

## CONTENTS

Climate communication for adaptation	1
Rainfall recording: a community decision making tool in Niger	2
Communities benefit from agro-meteorology advice in Kenya	3
Making seasonal forecasts usable in Ghana and Kenya	4
The value of climate forecast information to Mbeere farmers in Kenya	5
Impacts of early warning systems in Garissa, Kenya	6
Stork Story: Uncertainty, our new friend	7
Dissemination of climate information using radio in Kenya	8

### About Joto Afrika

*Joto Afrika* is a series of printed briefings and online resources about adapting to climate change in sub-Saharan Africa. The series help people understand the issues, constraints and opportunities that poor people face in adapting to climate change and escaping poverty.



Ahmed Rage from Nanighi at his flooded farm in Kenya © Stanley Mutuma, ALP 2013

## Climate communication for adaptation

### Editorial

**Farmers and pastoralists, as well as policy makers, development and humanitarian programmes in Africa are searching for the best ways to adapt to the impacts of climate variability and change. Changes in seasonal rainfall patterns and more unpredictable, severe and frequent extreme events like floods and droughts are already being observed, threatening livelihoods in vulnerable communities.**

Most adaptation strategies aim to spread or reduce potential risks, for example by using drought tolerant seeds, cereal banks, diversification to non climate dependent income sources, weather based insurance products, or early warning systems. Although such concrete measures are essential, climate change is continuous and unpredictable. Adaptive capacity to make informed and flexible decisions for action is becoming even more important to ensure resilience to climate change impacts.

Climate science and meteorology provide valuable sources of information that can help, not only in predicting future weather and climate (which can never be fully accurate), but also in developing understanding and skill in befriending and managing uncertainty. Seasonal forecasts for example, give probabilities of three different rainfall scenarios. In the process of understanding how to use these probabilities, adaptive capacity is already strengthened. We can skilfully interpret and use the information by relating it to the risk assessments and decisions we make daily, and plan to spread or take risks, innovate or protect our assets, seize opportunities and make and modify decisions in response. Communicating climate information, in ways that users can understand and apply is therefore a critical resource to support effective adaptation to climate change.

This *Joto Afrika* issue shows how a range of programmes in Kenya, Niger and Ghana are developing approaches to incorporating communication of climate information into their work with farmers and pastoralists in climate vulnerable areas. Using a range of innovative communication mechanisms, the programmes demonstrate how such information has reached and supported communities to make their own decisions, diversify their livelihood choices and protect their assets.

In Niger, where seasonal rainfall is minimal and erratic, agro-pastoralists determine planting dates based on rainfall records acquired from their own community rain gauges. In Kenya and Ghana, locally relevant seasonal climate advisories are developed collectively among communities, sector service providers and meteorological departments, and disseminated widely. Seasonal, and in some cases short range, forecasts with advisories are disseminated to farmers and livestock keepers in Kenya and Ghana through community held seminars, chiefs' meetings, radio and mobile phones, churches and mosques, government and NGO extension services, and local early warning systems. Farmers are benefiting from using forecasts at different stages in the production to market cycle.

The articles in this issue reflect the experiences from a range of programmes implemented by: CARE International through the Adaptation Learning Programme in Kenya, Ghana and Niger; Christian Aid; the Kenya Meteorological Department (KMD) and IGAD's Climate Predictions and Applications Center (ICPAC) all in Kenya. Learning in relation to climate science and how to use it practically has been enhanced by support from the Humanitarian Futures Programme, the UK Met Office, World Meteorological Organisation and associated research. All contributors are gratefully acknowledged here.

These experiences clearly demonstrate how access and use of weather and climate forecasts, together with increased understanding of uncertainties as expressed in probabilities, can be transformed into useful and usable information. Such information empowers vulnerable communities to make their own calculated and climate informed decisions on livelihood and risk management choices, innovation and use of services and resources. Climate communication and information services are clearly an essential component for enabling adaptive capacity and effective adaptation.

### Fiona Percy

ALP Regional Programme Coordinator  
CARE International  
[fiona@careclimatechange.org](mailto:fiona@careclimatechange.org)



# Rainfall recording: a community decision making tool in Niger

Rainfall recording in Niger © Ababale Sanoussi

In the Sahel, erratic behaviour of seasons, linked to climate variability and change, is putting pressure on household food security and local knowledge. Livelihood choices and mobility are being reduced as families fail to rebuild their livestock herds and become increasingly dependent on settled agricultural production. In arid conditions, with only one short rainy season every year and uncertainties of climate change, this is a potentially risky strategy.

Land is becoming over exploited with lower harvests compared to previous years according to most farmers. Equally, local weather observation techniques are not as effective as in the past as unpredictable variability occurs from one season to the next. Capacity building of communities in Dakoro department, central Niger, to collect and use rainfall information has become an empowering tool for strengthening decision making for food security, community resilience and adaptation.

The Adaptation Learning Programme (ALP) in Niger, partnering with Niger meteorological services, has installed 20 community rain gauges in Dakoro district, linked to a community vulnerability monitoring and early warning system using mobile phone service. The community monitors have been trained to measure, record and disseminate rainfall amounts on a daily basis to the local meteorological services.

## The climate communication system

When it rains, the community monitors record rainfall amounts over a 24 hour

*"We used to dig the ground to the height of the forearm in order to know the depth of humidity and then decide whether to plant or not after the first rains. Now that we have rain gauges and our awareness has been raised on beneficial rainfall amounts, we only plant when conditions are right. Farmers in this village and those from surrounding areas no longer rush to the fields as soon as the first rains fall. They first come to get information on the rainfall amount recorded before deciding to plant", says Tagaza Gayya, a villager from Makérawa Lasseni (Bader Goula commune).*

period and communicate the data to the Dakoro meteorological department using mobile phones. They in turn, analyse the rainfall data and transmit the information to community radio stations and national radio, for dissemination. ALP also organizes debates on land use management and other livelihood options during which agricultural and environmental technical officers give advice to farmers.

Information disseminated through community radios reaches almost all communities in Dakoro and neighbouring districts. The two community radio stations: *Murya* and *Hadin Kaye*, estimates more than twenty percent of the total population, are likely to receive information disseminated through community radios in 14 communities in Dakoro.

## Impact of the climate communication system

Community rainfall information has had an immediate impact on decision making on farming. This has resulted into change in community attitude and practice and is supporting communities to make better decisions at the right time like deciding when to plant.

As total seasonal rainfall is low and distribution is erratic, planting is only successful when there is sufficient soil moisture to allow germination and survival through to the next rain.

Farmers are able to know the rainfall recorded immediately after downpours and this has given them confidence in the decision to plant or not, thus resulting to a reduction of the rate of seed loss due to multiple replanting. Rain gauge information has also enabled decision making on other farming operations such as weeding time, when to apply pesticides and search for pasture by pastoralists.

Installation of community rain gauges, training on rainfall data collection and dissemination of the resultant rainfall information in Dakoro therefore constitutes an important step for communities to have increased adaptive capacity through better access to information for livelihood decision making and early warning on potential risks, in an uncertain and changing climate.

## Sanoussi Ababale

ALP Niger Local Governance and Advocacy Officer

[amsanoussi@co.care.org](mailto:amsanoussi@co.care.org)



Women discussing the value of community rain gauges in Dakoro, Niger © Fiona Percy, 2012

## Useful links

Cassava farming in Mutomo Eastern Kenya: Experiences from a small scale farmer.  
Photo audio story (YouTube)  
<http://bit.ly/YQoCt7>

Photo slide show (Picasa)  
<http://bit.ly/WDQty4>

Audio story (Sound cloud)  
<http://bit.ly/UWauBm>





# Communities benefit from agro-meteorology advice in Kenya

*Benefits of meteorological information in Kenya © ICPAC*

**Smallholder farmers depend on rain-fed agriculture in most of sub-Saharan Africa. Over time, they have adjusted their planting patterns and farming calendar to the onset, duration and end of the rainy seasons. However, with changing rainfall due to climate change, their planting patterns and farming calendar no longer match seasonal rainfall distributions which often lead to crop losses. Seasonal rainfall forecasts are thus crucial for the provision of early warning information to be used by farmers.**

Current efforts to avail climate information to communities in western and southern Kenya are yielding fruits. The communities have reported that their food security situation is steadily rising. Seasonal, monthly, and ten-day climate outlooks for the Greater Horn of Africa Region are produced by the IGAD Climate Predictions and Applications Center (ICPAC). Through support from the Rockefeller Foundation, the downscaled seasonal climate outlooks by Kenya Meteorological Department (KMD) are interpreted by an agro-meteorologist into a form easily understood by intermediary users (extension officers, farmer coordinators and local leaders) and general advisories are developed for use by Nganyi, Reru and Nyahera communities in Kisumu (Western Kenya) and Imbirikani and Isinet communities in Oloitoktok.

## **Dissemination and generation of agro- advisories**

Dissemination is carried out before the beginning of every major rainfall season in Kenya; the MAM (March - May) and the SOND (September - December) seasons. It is done at community level in a participatory manner involving farmers, extension workers, local community leaders (Chiefs) and Project coordinators.

In the forecast dissemination process the previous seasonal forecast is evaluated, then the scientific and traditional forecasts are shared and harmonized. Advisories developed by the agro-meteorologist from ICPAC are then presented and discussed based on the performance of the previous season's forecast, current forecast and technical advice from agricultural and livestock extension workers. Final

climate-based agro-advisories to advice on seasonal farming activities are agreed upon by participants, with emphasis on gender perspectives. Contents of the advisories include; planting time, good farm management practices, choice of inorganic fertilizers and use of farm manure, suitable crop types and varieties to be planted, weeding regimes, the available seed suppliers, prevention and control measures for crop pests and diseases, pasture management and measures that community members could use to exploit the forecasted seasonal climate and other agronomic practices.

## **Benefits from use of seasonal climate forecasts and agro- advisories**

Community members in Kisumu cited improved agricultural production (yield increment of 3 or more times per unit area) due to proper and timely use of the agro-advisories to inform better farming methods as benefits of receiving the forecast in previous seasons. This has translated into improved food and nutrition security, improved land planning and management, awareness and proper planning, better decision-making and choice of agricultural technologies.

In Oloitoktok, the communities made informed decision on grazing schedules and herd movement, improved utilization of water and pasture resources, reseeded of highly degraded pasture reserves, breed improvement through cross breeding and regular culling, diversification of livelihoods through small scale irrigation projects, apiculture, craft-making and pasture seed harvesting.

## **Lessons learnt**

- Well established communication network that integrates new technology like use of mobile sms platform is essential for effective dissemination of seasonal forecasts.
- The 10-day seasonal updates allow users to know the prevailing weather and forecasted climate for ongoing decision making.
- Capacity building on the interpretation and use of the weather bulletins is crucial
- Involvement of agricultural and livestock field extension officers ensures access and interpretation of

seasonal forecasts and advisories generated during the workshops are properly used for increased farm productivity and improved livelihoods.

Accurate climate prediction, proper interpretation, packaging, timely dissemination and use translates into increased agricultural yields and improved food security hence sustainable livelihoods.

**Jasper Batureine Mwesigwa**  
ICPAC (IGAD Climate Prediction and Application Center)  
[jbmwesigwa@icpac.net](mailto:jbmwesigwa@icpac.net)

**Jessica Omukuti**  
ALP (Adaptation Learning Programme)  
[omukuti@som.care.org](mailto:omukuti@som.care.org)

## **Useful links**

IGAD Climate Prediction and Applications Centre  
<http://www.icpac.net/>

World Meteorological Organization (WMO) roving seminars  
<http://bit.ly/19UbOdL>

Climate Change Agriculture and Food Security adaptation activities.  
<http://bit.ly/12X5MHR>



Talking science, talking sense - work in Senegal, September 2011  
<http://bit.ly/11Oeb8Q>



# Making seasonal forecasts usable in Ghana and Kenya

*Interpretation of seasonal forecast and formulation of advisories in Gambaga, Northern Ghana. © ALP Ghana*

**Climate information is important to communities and government institutions for livelihood and development planning, which can result in reduction of losses attributable to climate variability and change. However, the way in which the information is communicated is essential – it needs to be understandable, accessible, and acceptable to the end users.**

Participatory Scenario Planning (PSP) is being used in Kenya and Ghana by the Adaptation Learning Programme (ALP) to facilitate communities and local governments to access and interpret seasonal climate forecasts in a manner that enables their understanding and use. PSP events involve a multi-stakeholder platform which respects, reviews and combines knowledge from community, local government planners, sector based service providers and meteorological services to support decision making.

## Process of advisories generation

Seasonal climate forecasts are presented as the probability of rainfall amounts being above normal, normal, or below normal scenarios in the forthcoming rainy season. During PSP workshops, probabilistic forecasts are presented by officers from Kenya Meteorological Department (KMD) and Ghana Meteorological Agency (GMET), and the local seasonal predictions are presented by community members. Consensus between the two forecasts is established where participants review the past seasons trends and current livelihood and environment status in the local area. The information derived from this sharing process is then interpreted into scenarios

of what it means for the local area in case the three rainfall probabilities occur, identifying specific opportunities, risks and impacts to various livelihoods and sectors. Information generated is used to develop a plan of action for each livelihood group and sector for each scenario. The plans are then summarized and translated into implementable, sector specific action points, which form advisories.

Advisories give options on livelihood and DRR strategies that can enable communities and local governments to take advantage of probable opportunities while seeking to address the probable risks. They aim to meet the information demands by different livelihood groups; in Northern Ghana the groups include crop farmers, livestock and poultry keepers, agro-based industries and vocational and artisanal entrepreneurs, while in North Eastern Kenya they are pastoralist and agro-pastoralist groups.

The advisories generated are then communicated to a broader group of communities and local governments for use in their decision making and planning. Advisories have made seasonal climate forecasts easier to understand and take action on.

*"I use climate information to plan community trainings and field assessments that are relevant to the probable seasonal climatic scenarios. Flexibility has become part of planning since I know there is the possibility of different climatic occurrences", says Joel Okal, the District Livestock Production Officer for Lagdera district, Garissa, North Eastern Kenya.*

Advisories for above normal rainfall, for the farming livelihood group in Ghana

- Carry out gardening in soils that are not at risk of being water logged to avoid loss of produce
- Plant long and short duration varieties of crops to spread risks related to rainfall distribution
- Avoid farming close to river banks

While advisories are already making a difference to extension messages and land user decisions, improvements are still needed. Some advisories are repeated in every PSP as they relate to long term development needs that have not been addressed. A clearer focus on the specific seasonal choices farmers and pastoralists need to make would enhance the process. Advisories are generated through discussions on probabilities, yet they are often presented as 'instructions' to be followed rather than options to be weighed up for users to make their own decisions, based on their own circumstances.

**Joseph Machaka Nderitu**,  
Adaptation Learning programme, CARE  
International in Kenya,  
[Nderitu@Gar.care.or.ke](mailto:Nderitu@Gar.care.or.ke)

**Thomas Ayamga**  
Adaptation Learning programme, CARE  
International in Ghana,  
[Thomas.Ayamga@co.care.org](mailto:Thomas.Ayamga@co.care.org)

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## Useful links

Decision-making for climate resilient livelihoods and risk reduction:  
A Participatory Scenario Planning approach.  
<http://bit.ly/TfiKs6>

Ghana community based adaptation update  
<http://bit.ly/11NZFxV>

ALP web page  
<http://bit.ly/tYpyyo>

CARE Climate change  
[www.careclimatechange.org](http://www.careclimatechange.org)

Advisories for below normal rainfall, for the pastoralist livelihood group in Kenya

- De-silting and fencing of water pans
- Consider livestock off-take in relation to pasture availability
- Irrigated fodder production
- Mass vaccination and de-worming





Abdullahi Foli from Shantabaq community, with his maize harvest in Garissa, Kenya. ©ALP Kenya

# The value of climate forecast information to Mbeere farmers in Kenya

**Using seasonal climate forecasts to inform farm management can reduce the vulnerability of marginal farmers in Africa to climate variability, especially when they are tailored based on an in-depth profile of the characteristics and needs of user groups.**

Farmer groups who are poor, rural producers with limited farm sizes in semi-arid Mbeere District, Eastern Kenya, face challenges including ability to adapt to the changing climate and adopt new farming techniques, better knowledge and skills to access inputs, business support and market information

In response, the Sustainable Agricultural Livelihoods Innovations Project (SALI) has linked small scale farmers to localised climate forecast information, through the Kenya Meteorological Department (KMD), and provided marketing intelligence and opportunities for increased and diversified agricultural production. KMD has localised and repackaged the weather information into user-friendly products including related advisories for crop farmers and pastoralists. Seasonal weather forecast information is disseminated through workshops where advice is given on possible crop varieties considering the projected rainfall patterns. Farmers also receive weekly and monthly updates.

## Impacts

A qualitative assessment by Christian Aid in October 2012 asked farmers to judge the link between changes in yields and their use of forecast information. Among the interviewed farmers, 94% attributed increases in crop output of greater than 5% to decisions they had made differently

*'I use sms to get information on weather patterns from SALI. The information has been very reliable, we trust, accept information and act on it. Before I used to plant maize without anything but now I can add beans and vegetables, I have plenty and can provide enough for my family', says Faith Njiru.*

as a result of improved access to forecast information. About two-thirds felt that the impact was greater than 15%. A small number did estimate yield reductions – in one case, a farmer planted more green grams based on the forecast and an army-worm outbreak had a negative impact. Another referred to waterlogged fields as a result of the heavy April rainfall period.

Farmers reported that access to forecast information linked to inputs (seeds) and market knowledge, enabled timely decisions and action for on-farm operations. Twenty groups of farmers rated face to face access as their preferred method, with radio and mobile phones next.

Radio forecasts however have to be substantially upgraded, with more explanation and new formats, such as a farmer forecast where farmers can ring in to ask questions or participate in the programme, discussing the forecast, its uncertainties and the agricultural recommendations that are developed. Mobile phones forecast services available

for KSh 7 were popular when the forecast was localised.

Technical and extension service information further amplifies these benefits as farmers apply better farm management practices based on climate and weather information. While links to market and input suppliers anchor the gains made to ensure farmers get better returns for the crops they sell, the impacts of access to climate and weather services leveraged an average 30% increase in crop production, demonstrating a clear contribution to agricultural resilience-building. Strengthening farmer groups, improving the outreach of weather communication services and increasing linkages with the relevant ministries for service provision will help to further enhance the scale and sustainability of these positive results.

## Eston Njuki

Programme Manager Livelihoods, Christian Aid in Kenya

[ENjukiNdegwa@christian-aid.org](mailto:ENjukiNdegwa@christian-aid.org)

The SALI project is implemented since 2011, through a partnership between Christian Aid, KMD (with UK Humanitarian Futures Programme and the UK Met Office), Traidcraft Exchange, Christian Community Services Mount Kenya East (CCSMKE) and the Anglican Church of Kenya Diocese of Mbeere in Eastern Kenya.

## Join the Joto Afrika debate online

Joto Afrika Eldis Community Group:  
<http://bit.ly/bM3ESo>

Joto Afrika Facebook Group:  
<http://bit.ly/aMNLth>



## Useful links

Building Resilience - A Farmer's Forecast work in Kenya, March 2012

English version:  
<http://vimeo.com/39827406>

Swahili version:  
<http://vimeo.com/40090861>



# Impacts of early warning systems in Garissa, Kenya

A flooded farm at Nanighi in Kenya. © Stanley Mutuma, ALP 2013

**Early warning systems empower communities to prepare for and confront the power of natural hazards. However, the efficiency of such systems is to be measured in terms of reduction in losses, which is directly related to the execution of an anticipated response by the people and institutions once a warning is issued.**

Garissa County, in North Eastern Kenya, is prone to seasonal floods. The River Tana swells with rainfall runoff from Mt Kenya region leading to flooding. These floods result in displacement and loss of human life, damage to property and irrigation infrastructure, destruction of crops, loss of livestock, and deterioration of health conditions owing to waterborne diseases. As a result people are forced to move to higher ground for safety.

In April 2013, River Tana burst its banks causing flooding in some parts of Garissa County. However, in Nanighi community, the situation was different. Losses were minimal because the community anticipated and prepared for the floods. The area chief and two other members of the Nanighi community had attended a Participatory Scenario Planning (PSP) workshop held before the onset of the March to May rainy season, to learn and interpret the seasonal forecast with the meteorological services, local government and communities, in order to make informed plans and responses.

"During the PSP, we developed possible impact scenarios. Although it was most likely that rainfall would be normal to below normal, there was still a low probability for

above normal rains. When we later realized that River Tana water levels were rising fast, we alerted the farmers living along the river banks through mobile phones calls and suggested actions they could take. Losses were minimized as the community members acted on the information by removing all their assets from the river banks. Apart from permanent crops that could not withstand sustained flooding, none of the farms in Fafi district lost any movable facility." says Titus Utungo – district Agricultural Officer – Fafi district, Garissa county.

According to Abdullahi Gedi, an elderly man from Nanighi, the advisories were very useful. When the area chief received a phone call about the impending floods due to excessive rainfall in areas upstream of River Tana, he informed the community about it. The community members did not ignore the early warning as they used to do before. People moved their pump sets away from the river banks while those that could not be moved were tied to big trees. Those living close to the river banks relocated to higher grounds while some crops were harvested, and livestock were moved to the wet season grazing zones.

The Nanighi community is now prepared to take advantage of the flood receding zone by planting food crops such as green grams, maize, and cowpeas. They also anticipate good regeneration of pastures in the areas that were flooded. This, according to Abdullahi Gedi will be very useful in the event of a drought in the coming season. Nanighi community has turned potential disaster into opportunity.

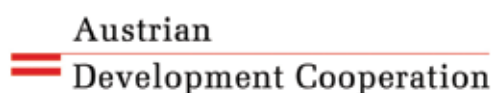
The advisories developed together have enabled change in farmers' attitudes and perception towards climate information, unlike in the past when community members believed that any happening was an act of God and nobody could influence it, they have now realized that climate information is useful in dealing with risks and seemingly bad situations.

**Joseph Machaka Nderitu**,  
Information and knowledge management officer,  
CARE International in Kenya, Adaptation Learning programme  
[Nderitu@Gar.care.or.ke](mailto:Nderitu@Gar.care.or.ke)

"We shared that there was a chance of floods downstream of River Tana with pastoralists from Balambala. When the floods came, the pastoralists were able to protect their assets by moving their animals to higher grounds early enough and harvesting their fodder. Losses were minimized and pastoralists are now taking advantage of the floods; instead of irrigation they are reseeded denuded areas and growing fodder using the available soil moisture as the floods recede." Says Eric Mwatuni – District livestock production officer – Balambala district

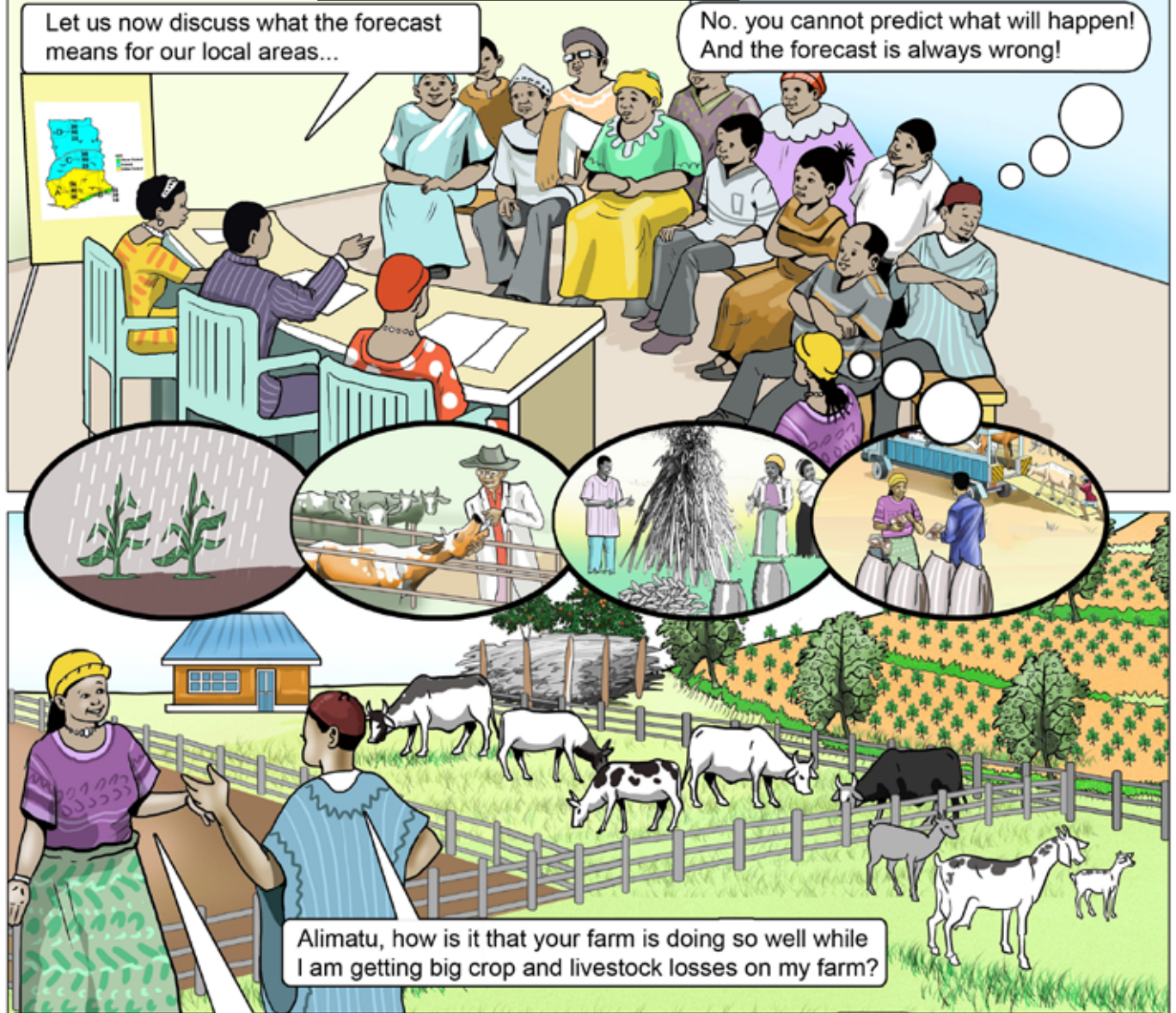
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*This special issue is supported by*





## Uncertainty, our new friend



Using seasonal forecast probabilities and option in the advisories given to us two months ago as well as the weekly SMS forecast updates, I am spreading risk of total crop failure by planting different amounts of maize, millet, early maturing cowpeas and fodder for my livestock. This also ensures good yields and income.

But how can such an uncertain forecast be useful when it did not say exactly what will happen?

The seasonal forecast helps me plan ahead knowing there is always some opportunity and some risks. I consider a variety of options, and use available updates like the weekly SMS updates and radio weather forecasts to decide on timing of day to day actions. I am also experimenting with different farming methods and getting help from the Ministry of Agriculture.

The very process of learning how to live with the uncertainties in climate information enables us to explore different options for spreading risk and making more flexible and responsive decisions even though the future is unknown. This strengthens our adaptive capacity.





# Dissemination of climate information using radio in Kenya

*Climate vulnerable livelihood in Garissa, Kenya © John van Mossel  
ALP 2012*

**Despite being projected to face the greatest impact of climate change, vulnerable people of the arid and semi-arid regions of sub-Saharan Africa have inadequate access to the support services and information they need to build their adaptive capacity to an effective level. Real-time meteorological products such as forecasts and warnings are highly perishable and must be disseminated rapidly in the most efficient way to the intended audience, to be of any use.**

RANET (Radio Internet) came in handy to address the existing dissemination gap. RANET is a pilot project that uses multimedia (internet, multimedia digital receivers, rural community FM transmitters, wind up radios and climate information centres) to disseminate vital weather and climate predictions to vulnerable rural communities, to enable them mitigate the effects of extreme weather and climate events. The RANET radio stations in Kenya are run by local steering committees with guidance provided by a team from the Kenya Meteorological Department (KMD). Four stations have been established in Suswa, Kangema, Budalangi and Kwale, two are in development in Isiolo and Baringo. Information centres have also been established country-wide and are housed by partner institutions like the Kenya Agricultural Research Institute (KARI).

## Content dissemination

RANET FM stations broadcast climate information every hour, presenting daily forecasts, seasonal updates and explanations of some simple climate related terms for educational purposes. Early warning information is given priority. Programs are compiled using local government officers working in key sectors such as agriculture, health, water, culture and education. Information relevant to local people and national government policies are broadcasted. All broadcasts are done in local languages where stations have been established.

RANET targets vulnerable rural communities prone to extreme weather and climate events. These include farmers, pastoralists, fishing communities, subsistence agricultural communities among others. Information disseminated is used to make decisions like when to plant and where to find water for livestock. Timely announcements over the radio ensures the information also contributes to strategic planning and reducing communities' vulnerability and risk to weather and climate extremes like flooding (e.g. in Budalangi), landslides (e.g. in Kangema) and droughts (e.g. in Suswa).

More than 350 wind up radios have been given out to communities. These radios are given to poor households, with consideration of gender balance and listening groups of youths. Listenership within the communities is estimated to be large because the radio signal coverage is 25-30 km radius.

## Impact

The local people appreciate climate and other developmental information broadcasted in their local language, terming it as very exciting and educational. They make calls to the radio stations and give their comments. The FM stations have continued to attract community members to listen in despite the presence of other radio stations due to ownership which is attributed to broadcasting done by their own children. The main challenge so far is to ensure the sustainability of RANET weather forecast services.

RANET radio has demonstrated an effective way of disseminating climate information therefore, it will be instrumental for other radio stations to replicate this practice to enable communities make informed decisions.

## Ayub Shaka

Public Weather Services, Kenya  
Meteorological Department  
[mwadali@meteo.go.ke](mailto:mwadali@meteo.go.ke)

The RANET concept was started by the African Center for the Meteorological Applications for Development (ACMAD) in Niamey, Niger and the University of Oklahoma in 1999. The project is operational in Africa (at different levels of involvement in different countries) and pilot activities are going on in Asia and the Pacific.

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## Guest Editor

**Fiona Percy**; Regional ALP Program Coordinator  
CARE International, Box 2039 - 00202, KNH, Nairobi  
**Tel** +254 20 2807000 / 4348347, ext 141  
**Email** [fiona@careclimatechange.org](mailto:fiona@careclimatechange.org)

## Editorial Team

Esther Lungahi-Chief Editor-ALIN  
Anthony Mugo-ALIN  
James Nguo-ALIN  
Maurine Ambani -ALP  
Jessica Omukuti -ALP  
**Banner photo:** Stanley Mutuma  
**Design & Layout:** Ecomedia Limited  
**Illustrator:** Shadrack Melly

Adaptation Learning Programme  
CARE International,  
Box 2039 - 00202, KNH, Nairobi, Kenya  
**Tel**+254 20 2807000 or 4348347, ext 181  
**Email** [alp@careclimatechange.org](mailto:alp@careclimatechange.org)  
**Website** <http://www.careclimatechange.org/adaptation-initiatives/alp>

**Joto Afrika**  
Arid Lands Information Network  
P.O. BOX 10098-00100 G.P.O.  
Nairobi, Kenya  
**Tel** +254 20 2731557  
**Fax** +254 20 2737813  
**SMS** +254 717032322  
**Email** [jotoafrica@alin.net](mailto:jotoafrica@alin.net)  
**Website** [www.alin.net](http://www.alin.net)

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