saharan Africa to adapt to climate change and climate variability. Since 2010, ALP has been working with communities, government institutions and civil society organisations in Ghana, Kenya, Mozambique and Niger to ensure that community-based adaptation approaches and actions are integrated in development policies and programmes. This is achieved through the demonstration and dissemination of innovative approaches for CBA, supported by practical tools, methodologies and evidence of impact. ALP is also working to create an enabling environment for CBA by working with civil society groups to influence national and international policy frameworks and financing mechanisms for adaptation.

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