



The development of early warning systems and contingency plans in relation to extreme weather events and assessment of risk and vulnerability of agricultural systems to different climate change scenarios

CARE International submission to the UNFCCC's SBSTA (Subsidiary Body on Scientific and Technological Advice) Work Programme on Agriculture, March 2015

Recommendations

1. Address gender and power dynamics as a matter of priority in all risk and vulnerability assessments at household and community levels.
2. Remove structural barriers that prevent women farmers from accessing and controlling productive resources.
3. Invest in building adaptive capacity through community-based adaptation and other interventions in the smallholder agriculture sector.
4. Engage stakeholders critically at multiple levels in community based adaptation and early warning systems work so that communities are linked to policy development processes and can scrutinise public service provision. This should include 'collectivisation' to allow marginalised voices emerge.
5. Strengthen the institutional capacity of local government to integrate resilience building measures into agricultural development planning and implementation.
6. Invest further in research and analysis of the links between early warning early action; community based adaptation; and the natural resource base in order to improve anticipation, adaptive capacity and disaster risk management simultaneously.
7. Decentralise and democratise research, analysis and information flows through participatory processes using innovations such as community advisories, one-stop information and advisory-nodes, agro-kiosks etc.
8. Adjust the provision of agricultural sector support to the poorest rural households and women farmers so that barriers in accessing productive assets, land, credit, technical services, climate and market information services etc. can be overcome. The use of short term or seasonal safety nets should be considered where appropriate.
9. In early warning systems work with vulnerable agriculture-dependent communities, apply the IPC principle of using the 'crisis as opportunity' to redress underlying structural causes of this vulnerability and risk.

Introduction; CARE International welcomes the opportunity to submit to the Subsidiary Body's consultation and appreciates explicit attention to risk and vulnerability assessment. CARE recognises that there are many underlying and complex challenges to achieving global food and nutrition security. Persistent inequity, environmental degradation, neglect of attention to nutrition, climate change and demographic change, sub-optimal (and often declining) production, inadequate maternal and child health services, poor water and sanitation practices and changing and unsustainable consumption and diet patterns are some of the considerable and often inter-related challenges. Today's food systems already underserve a global population of 7.2 billion, of whom nearly 1 billion are malnourished and over half a billion obese. Further, efforts to meet needs are being undertaken in ways that are rapidly destroying the planet's terrestrial and marine resources. Food security depends, among other factors, upon sustainable agricultural output to ensure a primary source of food and income for the poorest and most vulnerable; but because women and girls face gender-based bias and discrimination, it will be paramount that risk and vulnerability assessment of agricultural systems takes both sustainability **and** equity much more seriously.

Women play critical roles in food production and preparation, but in many cultures they consume the poorest-quality food and are the first to face hunger when the food and agriculture system upon which they depend fails. In Africa, despite contributing a large share of agricultural labour, women own disproportionately small amounts of agricultural land, are less involved in household decisions and have less control over household resources. Addressing the social inequality that underlies poverty, especially gender inequality, is thus indispensable for realising significant improvements in the way our agriculture systems work. At its root, poverty is caused by unequal power relations that result in the inequitable distribution of resources and opportunities between women and men, between powerholders and marginalised communities, and between countries. CARE believes that vulnerability cannot be reduced, from any sectoral perspective, without addressing these underlying power imbalances. Climate change is a reality for all, but those whose livelihoods depend on natural resources, including women engaged in smallholder farming in the developing world, are particularly vulnerable. They face changing seasonal patterns, unexpected and increasingly frequent extreme weather events, and long-term slow-onset changes in production potential caused by rising temperatures. All of these exacerbate existing threats to livelihoods from, for example, human-induced environmental degradation, or unstable market conditions.

CARE Approach: CARE aims to strengthen sustainable smallholder agricultural systems to improve food and nutrition security for farmers, workers and consumers. One of the critical pathways by which we work to meet this aim, which pertains to this SBSTA consultation, is to build **resilience** for communities and systems to be able to withstand and recover from climate-induced shocks and stresses and other risks by: supporting community-based adaptation in agriculture communities; connecting institutions and collectives for better governance; and using market, technical and climate information to support farmer-led analysis, planning and risk management.

Changing climate and weather patterns, and the uncertainty that comes with it, is a growing challenge for farmers and development actors – and none more so than smallholders in climate-sensitive hotspots. The new risks that climate change brings to agriculture are reducing farmers' confidence and the value of their local knowledge. Farmers face a growing need to access information to learn to anticipate possible futures, manage uncertainty and make economic, social

and environmental decisions and trade-offs on a continuous basis in relation to a changing climate. These abilities make up **adaptive capacity**, which is central to increasing the resilience of farmers and their agriculture systems. Building adaptive capacity involves strengthening a number of inter-related factors: 1) access to, accumulation of and control over assets; 2) access to knowledge and information; 3) innovation; 4) effective institutions and entitlements; and 5) flexible and forward-looking decision-making and governance – all of which are articulated in the [Local Adaptive Capacity Framework](#).

Community-based adaptation (CBA) is a holistic approach that focuses on building adaptive capacity and on addressing the underlying (structural, social, economic and political) causes of vulnerability. It does so by combining participatory decision-making processes that involve men and women, together and as different groups, with support to technical adaptation strategies or interventions (e.g. introducing drought-tolerant seed), informed by climate science forecasts and projections, climate risk and impact analysis, and the designing of ‘climate-resilient’ livelihoods and disaster risk reduction interventions. CBA builds on good sustainable development by adding climate change analysis, which considers different timescales and decision-making and is informed by anticipated future weather and climate. CARE’s experience indicates that analysis of differences in roles, power and resources, plus a targeted approach to promoting improved gender equality as part of adaptive capacity-building, produces beneficial outcomes in women’s empowerment, household and community capacity to adapt, and increased food and nutrition security. These outcomes are extremely pertinent in agriculture systems that are exposed to climate-related shocks and stresses. CARE has developed a comprehensive set of gender-responsive approaches to climate vulnerability and capacity assessment ([CVCA](#)), CBA planning and integration, [climate information systems, monitoring and evaluation](#) of CBA, among others. CARE’s CBA approach considers the most important issues for smallholder agriculture in the 21st century: risk and uncertainty; trade-offs and cost benefit issues; climate and market information; equity and power dynamics; early warning early action system links and consequent connections to humanitarian action; disaster risk reduction; and livelihood security.

Unpredictability and uncertainty: As has been highlighted by various scientific reports including the International Panel on Climate Change (IPCC) 5th Assessment Report or the “Turn Down the Heat” reports published by the World Bank, various climate risks increase significantly with higher temperature increases. These reports have documented the different levels of risks to agriculture and food security for different regions of the world. Future trajectories of warming will depend on today’s decisions to cut greenhouse gas emissions, but there is only broad agreement on the likely temperature increase for the next 10 to 20 years. However, even this broad agreement does not lead into certainty over the occurrence of climate extremes in a given region for the near future. Thus, dealing with uncertainty in climate information related to different scenarios is inherent to adaptation. Climate forecasts and projections “must be understood together with information on the uncertainty and probability of whether they will happen”, and they are most useful when produced and understood as a result of dialogue between various stakeholders.¹ Analysis demonstrates that community-based adaptation (CBA) approaches can be effective and efficient and

¹ Ambani, M., Percy, F. 2014: Facing Uncertainty: the value of climate information for adaptation, risk reduction and resilience in Africa.

deliver development benefits both in best-case but also worst-case climate scenarios in a given situation.²

However accurate the predictive capacity of an early warning system in terms of yield or production deficits, there are two areas in which such systems will not be able to predict accurate outcomes (and this is where participatory scenario planning can help). The first of these areas is in understanding the specific impact that the projected conditions will have at the household level, where people have different resources and capacities, different livelihoods and coping strategies, and where the context is changing rapidly.³ The second area relates to the complexities of human interaction. It is not possible to predict with certainty: how markets will react to variation in price, quality and availability, or changes to seasonal migration patterns; how different groups will interact with each other; or the potential for conflict over limited resources like water points and pasture.⁴ Humanitarian and development actors must thus take a more rigorous and coherent approach to dealing with uncertainty and anticipation (see the report [Facing Uncertainty](#)) and building adaptive and decision making capacity is critical to this.

One approach is to use farmer field school principles in applying climate risk analysis and aim to increase farmers' knowledge on climate change and improve their response to it. Farmers already operate in complex environments compounded by climate variability, especially around rainfall patterns, and they respond to this through adapting their farming practices throughout the season using a combination of improvised technologies and traditional knowledge. CARE seeks to improve farmers' adaptation strategies in a bid to increase resilience, within the limits set by the environment and changing seasonality, through better scenario planning. This includes working with meteorological service providers to receive rainfall data from farmers on a regular basis and disseminating forecasts and advisories throughout the growing season. This makes it easier for farmers to respond and adapt. In cases where official rain forecasts and predictions are not sufficiently downscaled, farmers are able to make their own observations and act on them. Farmers are now more aware of how to use climate information in managing their soil, water and crop resources for best results and benefit from their effort. Improvements and innovations in information and communication technologies (ICT) allow for better programming in this and other areas (such as marketing or early warning and early action) and should be considered in programme design.

Other successful approaches include integrated water resource management (especially for rainfed areas/flood zones where marginal community food production systems are extremely vulnerable); improving crop productivity through sustainable crop production practices (the use of drought/salinity tolerant seeds etc.); access to diverse livelihood options (animal husbandry/agro-forestry/non-timber forest product development/horticulture/non-farm enterprises etc.) for better income generation; and gender transformative changes (enabling marginalised women and girls to become agents of change).

² Vardakoulis, O. and Nicholles, N. 2014: Managing Uncertainty: An economic evaluation of community-based adaptation in Dakoro, Niger. Adaptation Learning Programme (ALP).

http://www.careclimatechange.org/files/Managing_Uncertainty_CARE_nefc_email_version.pdf

³ EARLY WARNING EARLY ACTION – Mechanisms for Rapid Decision Making; IFRC, Save the Children, Oxfam, FAO, WFP; Nairobi, 2014

⁴ *ibid*

For participatory approaches to have the desired impact, holistic and inclusive planning that brings multiple actors working at differing scales together is critical for sustainable outcomes and good governance. Participatory Scenario Planning (below) is an example of an emerging model in CARE's work that enables communities, local disaster management agencies and local governments to collectively interpret seasonal climate forecasts from government and private meteorological services and traditional forecasters at local level. It facilitates flexible, weather-based planning, enabling different actors (especially smallholders) to adapt to seasonal variations in climate, while at the same time building evidence and capacity for adaptation planning. Specific climatic vulnerabilities affecting the vulnerable population in a defined hotspot can be identified through participatory scenario planning and lead to appropriate responses to be defined depending on the socio-economic status of the population. A knowledge repository of largely visual information and set of micro measures can be created – the dissemination of which can lead to 'information-fortification' of the vulnerable population. This approach has been shown to lead to enhanced relationships between meteorologists and local actors, increased flexible and locally owned decision-making, and greater confidence in local knowledge and innovation.

Participatory Scenario Planning (**PSP**) is a multi-stakeholder forum for accessing seasonal climate forecasts and 'translating' them to relate to local livelihoods and development so as to generate information for use in decision-making and planning in a season. PSP ensures that community voice, experience and expertise contribute to developing locally relevant agricultural solutions to existing and new climate risks and challenges. It enables **equitable** access to climate information by smallholders, agricultural extension and support services. PSP is grounded in shared and iterative learning and the process creates links between actors who would not normally sit together to plan, resulting in connectivity between actors, institutions and organisations for coordinated actions. The PSP process follows five major steps:

- 1) Designing** – a locally relevant and appropriate process, including deciding the level (national, county/province, district, etc.) at which to conduct PSP and form partnerships);
- 2) Preparing** – bringing out stakeholder information needs for the coming season;
- 3) Workshopping** – a multi-stakeholder forum where seasonal forecasts from local forecasters and climate scientists are combined to create a more accurate forecast for a local area. This is combined with technical expertise from different government sector ministries, organisations and institutions to develop actionable and locally relevant information (advisories) for decision-making and planning;
- 4) Communicating** – the advisories to reach wider and targeted audiences who need to use the information;
- 5) Monitoring, evaluating and feedback** – to learn the challenges, benefits and impacts of PSP on livelihood decisions and choices.

Scenario planning addresses the need to understand and manage broader future uncertainty as the climate continues to vary and change. Uncertain information on the future climate is taken as a barrier to using the information, even though it is more useful for planning agricultural investments than no information at all. Scenario planning enables actors to contend with a range of possible climatic impacts, now and in the future, so that shocks do not come as surprises and risks can be anticipated, reduced, managed or turned into opportunities. This builds actors' capacity to make informed, appropriate and forward-looking decisions and plans on **sustainable** and **productive** agricultural technologies and practices for increased food and nutrition security, while ensuring that smallholder agriculture is climate **resilient**.⁵

Recommendations

Based on the above, and the work of our colleagues and partners, CARE proposes a set of recommendations which can be applied in different circumstances and by different decision-makers and stakeholders, including in national planning contexts (such as in relation to National Adaptation

⁵ Decision-making for climate resilient livelihoods and risk reduction: A Participatory Scenario Planning Approach. CARE international; Adaptation Learning Programme (ALP), 2012.

Plans, National Agricultural Investment Plans), in the provision and implementation of support for adaptation action (both through bilateral support and multilateral institutions such as the Green Climate Fund, the Adaptation Fund, the World Bank and others), in addressing research and knowledge gaps etc.:

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3. Invest in building adaptive capacity through community-based adaptation and other interventions in the smallholder agriculture sector.
4. Engage stakeholders critically at multiple levels in community based adaptation and early warning systems work so that communities are linked to policy development processes and can scrutinise public service provision. This should include 'collectivisation' to allow marginalised voices emerge.
5. Strengthen the institutional capacity of local government to integrate resilience building measures into agricultural development planning and implementation.
6. Invest further in research and analysis of the links between early warning early action; community based adaptation; and the natural resource base in order to improve anticipation, adaptive capacity and disaster risk management simultaneously.
7. Decentralise and democratise research, analysis and information flows through participatory processes using innovations such as community advisories, one-stop information and advisory-nodes, agro-kiosks etc.
8. Adjust the provision of agricultural sector support to the poorest rural households and women farmers so that barriers in accessing productive assets, land, credit, technical services, climate and market information services etc. can be overcome. The use of short term or seasonal safety nets should be considered where appropriate.⁶
9. In early warning systems work with vulnerable agriculture-dependent communities, apply the IPC principle of using the 'crisis as opportunity' to redress underlying structural causes of this vulnerability and risk.⁷

⁶ Sahel Working Group, Gubbels, P. Escaping the Hunger Cycle: Pathways to Resilience in the Sahel, 2011. Agro-ecology, for example, is the appropriate paradigm for small scale agricultural production in risk prone areas of the Sahel. There is extensively documented evidence that agroecological techniques such as agro-forestry (FMNR), integration of livestock, soil and water conservation, if judiciously combined, and applied in a way that supports women, including control over productive assets, can achieving multiple benefits. These include strengthened resilience of livelihoods, sustainable increases in yields, regeneration of the natural resource base, increased income and improved household food security. Complementary techniques that also reduce risk are improved storage, dry season gardening, microcredit (for women), and provision of improved short cycle seeds

⁷ *ibid*

Annex 1

Key aspects of a range of CARE projects with regard to the use of early warning systems⁸

CBA project	Main role and experience related to early warning systems
Farmer field schools in Mozambique	Farmers in Angoche have been discussing how they might better access weather information via text messages from local disaster risk reduction agents, or by radio. Early warnings of cyclones and droughts, as well as seasonal forecasts that provide information about rainfall probability and estimate when rainfall periods are likely to occur, can allow farmers to make better-informed decisions about which crop and variety combinations to invest in on their farms.
Community adaptation action planning in Niger	This project has supported the implementation of early warning and emergency response committees at community level. Committees collect rainfall records and share them with the local government vulnerability monitoring observatories (OSV), which then pass them on to local radio, as well as to higher governance levels of the early warning system. The radio broadcasts provide current data, informing decision-making on crop variety and planting timing, which reduces the risk of seed loss through multiple replanting and reduced harvests. As a result of the early warning system, community information is taken into account at municipal, departmental and even national levels, and emergency responses like food distribution, pest control or cash for work are better tailored to reach vulnerable households.
Participatory scenario planning in Kenya	PSP enables district government departments to have better access to localised seasonal climate information and to use it for collective planning. This has resulted in timely support for communities, especially in terms of passing information, providing extension services, and giving early warning for flooding. In the past, services were limited to emergency measures and provision of relief programmes after extreme events.
Sustainable livestock production in Cuba	This project carried out a vulnerability assessment using CARE's Community Vulnerability and Capacity Assessment (CVCA) tool. This enabled the project team, together with partners, to define priority interventions and draft a disaster risk reduction (DRR) plan for each of the eight livestock cooperatives in Camagüey Province. The project helped to finance up-to-date meteorological instruments for the Provincial Meteorological Centre, also used by the technicians of the cooperatives, to better manage climate forecasts and understand agro-meteorological applications. Members were then trained in the use of a monitoring and early warning system for drought. The project also helped producers affiliated to the cooperatives to adopt more resilient crop-production methods, through the introduction of agro-forestry systems and the planting of tree nurseries, fruit trees and fodder.
Preparing for glacial lake outbursts in Peru	The project worked with communities, and national and local partners, to design a risk management system that includes a radio communication system to provide early warning for flash floods in this micro-watershed area of the Sacsara River. The use of maps led to the development of an early warning system for glacial outburst floods, with planned evacuation routes and disaster responses. Through these activities, the project is building local capacities to adapt to a changing environment and manage emerging risks from the impacts of climate change on tropical glaciers. The early warning system has also contributed to the institutional strengthening of local government and civil defence platforms by providing opportunities for training, technical knowledge and relationship-building. The multi-stakeholder co-design of risk management plans has integrated municipal actions within broader regional and national spaces.

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⁸ King, S; Community-based adaptation in Practice: A global overview of CARE International's practice of Community-Based Adaptation (CBA) to climate change, 2014.
http://www.careclimatechange.org/files/cba_in_practice_lr.pdf